

# Electric Railway Journal

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**BRINGING PUBLIC RELATIONS WITHIN REACH** Of all the subjects that are difficult to make concrete and tangible, one of the worst is public relations. This term has been applied to a very complicated set of conditions, and it is as yet far from exact definition. Like others vitally interested in the electric railway industry, the editors of the **ELECTRIC RAILWAY JOURNAL** have endeavored to visualize the subject somehow so that it could, as it were, be brought down out of the clouds within reach from the ground. The natural result of this endeavor has been the preparation of an outline, at first without the idea of publication. It was later considered, however, that others might find such a compilation useful, and it is printed on page 386 in this issue for convenience of reference. The outline attempts to list answers to the "Why" and the "How" of public relations. It is not put forth as a complete syllabus but is tentative and suggestive only. In stating that public relations need definition, we do not refer to that friendly attitude or state of mind which is necessary on both sides if relations between any two parties are to be pleasant and profitable. That such a state of mind must exist goes without saying. What we do refer to are the factors which go to produce this attitude. There is no more important study to which managers can address themselves than to that of these factors. The basis of this study must be the truism that no transactions can be carried on continuously that are not profitable to both parties. The managers have then two big tasks: to insure the twofold profitableness of their business, and to convince the public of the exact conditions surrounding this business.

**ELECTRIC ROADS IN THE PRESENT STEAM CRISIS** The crisis in the steam railroad strike brings to the forefront, of course, the very serious question of what the public will do for its transportation in case there should be a serious interruption of service on the steam railroads next week. Among the substitutes, that which promises to be the most useful in this emergency are obviously the electric railway systems of the country. The electric roads are by no means as extensive, measured in aggregate amount of track, as the steam railroads, there being only about 46,000 miles of electric railway track in the United States as compared with some 387,000 miles of all kinds of steam railroad track. The electric roads also cannot approach the steam railroads, of course, in speed or weight of trains. Nevertheless, during the past fifteen years, many miles of electric railway track have been built connecting the larger cities of the country, and it is

very probable that in case of serious impairment to the service of the steam railroads owing to strikes, the electric roads can be of great assistance to the public in the transportation of both passengers and freight. It is in the north central states that the interurban electric railway business has received its greatest development. Thus, between Buffalo on the east and St. Louis on the west, and between the Ohio River on the south and the middle of Michigan and Wisconsin on the north, there is a network of connecting electric lines most of which are now doing considerable freight business in standard freight cars, in addition to a very large passenger business. In the Eastern states the number of high-speed electric interurban lines which have been built is not so large. Nevertheless, it is possible to travel from Washington, D. C., to Portland, Me., and beyond by electric cars, as well as practically all the way across New York State, and most of these electric railway companies in the East also do a freight business, although not on so extensive a scale as those in the central states. The traveling will be slower than on the steam railroads in most cases, but there is no doubt that the electric lines will be able to help out greatly both in passengers and freight in case the nation-wide strike occurs, not only in short distance travel, as in carrying steam railroad commuters in the neighborhood of the large cities to and from their business, but even in through service to a considerable extent as well.

## **EMPLOYEES BEHIND THE SCENES**

The general public has little conception of the varied classes of employees, apart from those engaged in the car service, who are required to carry on the affairs of a large electric railway system. Occasionally a group of linemen or trackmen is noticed and now and then a glimpse is had of a few power plant or substation employees, but the great body of patrons sees little of any but uniformed men. A suggestion of the large number of employees who work behind the scenes, as it were, on a large urban system, is found in the recently printed agreement of the Boston (Mass.) Elevated Railway and the Amalgamated Association as to wages and working conditions. Among these are no less than fifty-two blacksmiths and horseshoers, twenty-one blacksmiths' helpers, five brass finishers, two harness makers, ten masons, 103 machinists, thirty-four outside carpenters, seventy-five painters, two plumbers, four riggers, eight roofers, eight steamfitters, thirty-one structural iron painters, forty wiremen, 216 woodworkers, forty-nine armature room workers, two boiler



room engineers, sixty firemen, five hoisting engineers, 162 mechanics, eighty-three oilers, 183 carhouse repairmen, 267 car cleaners, thirty-six switchboard operators, twenty car shifters, seventy-eight power station men, twelve stock room clerks and many other classified workmen. Here are more than 1500 employees whose pay ranges roughly between 20 and 41 cents per hour, the great majority of whom the traveling public never recognizes as on the electric railway payroll, but who, with their dependents, represent a pretty substantial community. These figures do not show the actual percentage of what might be called non-transportation employees in the company's service, who total approximately 4000 out of roughly 10,000 on the entire payroll. It would be incorrect to say that for every motorman or conductor, guard or brakeman in the service another employee is engaged in collateral or auxiliary duties, but something like this expresses the relationship between the blue uniform men and the other employees, in a rough sort of way. When occasion permits, it is a good thing for a local public to be given some idea of the other side of the organization from that which is visible, as a means toward a better appreciation of the magnitude of the problem which the utility in question is trying to solve.

#### EDUCATING THE PUBLIC

The policy of this paper, in common with that of most of the progressive railways, is strongly in favor of publicity. Fresh evidences arise every day to indicate the necessity for continuous and patient presentation of the street railways' problems to the public.

A short while ago a street railway man was riding in a city street car in company with a man who held an official position of responsibility with a small savings bank in the city. In the course of conversation, the banker criticized the service of the company and expressed his belief that it should be obliged to purchase more modern and comfortable cars than those in use on the particular line on which they were riding. As a matter of fact the cars were poor and fully deserved the criticism. The service was about average, being neither very good nor very bad, as urban traction service goes.

The street railway man turned the conversation to matters of more immediate concern from the viewpoint of a banker and began to discuss the subject of investments. Within a few moments of his condemnation of the obsolete cars, the banker was telling the other man that his bank had refused to purchase a part of a new issue of bonds which that particular electric railway company had just attempted to float. The obvious reasons for the bank's attitude in this case was, of course, that they were not satisfied that the loan would be a safe one, despite the fact that the company in question is both conservatively financed and efficiently managed.

Just how this banker, as an ordinary citizen and user of the street cars, thought that the street railway could buy new cars when the banks would not loan it new funds for additions and betterments, is not clear. Of

course the real fact was that he never stopped to consider the railway's problem in just that light. As a man acquainted with business and financial matters, we might expect him to know better. The question is that when a man in that position does not understand nor stop to consider the fundamental economic side of the question, how can the average clerk, mechanic, laborer and professional man be expected to appreciate it?

It seems clear that it is not only to the advantage of the street railways that they should seek to make these mutual problems more public, but that it is almost a necessity for them to do so. As to whether the publicity should take the form of paid advertisements in the newspapers, notices in the cars, lectures to civic associations or any other way, is a matter of local policy. The broad underlying principle is that if the street railway wants the public to deal reasonably and patiently with it and to make allowances for its financial and operating difficulties, it must at least make the public acquainted with the fact that such difficulties exist and that the fault is not wholly on the side of the company.

#### SHORT RIDES BY JITNEY

Within recent years organized labor, through its leaders, has been closely studying the businesses from which its members draw their livelihood. In most cases this study has been prompted by a desire to ascertain the most effective and destructive methods of waging labor wars, and as advancing civilization develops new methods they are pressed into service, just as the European antagonists utilize the latest discoveries of science in their warfare on each other.

A case in point is described in an interview with an official of an electric railway labor organization, as reported in a Philadelphia newspaper recently, in which a new plan of campaign, to be followed in prosecuting the strike recently declared against the street railway company in Harrisburg, Pa., is outlined. As a matter of fact, this strike has been a failure. The cars are running again on the regular schedule, and traffic is approaching normal. The loss in travel now concerns only those workers in industrial plants whose action can be controlled through the channels of organized labor. Such people have been patronizing the jitneys. The interesting feature concerning the recent pronouncement in the Harrisburg case relates not to the strike, which the company has won, but to the prosecution of a guerrilla warfare after the main issue has been settled.

The labor union representative in this case announces that efforts will be directed to divert the short haul rider because, as he states, this is the profitable portion of the business. As every operating official knows, it is, moreover, the only portion of the business which can be handled by the jitneys without bankruptcy to themselves. On the other hand, organized labor is to encourage workmen to ride on the electric cars for long distances because, as is stated, the larger the number of people who take the long, unprofitable rides, the more money the company will lose. It



remains to be demonstrated, of course, how completely will be the control which the affiliated labor organizations can exercise in carrying out such a plan of campaign. It will require considerable instruction to workmen to enable them to segregate the unprofitable from the profitable rides. It is doubtful in most cases also whether the men would take the trouble to differentiate, even if they could.

At first glance, these tactics appear to contain a new menace to the electric railway. In the long run, however, we venture the prediction that education of this character will be helpful. If the day laborer and the skilled mechanic can be educated to the point where they realize what portion of the electric railway business is unprofitable, the information will become common property. The labor unions will find that their campaign of education has been a boomerang, for instead of hurting the companies it will, in the long run, inure to their lasting benefit.

#### SAVING POWER ON SMALL ROADS

If the papers presented at recent railway association meetings may be considered as "the straws that show which way the wind blows," there is a rapidly increasing tendency to use devices which promote the more intelligent use of equipment by motormen. Much has been published in these columns and elsewhere dealing with the theory underlying the use of such devices, and operating data representing the experience of a number of roads have been presented. Possibly, a part at least of what has been published has not been of much interest to the men who actually "run the cars," because of the technical style in which it has been written. In an article in this issue, William Arthur has stated the fundamentals of energy saving in plain every-day English. The advantages that arise both directly and indirectly from the use of energy-saving methods are pointed out, and the necessity for a fair basis for comparing the performances of the various motormen operating like cars in similar services is emphasized. He has also formulated some simple rules for "power saving," copies of which, placed in the hands of car crews, might be made the basis of an energy-saving campaign.

Many small street railway systems cannot afford—or at least feel that they cannot—the more elaborate and satisfactory apparatus and the organization necessary to secure the best results obtainable therewith. Published reports indicate, however, that on elevated roads even so simple a device as the coasting board may reduce the energy consumption 5 or 10 per cent. While elevated roads, with their fixed stopping points, afford better opportunities for the effective use of such devices than the small street railway, some saving on the latter might be effected by the use of boards or some other cheap and simple device. If boards are used it would not, of course, be necessary to locate one at every stopping point, but locations should be made at down-grade sections of track and at points where stops are frequently made. For such a device the cost in maintenance would be low, and the close personal contact between motormen and their superior officers, the absence of extremely

heavy rush-hour traffic, and the easy schedules usually maintained on small systems would tend to make the saving, expressed in percentages, comparable with those obtained on elevated roads.

There is no doubt of the widespread existence of energy-saving opportunities on large and small roads alike. The seizing of these depends upon intelligent co-operation between the men on the platform and the men in the office. The latter must furnish the former with the knowledge and the incentive to expend the electrical energy produced or purchased by the company with the same care that he spends his own cash.

#### RECONCILING WHEEL AND RAIL CONTOURS

An inconspicuous statement of fact in the report of the work done by the Engineering Association committee on standards at the recent meeting in New York City, when considering the proposed revised standards for wheel tread and flange contours, showed that this committee appreciates the necessity of the joint action of the equipment and the way committees in arriving at a standard wheel contour. Wear on both the wheel and the rail is dependent absolutely on the line of rolling contact, and if the maximum wear life is to be obtained from both, it is very necessary that the line of contact between the wheel and the rail provide as nearly as possible a full tread bearing particularly in street railway service. The standards committee therefore is to be commended for requiring that the differences between the equipment committee and the way committee regarding wheel tread contours and rail head contours be reconciled.

The recent article by R. C. Cram on curved heads for grooved-girder rails in Brooklyn, N. Y., undeniably showed that the rate of rail head and wheel tread wear was increased by load concentration. To remedy this difficulty, he proposed a curved-head rail, which would provide a full wheel tread line of contact on average worn wheels. Such a move solves the problem so far as grooved-girder rail is concerned, but the application of a curved head on a plain girder or T-rail produces an unbalanced section, and obviates one of the greatest advantages of this type of rail, namely, that it is a symmetrical section thus making either side the gage side.

C. H. Clark, engineer maintenance of way Cleveland (Ohio) Railway, has been able, however, to provide a full line of contact between the wheel and the plain girder rail by tilting the axis of the rails inward until they are practically at right angles to the wheel tread slope. No particular difficulty was experienced in tilting the rail at this angle because Mr. Clark builds his track on steel ties and arranges with the manufacturers of these to bend the ends so that they will tilt the rail at the correct angle to the wheel. Some of this tilted-rail track has now been in service more than a year, and from the beginning of service, the area of wheel and rail wear indicated that a full line of contact was being obtained. The method employed in Cleveland and the one suggested by Mr. Cram show that the way engineers appreciate the value of a full line of contact between the wheel and the rail.



# Improvement of Public Relations

## Outline of Some of the More Important Methods of Bettering the Relations Between the Railway Company and the Public

**D**URING the last few years electric railway companies have been paying a great deal of attention to methods of improving their relations with the public which they serve, and many articles have been written on the subject. To aid in the study of this subject the following outline has been prepared of the objects of establishing good public relations and of some of the methods by which this result can be accomplished.

### OBJECTS OF ESTABLISHING GOOD PUBLIC RELATIONS

- (A) To secure the maximum patronage.
- (B) To secure good treatment and popular support:
  - (I) When questions of fare increases or service changes arise.
  - (II) When questions of franchise extensions or alteration of franchise conditions arise.
  - (III) When labor difficulties confront the company.
  - (IV) When accident cases are being tried by jury.
  - (V) When competition of any kind threatens.
  - (VI) When discriminating taxation is imposed.

### METHODS OF ESTABLISHING GOOD PUBLIC RELATIONS

- (A) By giving as good service as the rate of fare warrants.
- (B) By having a clean internal corporate history as regards finances and relations with labor.
- (C) By convincing a large majority of the public that this is the case.
- (D) By having the city or a considerable number of the citizens interested financially in the enterprise.

- (A) A company tends to give as good service as the rate of fare warrants:
  - (I) Through having the franchise conditions fair to the company:
    - (a) By having a long-term or indeterminate franchise.
    - (b) By reducing the burdens under the franchise which are not directly reflected in service (such as pavement charges, excessive taxes, etc.).
    - (c) By providing an extra fare zone for very long distance riders or possibly charging for transfers.

(II) Through introducing all possible economies in the service, compatible with good service:

- (a) By studying the practice of other companies and applying the lessons thus learned where suited to the case.
- (b) By employing competent engineers and transportation officials, yet not letting administration expenses become excessive.

(III) Through providing attractive, comfortable and sanitary cars and equipment and safety features for the protection of passengers:

- (a) By maintaining a high standard of maintenance for track, cars and other equipment, so that breakdowns are infrequent and cars are always clean.
- (b) By purchasing new equipment as a substitute for old equipment when conditions warrant.
- (c) By paying regard in new and old equipment to the features that directly affect the public, like comfortable seats, good heating, lighting and ventilation, attractive exterior and interior finish, adequate and neat car designs, easy riding track, tasteful overhead work and buildings.
- (d) By the adoption of inclosed platforms and other approved safety devices.

(IV) Through providing competent and courteous train crews:

- (a) By paying a fair wage and requiring only reasonable hours.
- (b) By exercising care in the selection and training of employees.
- (c) By employing superintendents who will administer discipline impartially but sympathetically so as to stimulate loyalty in the force.
- (d) By special instruction on the subject of neatness and courtesy to old and new men.
- (e) By having the company officials set examples of neatness and courtesy for the men.
- (f) By interesting the employees in the financial results of the enterprise:
  - (1) By adopting a bonus scheme based on individual performance.
  - (2) By basing the wage rate on the gross or net receipts.
- (g) By conducting welfare work:
  - (1) By club rooms, reading rooms, restaurants, etc.
  - (2) By pensions for superannuated employees.
  - (3) By mutual benefit associations.
  - (4) By co-operative buying.
  - (5) By presents to the men at Christmas or other stated occasions.



(V) *Through fulfilling other obligations, expressed or implied, that the company owes to the public, such as in the matter of:*

- (a) Suitable operating schedules.
- (b) Maintenance of paving.
- (c) Willing settlement of just damage claims.
- (d) Prompt payment of taxes.

**(B) A company can have a clean internal corporate history as regards finances and relations with labor:**

*(I) Through publishing adequate reports for stockholders:*

- (a) By giving detailed financial statements, in comparative form so as to make examination of old reports unnecessary.
- (b) By neglecting the whims of individual auditors and using the official classification so as to permit of ready intercompany comparisons.
- (c) By avoiding such meaningless expressions as: "The property has been well maintained during the year."
- (d) By informing the stockholders as to any unusual actions of the board of directors and in general giving them, besides the annual reports, enlightening communications during the year on matters affecting the company.

*(II) Through avoiding even the suspicion of secret deals with politicians:*

- (a) By explaining fully to the stockholders all unusual financial items.
- (b) By insisting that the public be admitted to franchise and similar hearings.
- (c) By appealing to the public directly in case the city council declines to act in such improvements as skip-stops, rerouting of cars, near-side or far-side stops, etc.

*(III) Through establishing adequate depreciation accounts:*

- (a) By determining through competent authority the depreciable life of the items of property.
- (b) By maintaining a property ledger showing a continuous inventory with a complete depreciation record.
- (c) By co-operating with regulatory bodies in formulating official rules for depreciation accounting and following them when issued.

*(IV) Through paying the employees fair wages and treating them fairly and liberally along welfare lines, as explained under A IV.*

**(C) A company can convince a large majority of its public in regard to its clean history:**

*(I) Through a proper method of newspaper publicity:*

- (a) By having a publicity agent or a designated official in direct charge of press relations.
- (b) By voluntarily furnishing the newspapers through such an official with financial, operating and general data of interest to the public.

(c) By giving reporters an opportunity to inspect improvements, new equipment, etc., and furnishing them with complete facts in regard thereto.

(d) By giving reporters prompt and explicit information on points which they themselves raise.

(e) By having occasional articles written by company officials on matters about which the newspapers desire full information.

(f) By publishing occasional advertisements on:

- (1) Questions before the public.
- (2) Problems in the industry.
- (3) Announcements of fare and schedule changes, new service, etc.

*(II) Through having the leading officials prominent in local affairs as a result of:*

- (a) Active membership in civic associations and town improvement organizations.
- (b) Co-operation with the local board of trade.
- (c) Membership in social clubs.

*(III) Through having its officials recognized as men on whose word the public can rely, as a result of:*

- (a) Frank explanations of company policies.
- (b) Honest criticisms of and efforts to avoid corporate evils.
- (c) Refusal to act under cover at any time.
- (d) Insistence upon the rigorous keeping of all promises to the employees and the public.

*(IV) Through treating the complaints of the public courteously:*

- (a) By having a definite and tactful officer of the company to handle complaints.
- (b) By giving him ample authority to settle minor complaints and full information for overcoming unjust complaints.
- (c) By having him arrange in the case of major complaints a direct approach without delay to the responsible higher official.
- (d) By instilling in this higher official a sense of his duty in standing ready to serve immediately in such cases.
- (e) By having complaints solicited by newspaper, placard or billboard advertising, house-to-house canvasses or car canvasses, and having them adjusted promptly wherever possible.

**(D) A company can have a considerable number of the citizens interested financially in the enterprise:**

*(I) By encouraging local investment in its securities:*

- (a) By making some of its securities readily available to the local public through the company's own offices or through local banks.
- (b) By issuing the securities in small denominations.
- (c) By permitting the purchase of the securities on a partial-payment basis.

*(II) By having a profit-sharing agreement with the city.*



# Signals on the Scranton & Binghamton Railway System

Performance Records Show That This Road's Signal System, Which Is Used To Direct Train Movements as Well as to Protect Them, Provides a High Degree of Reliability, the Average Number of Causes of Interruption being One in 37,000 Signal Movements.



SCRANTON & BINGHAMTON SIGNALS—INTERMEDIATE SIGNAL

SINCE the Scranton & Binghamton Railway developed its method of operation by signal indication, as described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 3, 1914, the degree of success accompanying the operation of its signal system has been subject to much discussion, owing to the use of signals for the direction of trains as well as for their protection. In the accompanying paragraphs there is published a complete record of the signal performance extending over six months, including last winter. This shows that the signals have behaved in a thoroughly normal manner, an average of twelve out of 3000 trains operated being delayed during the course of a month because of the safeguards imposed by the signals. The average delay from this cause was three minutes per train.

As might be expected in an installation where so many movements are made, there have been false-clear indications, one of them appearing during the period covered by the record herein published. Yet in no case has any such failure been accompanied by circumstances that made a collision a possibility.

This disposes of the argument that, under this method of operation, a false-clear indication would be certain to result disastrously if the train movements were not controlled primarily by train orders. As a matter of fact, in no case has a false-clear indication caused a train even to enter an occupied block, but in every instance thus far the failure has been immediately caught by some employee who observed the improper position of the semaphore at the end of the block as the train left it.

During the period covered by the records the railway's schedule called for a thirty-minute service in each direction from Scranton to Brookside, which includes about 8 miles of signaled territory, while on the rest of the signaled road the service was hourly. The road and its signal system are in operation for twenty-one hours each week-day and for twenty hours each Sunday.

The signaled territory under consideration covers 22.8 miles of single track divided into eighteen blocks. Each block is arranged to include the track between a pair of passing sidings, the latter being located at intervals of about 1 mile. The home signals at each siding are of the semaphore type, and two intermediate signals of the light type are installed at about the center of the block. In general, the signal arrangement is that of the Union Switch & Signal Company's T. D. B. system with the exception that "direction indicators" have been added. The latter device is a normally unlighted, or dark, single-lens light signal mounted on a pole a short distance beyond each semaphore signal governing entrance into a block. When a train enters the block this signal will display a white light if (a) the direction controlling relays have established the proper direction of traffic for the movement of this train and (b) the semaphore signal in the rear of this train has gone to the stop position.

Motormen, therefore, are required to obtain the indication of a clear semaphore signal to enter a block, and they must have a lighted direction indicator to proceed through the block to the intermediate signal. Only one of the two direction indicators for a block can be lighted at any one time. If a train should enter one



end of a block simultaneously with another train at the opposite end, one of the two would be prevented from running into the block as far as the intermediate signals before being stopped, as would be the case with a standard signal arrangement.

Trains are permitted to advance meeting points on the authority of a clear home signal supplemented by the direction indicator and are required to wait at a stop signal for a period of time sufficient to allow an opposing train to get through the block, after which, if the signal remains at stop, the waiting train may flag itself to the next home signal in advance. In case of an extended interruption, the trains are moved by time card and train orders issued from the operating office at about the center of the line, this office being con-

The data given in Table I cover a six-month period beginning with September, 1915. The record for that month, it may be said, was an unusually unfortunate one. In practically every case of deranged signals a considerable time elapsed between the occurrence of the interruption and the restoration of the normal operation of the signals, and to this may be ascribed the larger number of interrupted signal movements which appear in the table for this period.

During the month there were six interruptions, of which one was due to the grounding of the signal mains because a broken lighting wire connected them to a telephone line. This occurred at night, and some time elapsed before the cross was located and repaired. Another of the interruptions was due to lightning, which



SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL AT PASSING SIDING

nected by telephone to the various points along the line. The feature of the operating methods, therefore, is not the elimination of the dispatcher—for whom an equivalent is provided in cases of emergency—but rather the advancement of meeting points under clear signals. A great many delays are thus eliminated.

RECORD OF INTERRUPTIONS

The record of "causes of signal interruptions," which is shown in the accompanying table, averages one cause of signal interruption to 37,000 signal movements, or three and one-third causes of interruption per month. A cause of signal interruption, it may be said here, is defined by the railway company as a derangement of the signal system in which one or more signals fail to give the proper indication. This should be differentiated from the "interrupted signal movements," resulting from causes of signal interruptions. One cause of interruption for one signal, if it is not promptly remedied, may produce a large number of interrupted signal movements, the record of the latter showing operating conditions, while the former covers only signal line, apparatus, track and maintenance conditions. Thus, in February, 1916, four causes of signal interruptions resulted in sixteen interrupted signal movements, delaying eight trains for twenty-six minutes. A little consideration will show that this information does not give the number of times that trains passed deranged signals, as those data were not considered essential for the purpose of securing an operating and signal efficiency record. A signal failure is considered only as the action of a signal in which a false-clear indication is given.

blew a high-tension fuse and affected a number of signals. A third interruption, which affected one signal for forty-five minutes, was caused by high voltage at the power house, which so affected a semaphore signal just starting to clear that a motor circuit controller was broken, and the signal failed to make the movement to the clear position.

During September, also, one power failure occurred, this being caused by a badly worn dog in a power-house circuit breaker which allowed the circuit breaker to open the primary power circuit, affecting all signals until repairs were made. Another of the interruptions was brought about by a short-circuited track section, which put one block out of commission for about four hours. This was caused by a track laborer, who, in driving a staple, so bent it as to cross certain power and

TABLE I—SIGNAL OPERATING RECORD—SCRANTON & BINGHAMTON RAILWAY

	Sep- tem- ber 1915	Oc- to- ber 1915	Novem- ber 1915	De- cem- ber 1915	Jan- u- ary 1916	Feb- ru- ary 1916
Signal move- ments . . . .	124,429	125,919	129,000	123,054	122,399	114,946
Causes of sig- nal interrup- tions . . . . .	6	3	0	2	5	4
Signal failures Interrupted sig- nal move- ments . . . . .	1	-	-	-	-	-
Trains oper- ated . . . . .	217	36	0	9	59	16
Trains delayed Total minutes delay . . . . .	3,273	3,370	3,168	3,276	3,259	3,060
Signal move- ments per in- terruption . .	36	14	0	4	12	8
Train move- ments per train stop . . .	82	46	0	8	51	26
	20,738	41,973	-	61,527	24,479	28,736
	91	241	-	819	272	382





SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL WITH DIRECTION INDICATOR TWO POLES IN ADVANCE

track circuit cables. The sixth interruption for the month was caused by blasting in a quarry near the line, flying stones breaking the 2200-volt signal main and shutting down the signals until the line was coupled up.

#### RESULTS OF BAD RAIL CONDITIONS

During the month of September, also, there appeared a false-clear indication. It was caused by bad track conditions at a point where the railway runs at one side of a turnpike. Here, the low rail was covered for some distance with dirt that evidently had been thrown by an automobile running close beside the rail. This practically insulated one of the rails from the car, preventing shunting, and the block cleared while a train was stopped on this section of rail. The improper action of one of the signals was reported by the motorman, but as a matter of fact passing cars cleared the rail of most of the dirt and corrected the condition, the trackmen completing the cleaning. This signal failure, it may be said, was the only one to occur during the six months of operation under consideration here, during which time there were 739,747 signal movements.

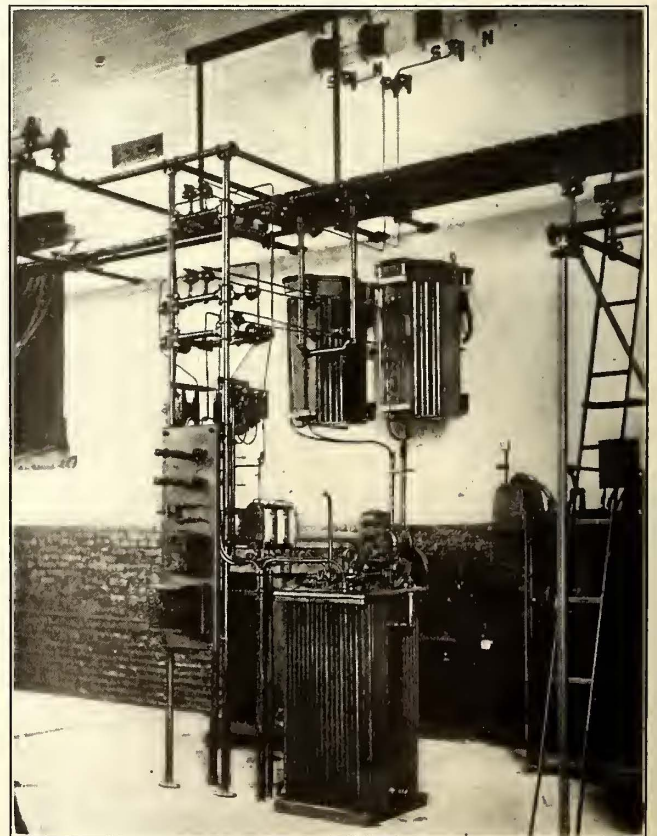
The difficulty of keeping the surface of the rail clean in those sections of track which lie alongside the turnpike mentioned was in evidence also during the month of October, when two signal interruptions occurred on successive days because of bad rail conditions. At that time the turnpike had been heavily oiled to lay the dust, and the mixture of oil and dust was carried by wagon wheels onto the track at a crossing, thus insulating the rails from the car wheels at two points. In the case of one signal interruption, a car using power over a crossing upset the balance of current flow between the two rails and blew the fuse on the track side of the relay at the nearest signal. The other interruption, primarily due to this cause, was brought about by the fact that the partly-insulated rails caused an abnormal number of partial movements of a semaphore signal with such rapidity as to cause injury to certain contacts. This left the signal in stop position and prevented it from clearing until repaired. Neither interruption involved any great waste of time in the actual clearance of the difficulty, but in each case there was some delay in getting the word of the difficulty to the signal maintainer. This resulted in one interruption causing a shutdown of the signal for about two and one-half hours, and in the other case forty-five minutes.

The third interruption that occurred during the month of October resulted in a similar effect on a signal, and was caused by a car moving slowly in a certain portion of a block under conditions such that a large number of partial track relay movements were produced. Subsequently, improvements were made in the motor circuit controller so that it would be better able to stand the strains. After a time test of this improvement, all of the signals had their controllers changed, and interruptions from this cause ceased.

During the month of November there were no interruptions or failures of the signal system, the operation being 100 per cent perfect. In December, however, there were two interruptions, one being caused by poor contacts in a control mechanism, and the other by a flaw in the metal of a brake stud which, by repeated abnormal movements of the signal mechanism, broke a pin that fastened a gear to its shaft and prevented the signal from clearing. The latter interruption lasted two hours, but since only one signal was affected the number of interrupted signal movements was small.

During the month of January, 1916, five interruptions took place. Two of them were due to trouble with the signal lines, one being a break in the 2200-volt main and the other being due to a short-circuit of a control wire with a 600-volt feeder, burning out the lamps in an intermediate light signal as well as a relay. During this month, also, there were two failures of one relay, which gave trouble intermittently for several days and which had to be replaced. The difficulty was found to be due to badly worn back contacts in the relay. Intermittent trouble also developed in one of the insulated track joints. This was traced to original but unnoticed faulty assembling, which brought about intermittent short-circuiting at the joint.

During the month of February two of the interruptions were due to snow and ice on the rail. This caused abnormally frequent movements at two signals and broke



SCRANTON & BINGHAMTON SIGNALS—VOLTAGE REGULATOR IN POWER HOUSE





SCRANTON & BINGHAMTON SIGNALS—SWITCH INDICATOR AT OUTLYING PASSING SIDING

certain connections in the signal mechanisms, thereby preventing them from clearing. The other two interruptions during February were due to wrong connections made by a lineman in repairing broken line wires.

From the foregoing detailed account of the signal interruptions it will be seen that of the twenty interruptions that occurred during the period under consideration four were chargeable to the line department. The signal department is charged with eight, of which some might have been prevented while others could not have been avoided. Two interruptions were chargeable to the power department, and one each was due respectively to unavoidable causes and defective materials. Two interruptions were caused by defective track circuits and two to bad track, the latter condition being responsible also for the one signal failure that occurred.

#### VOLTAGE REGULATION

Reference was made in one of the preceding paragraphs to the use of a voltage regulator. This device was introduced for the signal system because of the fact that the railway company's power house, which supplies both lighting and railway power, is subject to violent fluctuations of load that make it difficult to maintain an even voltage. In consequence, the 2200-volt signal mains are fed through a regulating transformer, as shown in one of the accompanying illustrations, the secondary coil being shifted in accordance with the direction of rotation of a small motor mounted above the machine and operated by the current flow induced by changes in the primary voltage. The device has been in operation for a number of months, and it maintains the voltage of the signal mains practically constant at all times, the maximum variation being between  $108\frac{1}{2}$  and  $111\frac{1}{2}$  volts.

The primary object for the installation of this regulator was to obtain more constant voltage on the 2200-volt line. Prior to the installation of the regulator, the variable load on the generators caused such wide variation in the voltage across the terminals of the lamps in the light signals as to decrease their visibility on the low voltage, and to decrease the life of the lamps on the high voltage. With the installation of this regulator it was possible materially to increase the sensitiveness of the track circuits to the presence of a high resistance shunt, such as would be encountered when a car passed over particles of dirt on the rails or when the car ran over a stretch of rusty rail.

Prior to the installation of the regulator, the track circuits were adjusted for satisfactory operation of the relays on the lowest potential on the signal mains. The relays, of course, were considerably over-energized when the potential on the signal mains assumed its highest value. Naturally, even though the shunting was sufficient on the lower value of potential, the relays would be more difficult to shunt on the higher potential. By a combination of circumstances, a car on a track circuit which had considerable dirt on the rails resulted in the one signal failure described above. The relays on the lower potentials were sufficiently sensitive to shunt even with some dirt on the rail so that it may be said that this voltage variation has been the one cause of signal failure since the signals were installed, aside from the track conditions to which reference has previously been made. Naturally, since the regulator has been installed, all of these difficulties have disappeared.

#### SIGNAL LAMP RENEWALS

In the territory protected by block signals there are thirty-six semaphore signals and thirty-six intermediate signals of the light type. Each of the semaphore signals is equipped with two lamps in multiple, making a total of seventy-two lamps for the semaphore signals. The light signals have two separate lights, one red and one green, and as each one has two lamps in multiple there are 144 lamps for the intermediate signals. Near the entrance to each block, also, there is installed the direction indicator, which is equipped with two lamps, thus adding seventy-two more lights, and this gives a total of 288 lamps on the block-sigaled territory.

This number of lamps involves somewhat less than 9000 lamp days during the course of a month, and the average number of lamp burnouts per month during the period under consideration was two and two-thirds. Of course, this figure includes all burnouts whether or not they were the cause of signal interruptions. As a matter of fact, none of the signal interruptions during the period under consideration was due to this cause.

#### MAINTENANCE ORGANIZATION

The signals are maintained by a signal supervisor, who devotes only part of his time to this work, as he has charge also of the crossing bells, power wiring, repairs to motors and wiring about machines that are used in connection with the railway company's general lighting and power business. Reporting to the supervisor is a repair man who looks after crossing bells, passenger station lighting and light repairs to the overhead construction and trolley wire, and although he is really a lineman he devotes a part of his time to the signal maintenance and repairs. Whenever heavy work is required on the signals the line gang is called upon, this being a construction gang that is engaged in erecting overhead construction for the extensions of the road which are now being built.

Operation on the Scranton & Binghamton Railway is in charge of R. W. Day, general manager; R. L. Koehler, general superintendent; J. C. Meixell, superintendent of transportation; W. R. Hornberger, signal supervisor, being directly responsible for the operation of the signal system.

In the first three months of 1916 there were in Los Angeles, according to the traffic bureau of the police department, 1840 vehicle collisions, in 1224 of which it is charged that the drivers were guilty of an infraction of some traffic ordinance. There were 389 injuries reported from these accidents, among which were 126 serious injuries and twenty-two deaths. In accidents involving pedestrians their own negligence was responsible for 50 per cent of the injuries received.



# The Present and Future Development of Interurban Railways

By F. W. DOOLITTLE

Consulting Engineer, New York, and Formerly Director of the Bureau of Fare Research  
American Electric Railway Association

Although electric interurban railways are of great economic importance to the communities which they serve, their financial returns have not been satisfactory. The author of this article analyzes the factors which have caused failure in the past and outlines conditions under which better results may be expected in the future.

IN the development of public utilities it is hard to find an instance where any project, so valuable to the community served and in general so well conceived and constructed under such apparently favorable circumstances as the interurban railway, has resulted in so many cases so disastrously to those who have engaged therein. In any new work there must be cases where human foresight is defective and where the future fails to develop the promises of the early years, but the distressing frequency with which the foreclosures and reorganizations with the accompanying shrinkage of investment have occurred in the history of electric interurban railways indicates that the early investors were unusually optimistic and not sufficiently aware of the hazards of their undertakings. In view of this situation it will be of interest to examine the facts as to the economic status of the interurban railway and its history from the standpoint of a commercial enterprise.

The primary purpose of the electric interurban railway is to provide transportation for people and for commodities and not to serve as an agency to develop communities. In so far as the development of communities may be accompanied by an increase of traffic sufficient to warrant the years of unremunerative operation, a private company is justified in devoting its funds to this purpose, but to project lines on the basis of community development alone is to doom the enterprise to failure and to make more difficult the securing of funds for legitimate railway purposes. It is probable that in no other respect were the early projectors of interurban railways so frequently led astray by their optimism as in connection with their estimates of probable future business. Unquestionably, the electric interurban has done much to develop communities but the process has in general been accompanied by such conditions as have made the results less satisfactory from a financial basis than investors had a right to anticipate, with the unfortunate result that private capital has lately looked with less favor on such investments.

## GREATEST DEVELOPMENT FROM 1898 TO 1906

The history of electric traction,\* so far as interurban railways are concerned, may be divided roughly into three parts. From 1888 to 1897 may be termed the preparatory period as during these years experiments in the application of electricity to street railways disclosed the many advantages which this form of motive power had over animal traction and the very promising, though short-lived systems of propulsion by cable. The advantages of electric power encouraged street railway

operators to extend lines into the less well settled parts of cities and eventually into suburbs. Later developments have indicated that many of these extensions were unwarranted and that they have remained until the present burdens on other and more profitable lines.

Beginning in the late nineties, for convenience let us say 1898, many lines were projected and built, first as continuations of suburban lines and later as independent projects to connect larger centers of population with outlying villages and with cities of larger size at some distance. This movement continued, and a considerable amount of mileage was constructed up to and including 1906. The financial difficulties of 1907 brought to a close the second period which may be termed that of development, and from that time to the present a very small amount of electric interurban mileage has been projected and built.

While the financial depression beginning late in the year 1907 would have restricted the development of interurban railways, it is evident that other causes have been effective deterrents, inasmuch as the recovery in other lines of industry was accomplished within about two years. In 1912 and at the present time business conditions have been excellent for the development of new enterprises, but it appears that interurban railways have not enjoyed the prosperity of other lines of commercial activity. The explanation undoubtedly lies in the fact that many electric interurban railways have not justified the anticipation of their projectors.

## STIMULUS GIVEN BY PROGRESS IN ELECTRICAL DESIGN

One of the principal causes of the rapid growth of interurban railways in the decade preceding 1907 was the possibility of high-speed operation brought about through the invention and perfection of the transmission of high voltage current, together with the development of the rotary converter and improved transformers. The progress in the art of transmission and application of electric power was rapid and held out great promise of providing a satisfactory and economical source of power. Unquestionably the later developments have justified many of the claims which electrical men have at any time made for their apparatus, but the advantages derived from the perfection of the transmission and application of electric current were allowed to outweigh certain of the handicaps to be experienced

\*For a brief but very interesting historical sketch of transportation, from its earliest recorded forms to the modern high-speed electric interurban railway, see address by Chas. T. Henry, president Indianapolis & Cincinnati Traction Company, 1911, Proc. A. E. R. A. Page 226.



by new lines. Funds for the projection of interurbans were obtained through directing attention to the development of the art rather than to the development of traffic or the difficulties thereof.

It would be interesting and instructive to trace the growth in mileage of electric interurban railways were accurate data available for the purpose. Prior to 1912 the United States Census contained no specific figures of interurban development, but data disclosed in that year indicate that slightly more than 16,000 miles out of 41,000 operating in the United States were to be classed as interurban lines. Of this mileage nearly one-half lies in the east north central division, which contains the states of Ohio, Indiana, Illinois, Michigan and Wisconsin; Ohio leading with more than 2700 miles. The accompanying table gives the mileage reported in 1912 census, together with the rank of the several states and division.

THE AVAILABLE STATISTICS ANALYZED

While not conclusive it is at least important to note that of the 7800 revenue cars other than passenger cars in service in 1912, nearly 75 per cent were in service in 1907 and only 14 per cent in 1902. In a general way this locates the period of growth of interurban railways in the five years preceding 1907, although the movement continued into the two following years. The revenue car-hours operated in these years is also sig-

nificant, there having been 92 per cent as many car-hours made by express and freight cars in 1907 as in 1912, and but 16 per cent as many in 1902 as in 1912, indicating an increase of about 500 per cent in the first five years of the decade and an increase of only about 9 per cent in the last five years. In 1907 the freight revenue of electric roads was five times as great as in 1912, but from 1907 to 1912 the revenue did not double.

It is difficult to get comparable figures from the various reports of the State commissions. The Illinois Railroad & Warehouse Commission reports miles of line constructed by years since 1900. The maximum amount of construction was in 1906, and is reported as 168 miles. This is 20 per cent of the total construction of 847 miles in the years 1900 to 1914 inclusive. In the three years 1904 to 1906, inclusive, 392 miles or 47 per cent of the total for fifteen years were reported. The Public Utilities Commission of Ohio reports total miles constructed from 1908 to 1915, inclusive, as 364, of which 216, or 60 per cent, were built in 1908 and 1909.

One of the serious difficulties in a study of interurban electric railway statistics lies in the fact that it is difficult to define with accuracy and to distinguish between urban, suburban and interurban railways. A considerable portion of the mileage of certain interurban railways, particularly those in the more densely settled part of the United States, lies in political subdivisions which, while termed town or township organizations, are quite comparable to the villages and other incorporated municipal divisions of the Western States. Another difficulty is met in connection with the mileage of interurban railways lying within the corporate limits of the various municipalities served. Further, it is not always clear on what basis an electrified division of a steam railroad is to be considered. A part of the lines of the Long Island Railroad Company lying in the Borough of Queens has a traffic very similar to that of New York, Westchester & Boston and of the San Francisco-Oakland Terminal Railway. The latter is generally classed as an interurban electric railway. The Westchester is in many respects a suburban electric railway, although it serves to connect several cities of considerable size with New York. The electrified division of the Long Island Railroad is not usually considered to be an interurban railway, although the difference between it and some others which are so classified is not obvious. In the general use of the term it is probable that the classification "interurban" is associated with an electric railway system such as the Illinois Traction or the Pacific Electric Systems or those systems in Indiana and Ohio which, though having less mileage, are nevertheless typical interurban developments. A road such as the Bay State Street Railway Company is an interesting variant. It has resulted from the consolidation of a large number of small urban systems in adjacent communities.

Due to these variations in type, accurate and consistent definitions are difficult, but for the present purposes the following will be considered as essential and characteristic features of the electric interurban railway. Car mileage is made chiefly outside of city limits. The lines serve in general more than one primary center of population as distinguished from a suburban system which serves in general one primary center and one or more secondary centers of population. The terms primary center and secondary center as here used are relative and correspond roughly to the usual designations "terminal" and "subterminal." In the past it would have been of assistance in framing a definition of the interurban railway to point out that a distinction between an electric interurban and an electrified division of a steam road lay in the fact that the latter

INTERURBAN TRACKAGE  
1912 Census

Geographic Division	Miles	Rank	Per Cent of All Electric Railway Track	Rank
Total	16,366	..	39.9	..
East North Central	7,193	1	60.9	1
Middle Atlantic	3,359	2	34.4	2
Pacific	1,825	3	43.6	3
New England	1,388	4	26.2	5
South Atlantic	856	5	28.9	5
West North Central	821	6	26.5	6
Mountain	338	7	33.6	4
West South Central	322	8	23.4	8
East South Central	164	9	12.7	9
State:				
Ohio	2,747	1	67.5	4
Indiana	1,777	2	77.2	2
New York	1,617	3	35.1	21
Pennsylvania	1,575	4	38.2	19
Illinois	1,343	5	43.0	16
California	1,095	6	42.0	17
Michigan	911	7	60.5	6
Massachusetts	796	8	26.4	28
Washington	428	9	41.3	18
Iowa	427	10	53.1	9
Wisconsin	414	11	51.4	10
Oregon	301	12	55.3	7
Maine	273	13	50.9	11
New Jersey	268	14	20.3	31
West Virginia	257	15	63.5	5
Kansas	243	16	53.8	8
Maryland	234	17	33.7	23
Texas	200	18	27.9	25
Connecticut	174	19	17.4	32
Colorado	134	20	28.6	24
Virginia	132	21	23.5	30
Kentucky	127	22	25.7	29
Oklahoma	109	23	43.1	15
New Hampshire	107	24	43.3	14
South Carolina	90	25	44.4	13
Utah	90	26	34.5	22
Missouri	83	27	8.3	39
Idaho	69	28	77.4	1
Georgia	65	29	14.8	33
North Carolina	52	30	27.4	27
Minnesota	39	31	7.0	43
Vermont	28	32	27.5	26
Tennessee	28	33	7.5	42
Nebraska	26	34	10.5	36
Arizona	17	35	37.7	20
Florida	15	36	9.1	38
Louisiana	14	37	4.7	44
Wyoming	11	38	48.0	12
Rhode Island	11	39	2.8	45
Delaware	11	40	12.0	35
Mississippi	9	41	7.8	41
Nevada	8	42	70.7	3
Montana	8	43	7.9	40
North Dakota	4	44	13.8	34
New Mexico	1	45	10.4	37



interchanged equipment with the steam roads, but this distinction is gradually disappearing.

Owing to the difficulty of definition and classification pointed out above, there are practically no regularly published statistics available, concerning the financial and operating conditions of interurban railways as distinct from other types of electric traction. Various items appear, of course, from time to time in the *ELECTRIC RAILWAY JOURNAL* and other technical publications, and in financial journals, such as the *Commercial & Financial Chronicle* and *Wall Street Journal*.

An examination of these various sources of information furnishes some interesting data concerning the number of receiverships of electric interurban railways, together with the mileage and outstanding securities involved. For the past seven years the *ELECTRIC RAILWAY JOURNAL* has published early in January of each year a statement showing the extent of receiverships of suburban and interurban railways during the preceding twelve months. The accompanying table is summarized from this source:

ELECTRIC RAILWAY RECEIVERSHIPS IN SEVEN YEARS—1909 TO 1915

Type	Length of Line		Outstanding Capital Stock		Securities—Funded Debt	
	Miles	Per Cent	Amount	Per Cent	Amount	Per Cent
City lines . . . .	1,374	34	\$71,418,500	36	\$152,791,990	60
Suburban and Interurban Lines . . . .	2,631	66	127,984,700	64	100,826,875	40
Total . . . . .	4,005	100	\$199,403,200	100	\$253,618,865	100

#### UNDUE OPTIMISM THE CAUSE OF MANY FAILURES

The financial difficulties here outlined are to a considerable extent the result of over-development and of an unwarranted optimism as to the traffic which was or would become available. A more detailed study of the causes indicates that the almost complete failure of electric railway construction, begun after the financial depression of 1907 and 1908, is due to a variety of causes in addition to those already pointed out. Failure to earn results, both from high costs and low revenue, and in the case of interurban railways, both factors are in evidence. A very important and frequent cause of financial difficulty is that fixed costs have exceeded the preliminary estimates. This situation arises, of course, in many lines of business, but it has been particularly true in the case of the interurban railways, due to the fact that in making preliminary estimates there has been a relatively small amount of information available. It is further worthy of note that there are but few industries upon which it is possible for communities to place such large burdens as have been repeatedly placed on electric railways. An interesting example of the fact that costs may frequently largely exceed estimates may be found in the case of the Philadelphia & Western, which it was proposed to construct for some 10 miles west from the western part of the city of Philadelphia from the proceeds of a bond issue of \$1,500,000, principal amount to be sold at 90 per cent of par. After construction was completed it was found that more than \$4,000,000 cash had gone into the property.

The undue optimism which underestimates cost of construction and fixed charges is also in evidence in connection with operating expenses. It has been the common experience in all lines of industry that the cost both of labor and material has increased largely during the last fifteen years. Many interurban lines proceeded with construction at a time when the plans they were adopting had not been sufficiently tested to warrant the assumption that the results could be regularly achieved. A frequent burden of expense to those in-

terurban roads which are the result of the consolidation of a number of small roads arises from the varying equipment and standards of the several lines combined. It has been found that powerhouses were not well located for the economical production of power, and that the size of the units was not economical for use in connection with the combined properties. Similarly the location of carhouses and repair shops, which may have been advantageous in connection with the property for which they were originally built, proves a handicap to operation when the properties are later consolidated.

In addition to the fact that expenses have greatly exceeded the original estimates it is of importance to note that revenues have invariably been less than estimated. This is due, in part, to a slower rate of development than had been assumed and in part to the construction of lines and operation within territory which is fundamentally deficient as a producer of traffic. The writer hopes, at some later time, to have an opportunity to present the results of a study of the general subject of estimating future business. Certain conclusions only need be pointed out at this time.

Estimates as to future population are distinctly unreliable, and comparison with the growth of towns apparently similarly situated is unwarranted. Estimates as to the probable traffic to be developed are likewise unreliable when based on a comparison of gross revenue per capita received by other lines in the territory they serve. If any one cause for the failure of electric interurbans to earn satisfactorily is to be emphasized it is this, that neither population nor revenue per capita can safely be estimated on the performance of other communities.

#### COMPETITION MET FROM STEAM RAILROADS AND AUTOMOBILES

Unexpected competition has been met with from steam roads which, with increasing density of passenger traffic, have been able to operate more frequent trains and thus attract to themselves certain passenger traffic which had been counted on for the interurban lines. In the meantime, passenger rates on steam lines were generally reduced from 3 cents to 2 cents per mile. This took away from the interurban its advantage from the lower fares, as it has not been found possible to operate at a rate much below 2 cents per passenger mile.

Within the last few years the good roads movement and the increased use of automobiles has introduced a serious type of competition. In the territory of one of the interurban companies in New England there were, early in the summer of 1916, 26,000 automobiles registered, exclusive of those in the principal city served by the company. If these 26,000 automobiles take but 10 cents a day from the interurban its revenues are affected to the extent of nearly \$1,000,000 a year. Nor is the competition for the passenger business the only serious result of the increased ownership and use of the private automobile. In certain localities express and freight service is regularly given by motor trucks and vans. These combine high speed on the road with short delays at terminals and due to the fact that they rely on others, notably the electric railway companies, to maintain the streets and highways for their use, they are able, under certain circumstances, to furnish service at a less rate than it can be rendered by the interurban. From the standpoint of a competitor, the automobile truck has distinct advantages in that it can make its charges to those cities, also receiving electric interurban service, sufficiently less to attract business, while in other communities where electric lines do not run the auto truck can charge a rate sufficiently high to offset any loss that might accrue on its competitive



business. A regulated utility does not have this opportunity. It is very likely that, within the next few years, much more attention will be given to the question of construction and maintenance of highways than has been given to it in the past. At the present time many cities and states are finding that the so-called permanent roads which they have constructed are wearing out before the bonds issued for the original construction have matured, the life of the highways having proven to be much shorter than was anticipated. Quite likely some effort will be made to place the burden of maintenance of highways more largely on motor vehicles, which are the chief destroying agency. Such a development would, of course, limit to some extent the competition experienced by electric lines from motor vehicles.

One difficulty not foreseen by the early projectors of interurban lines has been found in connection with the acquiring and operation of terminals. Many communities have been unwilling to permit the delivery or carriage of express and freight to and through the business districts over the lines of electric railways, and for this reason the development of freight and express business has been greatly retarded. The Illinois Traction System has met this difficulty in certain cases by the construction of belt lines located outside of the city limits. Such lines serve not only to avoid the restrictions imposed by the ordinance, but also provide excellent sites for the location of industries. These belt lines intersect the steam lines entering the city, and the traction company is able, by means of interchange agreements, to serve as either originating or delivering carrier for shipments handled in connection with the steam lines as well as handle traffic between points on its own line.

The increase of passenger fares on certain interurban railways during the past few years has served to make this business show smaller losses and is a recognition on the part of regulating bodies, where such have jurisdiction, that the original rates of fares of interurban roads were too low. In addition to the problem of finding satisfactory and adequate terminals for the handling of other than passenger business, freight business has been retarded in growth by rate schedules which for various reasons have proved to be unbalanced. A few interurbans have suffered a decline in revenues from a decline in business prosperity of the region served. This is particularly true in the case of certain lines in operation in the Northwestern States. Here a very marked activity in commercial lines was succeeded a few years ago by a very marked decrease, and in a number of communities by a considerable decrease in population. Roads which were built to serve these communities have, of course, suffered severely for this reason.

In 1915 the steam roads in the United States hauled a ton of freight 9 miles for every passenger carried 1 mile, and they received \$3 of freight revenue for every dollar of passenger revenue. They also hauled a freight car 6 miles for every passenger car 1 mile. This indicates that the bulk of transportation in the United States is freight transportation, and suggests that the interurban, which is fundamentally in competition with the steam roads, as a carrier must develop its freight business. In Ohio, where the interurban development is typical, the revenue from passenger fares, together with that from baggage and parlor and special cars, was \$16,000,000 in 1914, while that from express, milk and freight was only \$1,800,000. The Illinois Traction System in 1915 was receiving only about 20 per cent of its revenue from freight service. As has been suggested above, franchise restrictions account, in part,

for the apparent underdevelopment of the freight business. A further factor is the difficulty which electric lines have had in effecting interchange, joint rate through billing and switching absorption agreements with steam lines.

In recent years, however, the Interstate Commerce Commission has taken a hand, and the electric lines, backed by shippers and commercial organizations, have been able to make satisfactory arrangements for entering the freight business on the same basis as the steam roads.

Thirty years ago many of the shorter steam lines found themselves in the present situation of the electric lines. The solution of the problem for them differed somewhat, and they are now found as a part of larger systems, having been acquired after their inability to get favorable traffic agreements with their larger connections had forced them into receiverships.

#### POSSIBILITIES OF RELIEF

The place of the electric interurban in the economic scheme of the country is that of a transportation agency and not primarily that of a device for promoting growth of communities. In so far as it may be self-supporting as a transportation agency, it may serve the other purpose as well, but privately owned it must earn or go out of business. In many cases in the past it has not earned and has been forced to accept a large shrinkage in value in order that it might continue to operate. Even with these measures, many roads are still in doubtful condition, and will be until they receive some measure of relief. The form that this relief may take must in general be that of increased fares for passenger traffic and of a better adjusted scheme of rates for freight business so arranged as to secure greater diversity of traffic and adequate terminal facilities for freight carrying roads. This will tend to increase the density of traffic and to avoid the serious seasonal variations now met with.

### Montreal & Southern Counties Railway

St. Cesaire-Granby Extension Forms a New Milestone in Canadian High-Speed Electric Railway Development

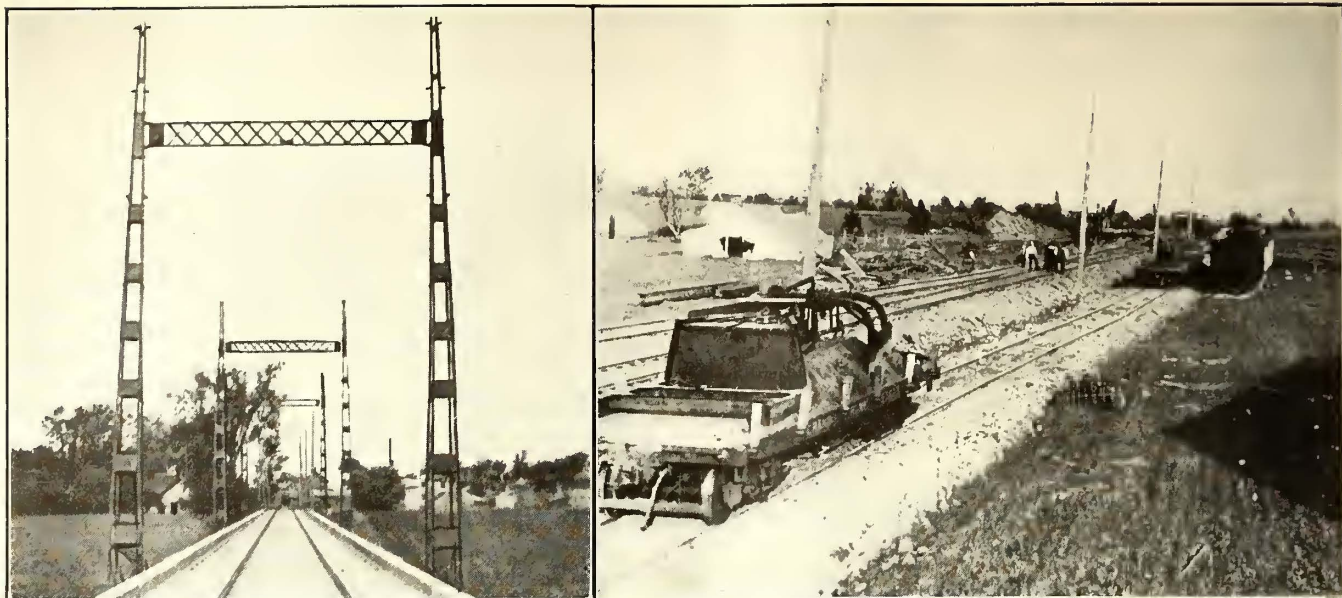
**A**NOTHER rung in the ladder of development undertaken by the Montreal & Southern Counties Railway has just been added by the placing in operation of the new 16½-mile extension from St. Cesaire to Granby. This new line, which marks a milestone in high-speed electric railway development in Canada, was placed in operation on April 30, 1916.

The Montreal & Southern Counties Railway is a suburban and interurban railway, connecting the south shore of the St. Lawrence River with Montreal via the Victoria Jubilee Bridge. The interurban arm of the development stretches in an easterly direction for a distance of 47.5 miles through the counties of Chambly, Rouville and Shefford, the present terminus being Granby. A description of the older portion of the line together with a map of the region was published in the *ELECTRIC RAILWAY JOURNAL* for March 28, 1914, page 702.

From a limited service inaugurated in 1909 between Montreal and St. Lambert, a distance of 3½ miles, extension after extension has been added until at the present time a majority of the municipalities of the south shore have been brought into such close communication with Montreal through frequent service as to make commuting a pleasure.

Construction work on the new extension was begun





MONTREAL & SOUTHERN COUNTIES RAILWAY—OVERHEAD CONSTRUCTION OF YAMASKA BRIDGE; ALSO VIEW SHOWING METHODS OF TRACK CONSTRUCTION

in October, 1913, when a contract was let for the construction of the concrete piers for the steel bridge across the Yamaska River at St. Cesaire. This bridge, which is of the deck girder type, is 240 ft. long and is supported on four piers spaced 80 ft., center to center. The steel work was supplied and erected by the Hamilton Bridge Company of Hamilton, Ont.

In the spring of 1914 a contract was let for the construction of the roadway. Work was commenced May 25, 1914, and sufficient force was employed to complete the work and place the road in operation by Oct. 15 of the same year. On Aug. 5, however, all construction work was suspended due to England's declaration of war, and it was not resumed again until May 19, 1915, from which date the work was carried on uninterruptedly until its completion Dec. 12, 1915.

#### LINE CONSTRUCTION

The type of construction used on this section is similar to that employed on the previously electrified extensions. The bonding consists of No. 0000 concealed type triplex bonds with  $\frac{7}{8}$ -in. terminals for compressing into the web of the rail. The overhead construction is of the standard catenary type with  $\frac{7}{16}$ -in. Siemens-Martin grade stranded galvanized steel messenger cable, from which, at intervals of 15 ft., is supported a No. 0000 American standard grooved hard-drawn trolley wire. The hangers are of the floating type, especially designed to absorb shocks, and consists of a three-bolt malleable-iron Detroit ear, to which is riveted a  $\frac{3}{4}$ -in. wide by  $\frac{1}{8}$ -in. thick strap-iron hanger.

Within the town of Granby the construction is cross span with 28-ft. steel poles set in concrete. The remainder of the line is constructed with 40-ft. cedar poles 7 in. in diameter at the top. On tangent track the poles are set 150 ft. apart, while on curves the spacing is either 75 ft., 90 ft. or 105 ft., according to the degree of curve. The minimum clearance between poles and rail is 6 ft. on tangent track and 6 ft. 6 in. on curves. Bracket type construction was used wherever possible. A 10-ft., T-iron bracket on which is mounted a malleable iron pin and porcelain insulator carries the messenger wire. The messenger wire is allowed to ride free in the recess in the insulator, thus permitting free adjustment of line between anchors, which are located a half

mile apart. Throughout the yards and on a number of the curves cross-span construction is used.

Supplementing the trolley wire throughout the entire distance is a 816,000 circ. mil aluminum feeder, with taps every quarter mile. The feeder is carried on glass insulators with oak pins, which in turn are carried in  $3\frac{1}{2}$ -in. x  $4\frac{1}{2}$ -in. x 4-ft. B. C. fir cross-arms. On all curves double cross-arms are used, and the wooden pins are replaced by malleable iron ones. The feeder taps consist of No. 00 stranded weatherproof wire, a four-bolt aluminum clamp being used to attach it to the feeder. A Garton-Daniels lightning arrester is installed at each tap.

On the top of the same poles which support the trolley feeder and telephone is carried the 25,000-volt, three-phase transmission line. The insulators are supported on steel pins with porcelain bases. No. 4 B & S gage copper wire is used for transmission and No. 8 B. W. G. galvanized-iron wire is used as ground wire. The ground wire is grounded every quarter mile.

The telephone dispatching system already in use was extended from St. Cesaire to Granby. The line wires are No. 10 B & S gage hard-drawn copper, and are carried on side blocks. This line is transposed every third pole in order to counteract the effect of induction. The instruments are of the Northern Electric Company selector type.

#### BUILDINGS

A substation equipped with three 185-kva. step-down transformers, a 400-kw. synchronous motor-generator set, and the necessary control apparatus for converting the 25,000-volt, 63-cycle alternating current to 600-volt direct current, was constructed just outside of Granby.

At Abbotsford the company erected a station building to provide accommodations for the passenger, freight and express traffic. A three-story brick block was purchased at Granby, the main floor and basement of which is used for station purposes.

The work of electrification was carried on by the company itself under the direction of G. J. Meyer, chief engineer and general superintendent. Other company officers are: E. J. Chamberlain, president; Frank Scott, vice-president; J. A. Yates, secretary, and W. B. Powell, general manager.



# The Fundamentals of Power Saving

The Author Explains the "Why" of Power Saving in Simple Language, Shows that Power-Saving Methods Save Brakeshoes, Reduce Load Peaks and Increase Safety, and Formulates Rules for Power Saving by Motormen and Conductors

By WILLIAM ARTHUR

New Haven, Conn.

AT FIRST blush one would expect to find that a process so common as the starting, running and stopping of a train or trolley car would long ago have been reduced to an exact science, and that the possibility of saving power by attention to the engineer's or motorman's method of notching up and braking would be quite limited. Yet the reverse is true. If left to themselves few motormen will handle a trolley car in an efficient and economical manner. They do not understand the basic principles—"the reasons why"—of economical car operation, and usually no incentive is held out to cause them to change their present wasteful methods.

In what follows, effort will be made to state in simple terms the fundamental principles governing efficient trolley car operation; it being understood that in general most of what is said applies equally well to local services on either steam or electric railroads—in fact, to any service requiring frequent starts and stops. In a technical sense, much has already been written on this subject. However, many of those most interested in power-saving methods—inspectors, foremen, instructors, chief motormen and others—have usually little time or opportunity wherein to study the more abstruse presentations

of the subject, and the present article is written with these men in mind.

## FUNDAMENTAL PURPOSE OF CAR OPERATION

Right at the beginning it is well to define why trolley cars are operated at all. Their fundamental purpose is to transport the public safely, comfortably, conveniently and as swiftly as the local needs demand. In doing this, car equipment must not be abused. No efforts at saving energy will be countenanced which prejudice any of these primary considerations. As we shall see, these requirements do not necessarily conflict with economical operation, but rather, in most respects, are its natural accompaniment.

## HOW CAN POWER BE SAVED?

Let us ask ourselves the following question: Suppose it to be assumed that a motorman is required to operate a car between two points a quarter-mile apart. How can he make the trip with the least expenditure of energy? The answer depends entirely upon the time allowed.

Case A.—Suppose that there is no time limit. Obvi-

## Rules Relating to Methods of Power Saving

A motorman can save power by attention to the following:

1. Be alert, and whenever possible have the brakes off, ready to start the moment you get the bell.
2. Notch up at as fast a rate as a proper regard for safety, for the comfort of the passengers, and for the care of equipment, will permit. Endeavor to avoid a jerky start; gather speed swiftly, yet smoothly. If likely to make a very short run, notch up to full series quickly; wait for a few seconds before moving to the parallel notches. This both saves energy and reduces the draft of power required from the power station. Move to the parallel position only as often as it is necessary to maintain the schedule.
3. Shut off power as soon as possible, but not so soon as to cause you to lose time.
4. Coast for as long a time as possible.
5. Apply the brakes at as late a time and at as low a car speed as is possible, having proper regard to safety and to the need for stopping at the proper place.
6. When braking, do so at as high a rate as is possible, having regard for the comfort of the passengers. Slow down the car without jerks. Whenever possible, make one application do the work. Ease the brakes a little just before the final stop. This will avoid a jerk.
7. Avoid unnecessary stops; for instance, when coming up behind a team,

if there is a chance you may be stopped, at once shut off power and coast up to the obstruction, sounding your bell loudly as you approach. The chances are that very often you will not be forced to stop at all, and you will have saved power. To do this requires that you keep a good lookout for possible obstructions.

8. In stopping to pick up passengers, stop at the right place; otherwise, the passengers will have to walk some distance, and time will be wasted. Remember that time wasted in the end means energy wasted.

9. Whenever necessary, do your part to help the passengers in and out of the car. This will shorten the stop and so save both time and energy.

10. Report promptly any car which is

A conductor can save power by attention to the following:

1. Be alert. Remember that the total energy used by a car depends almost as much upon how you do your part as it does on how the motorman does what is expected of him.
2. Avoid delays of all kinds. Remember that time wasted at any point in the run is, in the end, energy wasted.
3. Make the stops as short as possible, having regard to the safety and convenience of the public. Economy must begin only when safety has been assured, but it should begin then. Where necessary, assist the passengers

in any way defective. Report a car which seems to start too slowly or which does not run freely. Report defective or weak brakes. Report dragging brakes. Such reports will make for greater safety and better economy in operation.

11. Report any sections in the run or places at which you regularly meet obstructions, or have to run slowly, due to low voltage or other reasons.

12. Avoid arriving at your destination or meeting point ahead of schedule time. The only way you can have done this was to have used more power than was necessary.

13. Avoid delays and lost time in every way, having due regard to other considerations. Remember at all times that time saved is, in the end, energy saved, and that time wasted is energy wasted.

in and out of the car. This is good policy, and will save both time and power.

4. Give the motorman a clear signal just as soon as you are ready to have him start.

5. As soon as the car starts, call out in a clear voice the name of the next street or stopping point, so that as early as possible passengers may signify their desire to stop. Your bell in time will often prevent the motorman from throwing his controller handle over to the parallel position unnecessarily, and so you will have helped to save energy.



ously, then, the most economical operation would be for him to start the car, and then when it has gained speed shut off power and coast until the car stops, judging the speed at which power is shut off, so that the stored energy will just carry the car the required distance. By this plan the total energy input to the motors, except that wasted in resistance, is usefully utilized for propulsion, *i.e.*, in overcoming resistance to car motion. If, however, power is held on too long the speed will rise higher than is necessary; the run will be made in shorter time than before, and the car will over-run the stopping point unless the brakes are applied, *i.e.*, unless the extra energy put into the car is absorbed at the brakeshoes.

*Case B.*—If the motorman be told to make the run in ten seconds time less than before, he obviously can only do so, assuming the same acceleration rate, by keeping power on longer and applying his brakes to make the stop. In other words, time is gained at the expense of energy consumption.

*Case C.*—If, however, he again repeats the run and accelerates sufficiently fast, he can shut off power earlier than before, and then coast to a stop, making the trip in the same decreased time as before, but without using the brakes. In other words, the required ten seconds can be gained by correspondingly quicker acceleration and without wasting energy at the brakeshoes. If in the cases A and B the motorman had already accelerated the car at the highest practicable rate, then the saving in time (ten seconds) in case C could have been made only by keeping power on longer and using the brakes.

#### EFFECT OF LOSING TIME AT STOPS

If in maintaining a certain schedule the motorman loses time—say, in responding to the bell or in notching up or in braking at too slow a rate—he wastes energy to the same degree, because the actual running time has been decreased. If the conductor loses time in giving the signal or in other ways, he causes energy to be wasted proportionately. In this matter we are apt to consider the motorman too much and the conductor too little. Economical car operation depends upon the team work and joint efficiency of both.

From what has been said, it will be clear, after a little thought, that for any given schedule, other conditions remaining the same, the following relations exist:

(A) As the acceleration rate increases, the time power needs to remain on decreases; the coasting time increases, the braking time decreases, the maximum speed is lowered (for short runs), and the energy consumption is lowered.

(B) An increase in braking rate will produce the same general result as an increase in acceleration rate.

(C) The effect of a change in the length of stop is exactly similar to that caused by corresponding changes in either the acceleration rate or the braking rate.

#### MONEY SAVING DUE TO POWER SAVING

The difference between the least and most efficient possible car crews, in practice, is usually found to be represented by almost 50 per cent saving in energy consumption for the same service. This has been repeatedly demonstrated by careful tests and affirmed by many independent observers.

Suppose that the inefficient crew uses 3 kw.-hr. per car-mile and the efficient crew only 1.5 kw.-hr. for same service, *i.e.*, 50 per cent reduction as above; then assuming an over-all efficiency from trolley to busbar of 80 per cent, and with power at 1 cent per kw.-hr., poor operation will waste approximately \$4 per car per day. This is a considerable percentage of the crew wages. The average saving to be made on any ordinary city system is, of course, much less than this, for all car

crews are never so poor as the poorest, nor can they all be trained to reach the high point of efficiency attained by the best operators. It has, however, been repeatedly demonstrated that large savings can be made, and by proper means, steadily maintained.

Right here it might be said that up to a certain point passengers do not experience discomfort from high acceleration and braking rates. Discomfort arises more from jerky changes in the rate. Uniform acceleration or braking, even at rates as high as 2 m.p.h.p.s. or more is not uncomfortable, whereas sharp variations, say from 0.5 to 1.5 m.p.h.p.s. and back again, are quite uncomfortable. For years the writer traveled daily on a railway where acceleration rates as high as 2.5 and even 3 m.p.h.p.s. were common practice, and the public experienced no appreciable discomfort. These rates are unusual, however, and in any case trolley cars are rarely equipped with sufficiently powerful motors to make such rates possible, nor with ordinary city schedules are such high rates necessary. Economical operation can be realized by using reasonably high acceleration and braking rates. Nothing more is necessary.

The question now arises: How can we insure that the motorman and conductor operate the car so as to take advantage of these opportunities for saving energy; and, at the same time, how can we compare the relative efficiency and team work of two or more car crews operating similar services from day to day?

#### INSTRUCTION NECESSARY

The first thing to do is to give them suitable instruction, explaining in simple language the principles involved. This can be done through personal instruction by some properly qualified inspector, or by a series of lectures, at which, by the aid of a blackboard, 100 or more men can be taught at one time, or by the issuance of a small booklet of instructions on "Saving Power" distributed to each man concerned. Any or all of these methods would help to teach the men "how." Instruction, however, of itself is not enough. Experience has invariably shown that the gains which follow a power-saving campaign based on instruction only are temporary in character and disappear gradually when the first enthusiasm has passed. To make the gains permanent and to stimulate and retain the men's interest, it is necessary to have some means of comparing, on a fair and indisputable basis, their efficiency from day to day, and publishing at weekly or other intervals an efficiency record listing the relative standing of each man. How can this be done?

#### DEVICES FOR CHECKING MOTORMAN EFFICIENCY

It is obvious that through the use of suitable recording apparatus we could compare the men's relative all-day efficiencies, having as a basis any one of the three elements: power-on time, coasting time and braking time. Three types of apparatus are already available for this purpose, embodying each of the three principles above outlined, respectively.

In comparing men by the first method it is convenient to do this directly, and, by the use of a wattmeter or an ampere-hour meter, measure the actual energy input rather than the time element.

The second method is that utilized in the coasting time recorder.

The third method, recently developed by the writer, in one form simply records braking time. Since the energy wasted is chiefly that thrown away at the brakeshoes, it follows that by recording braking time the desired efficiency comparison is simply and easily made.

Each method possesses certain advantages and disadvantages, which, however, need not be here discussed.



The point may be emphasized, however, that no matter how the efficiency check is made—so long as it is made upon some fair and effective basis—the net effect upon motorman and conductor is exactly the same. Recording devices of themselves do not save energy, but in each case they force the motorman to pursue the correct methods of operation at each part of the cycle; otherwise he gets a bad record.

#### SAVINGS OTHER THAN IN POWER

It should be remembered that the saving in energy is only one of the points of advantage which result from a power-saving campaign. The other points may be briefly summarized:

1. The saving in brakeshoes is considerable, and from experience at many places appears to average about 33 per cent.

2. On large systems peak loads are reduced and power station, transmission line, substation and feeder-copper capacity are increased in proportion to the power saving. Extensions to existing plant may therefore be postponed. Voltage conditions are improved.

3. The average load on car motors is usually reduced. This is in contradiction to the first impression one is apt to have, namely: that quicker acceleration will necessarily increase the load on the motors. Analysis shows that although the momentary load on the motors is increased, the average motor heating is decreased. This is equivalent to a gain in motor capacity to the same extent, or, put another way, is equivalent to adding new cars to those already operated. The full advantage of this, however, obviously can only be realized on routes requiring many cars to maintain the headway.

With the increase in motor capacity referred to above, the schedules may often be "jacked up" proportionately without exceeding the normal safe capacity of the motors. This leads naturally to the next consideration, which in certain situations may be of more importance than the consideration of the amount of power which is saved.

4. As an average figure, approximately 55 per cent of the total expense of operating a trolley system consists of items which are affected by a change in schedule speed. The platform expense alone is usually about 30 per cent of the total operating expense. This expense and the number of cars required to maintain a given service are, of course, reduced proportionately to the increase in schedule speed.

In connection with this there is another point: In situations where the public demand is for quicker service, necessitating higher schedules, if the men have previously been operating at high efficiency, such new schedules can only be given at the expense of higher energy consumption per car-mile, but having once, by the use of efficiency recorders, forced the men at all times to operate in a manner best calculated to save power, we have at the same time automatically trained them to get the best that can be gotten out of any trolley car, or conditions as a whole. The result is that if it becomes necessary to raise schedule speeds, we can do so simply by shortening the coasting period and correspondingly increasing the braking period, *i.e.*, having once by the use of a recording device taken the "slack" out of a system we can utilize this slack either to save power or to raise schedules—whichever may be of greater importance in the particular case. In any given case the most economical schedule speed will, of course, be that at which the sum of power expense and platform (and other speed-affected items of) expense is a minimum. Usually, however, the problem is simply that of saving power; and, as we have seen, the economies which are

to be made in this direction alone are distinctly worth while.

5. The effect of correct operation upon safety must not be overlooked. As we have seen, the most efficient motorman is the one who on the whole is able to make his schedule with the lowest maximum speed, *i.e.*, by efficient manipulation he would each time find it unnecessary to reach the high speeds demanded by the inefficient operation of a poor motorman. This lower maximum speed makes for greater safety.

In addition, the efficient motorman, running as he does for a greater percentage of his time with power off, on the average has his car under better control. This again makes for greater safety. On the other hand, if effort is made to shorten the stop too much the danger to passengers increases. Safety first and always should be the slogan.

With the foregoing principles clearly in mind, a set of rules to form the basis of instruction to motormen and conductors on trolley cars has been tentatively drafted. They will, of course, need modification to suit local conditions. It is to be noted, however, that in every instance the element of time enters into the rule. This is striking evidence of the fundamental principle herein developed, that in the end power saving resolves itself into time saving, and time saving into power saving.

### Report of New York Bureau of Franchises

The report of the Bureau of Franchises of the Board of Estimate and Apportionment of New York City for 1915 contains schedules showing the applications presented to the board during the year and the action thereon or the present status of each case. The question of additional motor-bus operation in Manhattan, which has not yet been settled, is reviewed in detail. Owing to the financial depression during the latter part of 1914 and early in 1915, applications for franchises were fewer than before. Only four franchises were granted, one being a grant to the Long Island Railroad in exchange for rapid transit easements.

The bureau has included in its report a résumé of its work since its organization in 1905, accompanied by tables and charts showing all matters passed upon during this period. As the type of street railway cars has undergone a decided change in the last few years, photographs are presented of the various styles used by the companies in the different boroughs.

Between 1905 and 1915, 172 applications for franchises were presented to the board, of which seventy-eight were granted, sixty-three withdrawn, filed or denied, and thirty-one are still pending. The greater number of the franchises granted were for surface electric railways, forty-one grants of this character having been made mainly for short extensions to existing systems. For these forty-one grants, the total minimum compensation required for the franchise contracts was \$1,642,351. This total is composed of \$87,500 in initial payments, \$50 for past use of the streets and \$1,554,841 for minimum annual payments. The annual payments are in all cases based upon a percentage of the gross receipts with fixed minima, but the actual payments usually exceed these limits. The total number of franchise years (original term) covered by the grants is 630.16, giving an average of 15.76 years per grant and a minimum revenue of \$98,655 per year of average term. The total number of franchise years thus far expired amounts to 164.42, with an average expired term of 4.11 years, showing an average actual return on the annual payments of \$122,661 per year of expired grant.





LONDON POSTERS—MAP OF THEATER DISTRICT

### London Underground Posters

New Line of Attractive Display Sheets by English Railway Corporation

THE London Underground Electric Railways Company, Ltd., has always made a specialty of issuing very attractive traffic posters, and for this work has employed some of the most prominent artists in the United Kingdom. Views of some of those issued have appeared in previous numbers of this paper, and samples of four of the most recent are published herewith. Unfortunately, in the reproduction and reduction, a great deal of the detail is lost as well as is all of the coloring, which makes these posters most attractive. The view which suffers most, perhaps, in this reduction is the one representing the theater district of London, and shown by the single cut. The original poster is 40 in. x 50 in., and it is drawn in the old style and colored brilliantly. The border is made up of a series of panels giving the names and locations of the different theaters in London.

Of the three posters grouped together, the first has a gilt border and the lettering has an emblazoned initial and is printed in various colors. The middle poster is in red and black, and the right-hand poster is in the early English or Dutch style. The originals of these posters are 25 in. x 40 in. in size.

### Western Red Cedar Association Issues Standard Treatment Specifications

UNTIL recently different pole dealers have had different specifications for the application of preservatives. Railways have bought on these dissimilar specifications and also in accordance with their own specifications. Now the Western Red Cedar Association, after several months' investigation and study, has issued a standard set of specifications which all members will recommend for the butt treatment of red cedar poles by the open tank process. Three treatments are defined.

TREATMENT "A"—provides for a continuous submersion in hot carbolineum for a minimum duration of fifteen minutes.

TREATMENT "AA"—provides for a continuous submersion in hot creosote for a minimum duration of fifteen minutes.

TREATMENT "B"—provides for a continuous submersion in alternately hot and cold creosote for a minimum duration of six hours.

#### TREATMENT "A"—Carbolineum as Preservative

Poles shall be seasoned at least four seasoning months before treatment. (See seasoning calendar appended.) All fibrous inner bark and foreign substances must be thoroughly removed from that portion of the pole between the points one and one-half feet above, and one and one-half feet below the ground line.

The poles shall then be placed in an upright tank with the butts fully and continuously submerged in the preservative, to the height as specified, for not less than fifteen minutes when the atmospheric temperature is 70 deg. Fahr. or higher, and a proportionately longer time when the temperature is below that point; that is, during the colder weather the time of immersion must be sufficiently longer to result in the wood becoming as thoroughly heated as it would be under a fifteen minute treatment when the atmospheric temperature is 70 deg. Fahr. or higher.

The preservative is to be that known as "Carbolineum," which must conform to the specifications shown on page 401.

The preservative shall be heated to a temperature of 215 deg. Fahr. at least once every four hours of treatment, and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.

#### TREATMENT "AA"—Creosote as Preservative

Treatment "AA" is the same as Treatment "A" except that "Creosote," conforming to specifications later given, shall be used.

**H, LONDON,**  
THOU ART GREAT IN  
GLORY AND ENVIED IN  
THY GREATNESS. \* \*  
THY TOWERS, THY TEMPLES, AND  
THY PINNACLES ARE SET ABOUT THY  
HEAD LIKE A GARLAND OF FINE GOLD.  
THY WATERS HANG LIKE FRINGES OF  
SILVER UPON THE BORDERS OF THY  
GARMENTS. \* \* \* \* \*  
THOU ART ATTIRED LIKE A BRIDE, THAT  
DRAWEST ALL MEN THAT LOOK UPON  
THEE TO BE IN LOVE WITH THEE.

IS THIS LOVE OF LONDON DEAD?  
IF WE KNEW LONDON, IT WOULD NOT  
BE. TO-DAY THERE IS NO EXCUSE  
FOR OUR NOT KNOWING LONDON, WHEN  
WE CAN GET FROM PLACE TO PLACE SO  
EASILY AND SEE ITS GREATNESS FOR  
OURSELVES. \* \* \* \* \*

**- SPEED -**

1 MILE PER HOUR: Horse-drawn carriage

2 MILES PER HOUR: Horse-drawn carriage with multiple people

6 MILES PER HOUR: Horse-drawn carriage

10 MILES PER HOUR: Motorized carriage

12 MILES PER HOUR: Motorized carriage

24 MILES PER HOUR: Motorized carriage

**LOOK SHOP TRAVEL UNDERGROUND**

IF YOU HAVE THE TIME TO SPEND  
IF YOU HAVE THE MONEY TO SPARE  
IF YOU WOULD SAVE BOTH TIME & MONEY

PICCADILLY CIRCUS TOTTENHAM COURT RD. KNIGHTSBRIDGE  
OXFORD CIRCUS W. KENSINGTON HIGH ST. QUEENS ROAD W.

LONDON POSTERS—THREE ATTRACTIVE POSTERS



TREATMENT "B"—Creosote as Preservative

The condition and preparation of poles for Treatment "B" is the same as for "A" and "AA."  
 The poles shall be placed in upright tanks with the butts fully and continuously submerged in the preservative, to the height specified. The duration of treatment shall be divided between a hot and a cold bath. The poles shall remain in the hot bath for four continuous hours, after which they shall be transferred to the cold bath, in which they shall remain for two hours. (See note.)  
 The preservative is to be that known as "Creosote," which must conform to the specifications shown herewith.  
 The preservative constituting the hot bath shall be heated to a temperature of 212 deg. Fahr. at least once every four hours and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.  
 The temperature of the preservative constituting the cold bath shall not exceed 112 deg. Fahr. at the conclusion of the treatment.  
 Note: The intent of treatment "B" is to give poles as near a full sap penetration as possible. Experience has shown that, due to the variance in the density of the sap wood, some poles will not take a penetration as readily as others, but at least 75 per cent of the poles shall have an average penetration of one-half the sap wood. If necessary the duration of treatment shall be extended to accomplish this result.

SEASONING CALENDAR

Poles that has been properly piled for seasoning for a period of four seasoning months, shall be considered seasoned. In arriving at a seasoning month, the calendar months shall be rated as follows:  
 December, January or February equals one-eighth seasoning month.  
 March equals one-fourth seasoning month.  
 April equals one-half seasoning month.  
 May equals three-fourths seasoning month.  
 June, July, August or September equals one seasoning month.  
 October equals three-fourths seasoning month.  
 November equals three-eighths seasoning month.

REQUIRED ANALYSIS OF "CARBOLINEUM"

The carbolineum shall consist of the higher boiling fractions of pure coal tar and must not contain any admixture of any other tar oil or residue obtained from petroleum or any other source.  
 The specific gravity of the oil compared with water at 15.5 deg. C. shall not exceed 1.135 nor be less than 1.09 at 38 deg. C.

Open-Air Car Proves Popular in Vancouver

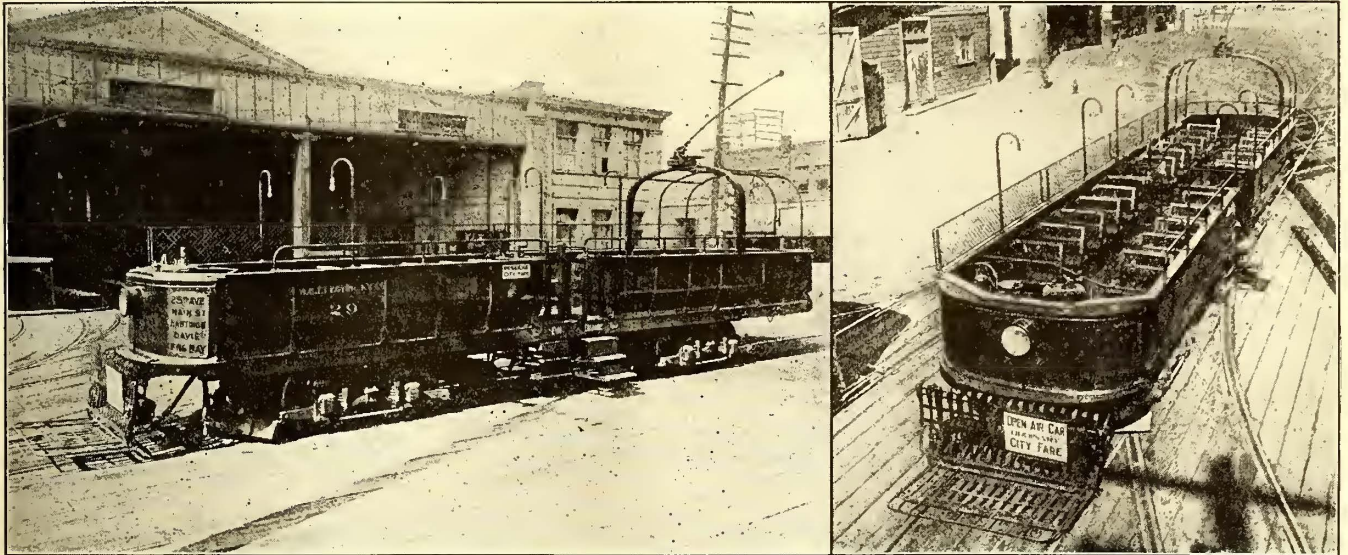
British Columbia Electric Railway Makes Good Use of Superseded Equipment

THE accompanying illustrations show an "open air" car recently put into service on the Vancouver city lines for summer travel. It is operated at regular fare and on regular runs, and has already become quite popular with the public, particularly during the evenings when there is heavy travel to the beaches and other open air resorts.

The car was originally a single-end prepayment car, with a seating capacity of forty, but it had been retired from service as it was not equipped with gates and other safety appliances required by the provincial government.

PARTICULARS OF VANCOUVER OPEN-AIR CAR

Length over bumpers	41 ft. 7 3/4 in.	Weight, per seat	641 lb.
Width over rails	8 ft. 3 1/2 in.	Trucks—Brill No. 27-G-1.	
Distance center to center of bolsters	22 ft. 2 in.	Wheels—33-in. chilled iron.	
Height over trolley base	12 ft. 6 in.	Motors—Four GE-67.	
Step heights, 15 1/2 in., 9 1/2 in., 9 1/2 in., 10 1/4 in.		Air brakes—Westinghouse.	
Seating capacity	54	Fender—Watson automatic.	
Weight, body and equipment	12,500 lb.	Trolley base—Sterling.	
Weight, trucks and motors	22,100 lb.	Trolley retriever—Earl.	
		Headlights—B.C.E. Ry.	
			34,600 lb.



SINGLE-END PREPAYMENT CAR AS REMODELLED FOR OPEN AIR, CENTER-ENTRANCE OPERATION IN VANCOUVER, B. C.

The flashing point shall not, in general, be below 140 deg. C.  
 The burning point shall not, in general, be below 170 deg. C.  
 The amount of distillate coming over at 300 deg. shall not exceed 15 per cent, of which not to exceed 2 per cent shall distill below 235 deg. C.  
 The tar acid in the distillate coming over below 300 deg. C. shall not exceed 2 per cent by volume of entire sample.  
 A sulphonation test of the fraction between 300 deg. C. and 360 deg. C. should yield in residue not more than one-tenth of 1 per cent by volume of entire sample.  
 The percentage of residue insoluble in benzol shall not exceed 0.25 of 1 per cent by weight.

REQUIRED ANALYSIS OF CREOSOTE

The creosote shall be a coal tar distillate obtained entirely from coal-gas or coke-oven tar and must not contain any admixture of any other tar, oil or residue obtained from petroleum or any other source, including coal-gas tar or coke-oven tar. The oil must be completely liquid at 38 deg. C. and shall be free from suspended matter.  
 The specific gravity of the oil shall not be more than 1.08 or less than 1.03 at 38 deg. C.  
 The oil shall not contain more than 3 per cent of water.  
 Up to 200 deg. C. the water-free oil shall render no distillate.  
 Up to 210 deg. C. the distillate shall not exceed 5 per cent.  
 Up to 235 deg. C. the distillate shall not exceed 25 per cent.  
 At 355 deg. C. the residue if it exceeds 5 per cent in quantity shall be soft.  
 The tar acids in the distillate coming over below 300 deg. C. shall not exceed 8 per cent by volume of the entire sample.

The present alterations included the removal of all the body structure above the sash rails, and of the end partitions. The step openings at both ends were closed and a new entrance and exit was made near the center. Three steps were arranged to swing under the car, controlled simultaneously with the gates by levers. Wood gates with clear glass panels were installed.

The trolley base was mounted on a 7-in. steel channel arch, to the rear of which was placed a guard made of 1-in. pipe with heavy wire netting over it. The seats were rearranged on 29-in. centers, and a circular one was built against the rear dash, giving a seating capacity of fifty-four.

Guard rails were placed along the open side and the standard wire guard panels, 18 in. high, along the devil-strip side. Eight 16-cp. lamps were mounted on standards along the sides, and for signaling from conductor to motorman a push-button and Faraday buzzer, the latter mounted on the front dash, were provided.



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

# ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

A List Is Published of Manufacturing Members Who Have Been Appointed to the Convention Transportation Committee—The Manila Company Section Meeting in July Was Enlivened by Several Interesting Features

## Manufacturers Appointed on Transportation Committee

The regular transportation committee of the American Association has been augmented by the addition of the manufacturers listed below. While acceptances have at this date not been received from all of the appointees it is hoped that all those invited will consent to serve.

### *New England:*

Warren L. Boyer, president Bemis Car Truck Company, Springfield, Mass.  
Arthur Hale, sales agent Griffin Wheel Company, Boston, Mass.  
J. E. Johnson, purchasing agent Laconia Car Company, Boston, Mass.  
F. B. Kennedy, vice-president New Haven Trolley Supply Company, New Haven, Conn.  
R. F. Gammons, vice-president United States Electric Signal Company, West Newton, Mass.

### *New York State (exclusive of New York City):*

W. K. Archbold, president Archbold-Brady Company, Syracuse, N. Y.  
H. M. Sperry, Publication Manager, General Railway Signal Company, Rochester, N. Y.  
Frank H. Gale, advertising manager General Electric Company, Schenectady, N. Y.  
F. D. Miller, president National Brake Company, Inc., Buffalo, N. Y.  
John Taylor, president Taylor Electric Truck Company, Troy, N. Y.

### *New York City:*

Bertram Berry, Heywood Brothers & Wakefield Company.  
William Wampler, vice-president and general manager The Ellicon Company.  
George P. Smith, secretary-treasurer, Smith-Ward Brake Company.  
William A. Lake, The Pantasote Company.  
Edward L. Leeds, general sales manager Niles-Bement-Pond Company.  
W. R. Kerschner, president W. R. Kerschner Company, Inc.

### *New Jersey, Pennsylvania, Delaware and Maryland:*

J. H. Horn, National Lock Washer Company, Newark, N. J.  
J. C. McQuiston, manager publicity department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.  
Ralph Moore, General Electric Company, Philadelphia, Pa.  
M. Alpern, American Engineering Company, Philadelphia, Pa.  
S. M. Wilson, The J. G. Brill Company, Philadelphia, Pa.  
F. A. Estep, president R. D. Nuttall Company, Pittsburgh, Pa.

### *North and South Carolina, Georgia and Florida:*

F. L. Markham, The J. G. Brill Company, Atlanta, Ga.  
A. H. Sisson, Southern Car Company, High Point, N. C.

### *Tennessee, Mississippi and Alabama:*

Frank Steffner, Chattanooga Armature Works, Chattanooga, Tenn.

### *Indiana, Ohio and Michigan:*

Edwin Besuden, general sales manager The Jewett Car Company, Newark, Ohio.  
W. I. Ohmer, Dayton Fare Recorder Company, Dayton, Ohio.  
James H. Drew, president Drew Electric & Manufacturing Company, Indianapolis, Ind.  
F. N. Root, manager Root Spring Scraper Company, Kalamazoo, Mich.  
Elmer J. Smith, vice-president and general manager Peter Smith Heater Company, Detroit, Mich.  
F. H. Williams, manager public utilities department, The White Company, Cleveland, Ohio.

### *Illinois and Wisconsin:*

W. S. Hammond, Jr., vice-president Consolidated Car Heating Company, Chicago, Ill.  
Frank Johnson, Ohio Brass Company, Chicago, Ill.  
L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL, Chicago, Ill.  
H. J. Kenfield, president Kenfield-Davis Publishing Company, Chicago, Ill.  
S. W. Midgley, general sales manager Acme Supply Company, Chicago, Ill.

### *Missouri, Kansas and Nebraska:*

Edwin B. Meissner, vice-president St. Louis Car Company, St. Louis, Mo.  
D. A. J. Sullivan, Galena Signal Oil Co., Kansas City, Mo.

## Joint Meeting of the Manila Company Sections

A joint meeting of the railway and electric light company sections of the Manila Electric Railroad & Light Company was held July 11. The feature of the meeting was the announcement that D. H. Blaisdell, chief engineer of the power plant department of the company, had won the Doherty gold medal given for the best N.E.L.A. company section paper during the year. The paper in question was presented by Mr. Blaisdell at the September meeting of the Manila Section, and some twenty-five papers were submitted in the competition. Mr. Blaisdell was not in attendance at the meeting of July 11, being on a six months' vacation in the United States, but the correspondence between the secretary of the association and Vice-President Duffy relating to the award were read. Later Mr. Duffy spoke congratulating the section that it had won this medal, and saying that with the winning of the 1915 American Electric Railway Association company section medal by J. N. Bury, assistant superintendent of transportation, for his paper entitled "Courtesy," the Manila Company Section has the distinction of having one company section medal in both associations during the first two years of its existence. The speaker added that he believed that this honor was held by only one other company, namely, the Milwaukee company.

Other interesting features of the evening were an address on the advantages of company section work by the manager of the Eastern Extension Telegraph Company, and also the reading of some correspondence on the value of company sections, conducted between W. A. Smith, chairman of the Manila Company Section, N.E.L.A., and the chairman of the Brooklyn Company Section, N.E.L.A. The latter had written to the chairman of the Manila section for an outline of his views as to how company sections could be made more valuable and beneficial to employees and the member companies. It also asked for information about the Manila section. In reply, Mr. Smith described the character of the meetings in Manila, which he said were attended by an average of forty members, or sixty per cent of the total membership. In conclusion he said that to make the meetings attractive "members should be impressed with the value and importance to them of company section work, and of the opportunity it affords them to equip themselves for higher responsibilities and duties and thus advance themselves in position and salary, to the mutual benefit of themselves and the company."

A plan for caring for right-of-way that promises to be popular with farmers along the line has been adopted by the Kansas City, Kaw Valley & Western Railway. The company is leasing back to farmers, at nominal rental, the right-of-way adjoining their land under condition that they crop it. There are no restrictions as to the crops to be planted, except that the company expresses preference for forage, and this is what most of the farmers who have rented ground will plant. Alfalfa so far has proved the most frequent crop designated.



## COMMUNICATIONS

### Unit for Comparing Track Upkeep Costs

UNION TRACTION COMPANY OF INDIANA  
ANDERSON, IND., Aug. 25, 1916.

To the Editor:

I have read the editorials in your issues of Aug. 12 and 19 with considerable interest and am submitting a few ideas with reference to methods of keeping the costs of track maintenance, also some of the things which would enter into these costs. A system of track maintenance costs would undoubtedly be very enlightening to the track department of any railway company. Whether the unit used is track-mile, car-mile or ton-mile the information obtained would be of great value in determining which pieces of track were demanding large expenditures to maintain them in good condition. In my opinion the ton-mile unit would give the most satisfactory results as it is the tonnage of trains and their frequency which cause track to deteriorate, action of the elements and the speed of trains not being considered.

The speed of trains also, however, enters into maintenance costs of open track construction, as it requires more labor to keep up track where train speeds are high than it does where they are low. The speed factor would be difficult to include with the degree of accuracy desired where all classes of trains operate over the same track. This could probably be solved best by dividing a road into speed classes, where the speeds of trains varied materially on different portions of the road. A given rating could be determined by calculating the average speed of all trains between stops.

The resultant costs from the ton-mile unit would not be any more satisfactory than those by the track-mile method unless each different type of construction was accounted for separately. Costs must be kept on each different type of construction in order to determine which type is the best for the tonnage operated over it. Records of this character covering a period of years would enable the engineer to determine the most economical type of construction for a predetermined tonnage. The subsoil conditions in some localities will necessitate better construction to obtain satisfactory maintenance costs than in others. Paving maintenance costs should be recorded in connection with each type of track construction and kept separate from the track costs. It should be divided into two charges—one for repairs made necessary on account of defective track and one for repairs necessary on account of street traffic.

L. A. MITCHELL,  
Superintendent of Roadway.

THE CINCINNATI TRACTION COMPANY  
CINCINNATI, OHIO, Aug. 22, 1916.

To the Editors:

The editorials on "A Unit for Comparing Track Maintenance Costs" in your issues of Aug. 12 and 19 refer to a subject in which I have been greatly interested for years, but I am just as far from a satisfactory conclusion now as when the question first suggested itself to me. The trouble is that with any property that has been in existence for a number of years, and most of them go back fifteen years or more, a number of types of track construction are used, varying materially as to track foundation, drainage, kind and spac-

ing of ties, paving foundation, paving and type and depth of rails. All of these enter as factors, regardless of the tonnage loads that pass over the tracks. Again, the proportion of tangent tracks to special work should be considered, but this will have to be handled separately.

The question of grades is also of considerable moment, particularly where sand is used, with resulting heavy rail depreciation. Consider points where the grades are between 8 per cent and 10 per cent, such as exist in this city in a number of instances, and up to and over 12 per cent in others, with curves in connection with tangent tracks, both horizontal and vertical. Conditions such as these naturally affect the cost of track maintenance, if indeed they are not governing factors. I agree with you that the whole subject is one which can well be taken up by the way committee of the American Electric Railway Engineering Association to determine if possible some definite plan of action.

I suggest, however, that the types of track recommended by the way committee be accepted as standard, and those types conforming most nearly to them be classed as similar construction, so as to start off with some basis for computations. Then the per cent of grades and, later, the extent of tonnage may be considered and weights determined. Special work would have to be handled separately, but would not involve quite as many features to consider as tangent tracks.

I suggest that the essential features of construction be divided into three classes for the various types, as follows:

Sub-structure, consisting of ballast, ties, sub-drainage and labor.

Superstructure, consisting of rails, fastenings, joints and labor.

Paving, consisting of paving foundation, paving, surface drainage and labor.

This classification is different from standard practice, but would simplify the keeping of cost data, and is suggested simply as an outline.

So far as grades are concerned, everything except the rails could be considered on the same basis, with some predetermined value, based on an increase for each per cent over 6 per cent. The question of deferred maintenance is one that should also be considered, but it is doubtful if anything but actual expenditures should be included. E. H. BERRY, Engineer of Roadways.

### Selling Securities to Patrons

H. M. BYLLESBY & COMPANY

CHICAGO, ILL., Aug. 26, 1916.

To the Editors:

I just looked over the ELECTRIC RAILWAY JOURNAL of Aug. 12 and must say that you gave a very splendid treatment to the article concerning "Selling Securities to Patrons." This is by far the best description of what we are trying to do which has so far appeared.

The editorial entitled "Popularizing Utility Ownership," on page 256, I read with very keen interest. The reasoning, to my mind, is entirely correct and conforms with the conditions which we are forced to meet. It is seldom that this vital question is treated in so thorough a way, but it deserves such attention.

The interest which is spreading throughout the country is shown by the fact that the Colorado Electric Light, Power and Railway Association has asked me to present a paper on customer ownership at their convention in September, which invitation I have accepted.

W. H. HODGE, Publicity Manager.



## Eight-Hour Bill and the Electric Railways

Secretary E. B. Burritt of the American Electric Railway Association is in Washington urging the inclusion in the eight-hour railroad bill now before Congress of a clause exempting interstate electric railways from its provisions. Reports from Washington on Sept. 1 state that the Senate committee on interstate commerce at a meeting held on the night of Aug. 31 had agreed to amend the bill so as to make its provisions not applicable to electric interstate railroads or to steam railroads of less than 200 miles in length. As the measure was intended to cover steam railroad conditions, the justice of the exemption of the electric roads is obvious. Henry S. Lyons, secretary Boston Elevated Railway, has also been in Washington during this past week associated with Mr. Burritt in presenting the electric railway side of the case, and many telegrams have been sent to senators and members of the House by electric railway companies since the measure was announced, urging that this exemption be made.

Present reports indicate that there will be no strike next week on the steam railroads, but earlier in the week when the strike appeared imminent, the effect on electric railway traffic received very careful consideration by all electric railway companies. Undoubtedly the interruption of steam railroad service would make the facilities offered by the electric railways even more important than they are at present. Some interurban managers in the central states interviewed by a representative of this paper said that owing to their limited coal supply they feared that they would have to reduce rather than increase the number of their cars in operation if the strike should occur. They would thereby conserve their coal and other supplies and be able to keep their roads open longer, in case the steam railroad strike should be prolonged.

## New Signal Installations on Electrified Steam Roads

The Chicago, Milwaukee & St. Paul Railway has completed the signaling of 134 miles of its electrified section, comprising stretches between Lennep and Three Forks and between Piedmont and Finlen. The signaling now being installed will cover the remainder of the 440-mile, 3000-volt d.c. electrification. The road, which is single track, uses the double rail propulsion return system. The power for the signals is transmitted by a 4400-volt, 60-cycle transmission line supplied by substations located thirty miles apart. Line transformers having a rating of 4400 to 110 volts are provided at each signal location.

The track circuits are fed from 0.5-kva. track transformers having a 110-volt primary and an 18-volt secondary. Two-position vane track relays are used with a reactor in series with the transformer leads. The normal pressure on the track element of this relay is one volt and on the local element, 110 volts. The line relays used in this installation are of two types, the three-position vane and the two-position single element vane.

On the heavy 2 per cent grades impedance bonds having a capacity of 1500 amp. per rail are used to carry the propulsion current. The impedance bonds used on lesser grades have a capacity of 500 amp. per rail. The light signals are of the three-light type, having red, green and white indications. Each lens is illuminated by a main lamp and a pilot lamp. The range of these light signals in day time is 3000 ft. under

normal conditions and 2000 ft. under the most unfavorable conditions.

The Pennsylvania Railroad is soon to begin the work of electrifying its Chestnut Hill branch on which a 11,000-volt, 25-cycle a.c. propulsion system will be used. The signals and locking circuits will be controlled from forty-three two-rail return and twenty-seven single-rail return track circuits. The propulsion current will be carried by means of thirty-five 200-amp. impedance bonds and by six 75-amp. bonds. The remarkable success achieved by the position-light signals used on the Philadelphia-Paoli division has caused the Pennsylvania Railroad to continue their installation on the new electrification. The track relays will be of the brakeless centrifugal frequency type. The vane frequency line relays will draw their energy from 1-kva., 110-volt, 60-cycle transformers. At each signal location 3300 to 110-volt transformers will step down the power from the signal transmission line. The maximum length of track circuit will be 3800 ft. and the minimum 1000 ft.

The signal material for both the above mentioned installations is being furnished by the Union Switch & Signal Company, Swissvale, Pa.

## English Tramways and the War

Some of the problems that have been confronting British tramway operations during the second year of the European war are well shown by the following extract from an editorial in *The Electric Railway and Tramway Journal* of Aug. 4:

"As to revenue, the great majority of our tramways have done remarkably well during the second year of the war. Some of the larger centers of population have scored continuous and notable increments, and our weekly traffic returns, as a whole, show a great preponderance of the plus over the minus signs. The working classes almost everywhere are earning more—in many cases much more—than average wages, and are spending their money freely, to the great benefit of the tramways.

"In respect of expenditure, it goes without saying that in almost all the items the cost has been higher. Wages have been advanced all round, allowances to dependents are steadily growing, and the cost of materials, fittings, etc., has not only gone up by leaps and bounds, but is befogged by the difficulty which exists in many lines of procuring supplies at any price whatever. The prices of certain materials and supplies have mounted much higher, and even where some attempt has been made to insure co-operative buying such things as tires have reached about \$50 per ton—a price which before the war would have been deemed unthinkable.

"On the whole, it appears to be a fair and reasonable conclusion that our tramways have done well in the teeth of great difficulties. They are, perhaps, piling up a certain number of troubles for themselves when the war comes to an end, but they cannot avoid these, seeing that they cannot obtain either the labor or the materials to keep their tracks, cars, sheds and so on in proper order. The postponement of repairs and adequate maintenance consequently is unavoidable, and it is up to the managers to do their best to keep going their services during the war, and leave what may happen afterwards to the arbitrament of circumstances. They cannot do either less or more than that."

On Aug. 1, during the visit of Judge and Mrs. Elbert H. Gary to the Philippines, they were the guests of honor at a dinner tendered them by C. Nesbit Duffy, vice-president Manila Electric Light & Power Company. The dinner was attended by prominent government officials.



# Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Fool-Proof One-Man Car—Improved Paint Gun for Car Shops—  
Motor Problems Imposed by Modern Car Design—New Copper  
Clad Steel Wire—A By-product of the Babbiting Furnace—  
Serviceable Frogs Made from Scrap by Arc-Welding

## Equipment of the "Safety" Car

On This Car the Air Brake Valve Performs Several Extra Functions and Air Is Used Also in Connection with the Control

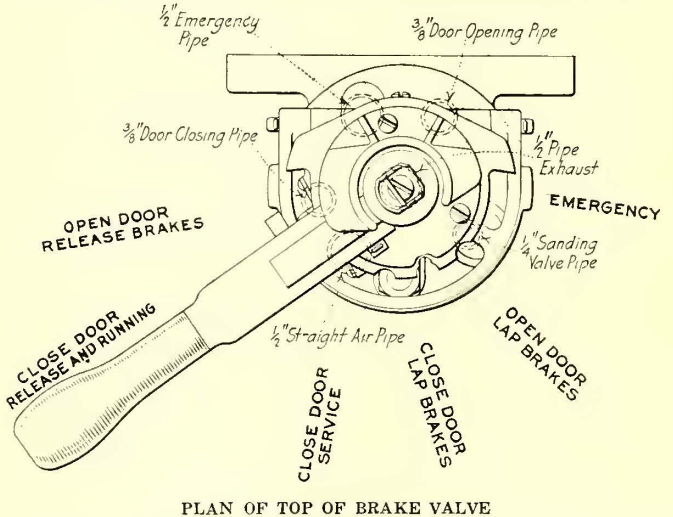
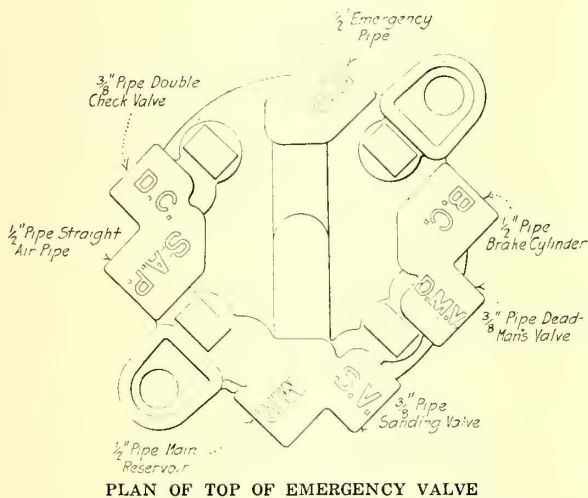
The flexibility of compressed air has been utilized by the Safety Car Devices Company, St. Louis, Mo., in the design of a safety car equipment. This provides for air operation of doors and steps, brakes, controller safety release and door locks, as well as the operation of other minor devices. The whole scheme of operation of the several parts is so interwoven that it is practically impossible to operate incorrectly without calling into play one or more of the safety devices. The following details relate to the one-man car brake and safety control equipment.

### THE BRAKING EQUIPMENT

The brake equipment is of the Westinghouse semi-automatic type which embodies an automatic emergency feature whereby the brakes are automatically applied in

lighter than standard sheets and with brazed head and body seams, a safety valve and a Type-28 brake valve. There are also an air gage showing main reservoir pressure, a Type K emergency valve, a special lightweight brake cylinder, a supply limiting valve for the sander, and the necessary switches, fuse blocks, etc.

Through the brake valve the operator controls not only the brakes, but also the doors and steps and the sand valve. As indicated in an accompanying illustration, the handle has six positions: Release (doors open), release (doors closed), service, lap (doors closed), lap (doors open), and emergency (doors open). Two release and two lap positions are provided for the following reasons: When a car is stopped on a level it may be desirable to release the brakes immediately in order that a prompt start may be made when the entrance and exit of passengers is completed. Consequently there must be a position in which the brakes will be released when the door is opened to permit passengers to enter and leave the car, and another position in which the brakes will be released when the door is closed for the



emergency with full force in the event of the breaking of pipes, etc. The safety control devices insure that the motorman must be at his post and attentive to his duties before the car can proceed, and he must remain alert to keep the car moving. Should he become incapacitated or remove his hand from the controller handle for any reason when the power is on the power will be automatically cut off, an emergency application of the brakes will be made, sand will be applied to the rails, the front door will be opened and the steps lowered, and the rear door will be unlatched so that it can be opened by hand if so desired. An emergency application of the brakes will produce the same result.

Taking up the braking equipment more in detail, the following equipment for a single-end car may be noted:

The compressor is of the Westinghouse duplex gear-driven type which has been in operation for several years. In connection with this are used a CD-1 lightweight compressor governor, a main reservoir made of

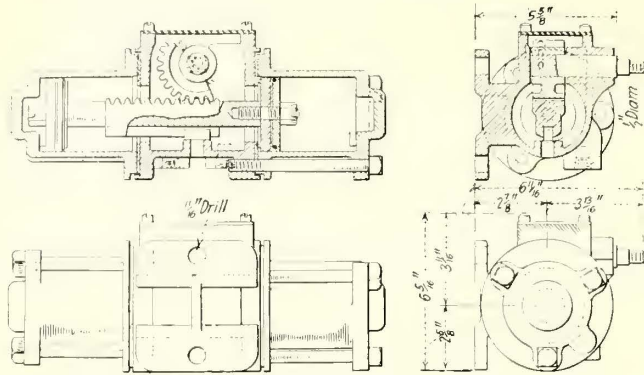
sake of safety while the car is running. To prevent any possibility of the doors remaining open while the car is running the brake valve handle is returned from release (doors open) position to release (doors closed) position by a spring as soon as the operator removes his hand from the brake valve handle. While the car is standing on a grade, the brakes must be held applied, and consequently there must be a brake lap position in which the doors will be open to permit the passengers to enter and leave the car, and also another brake lap position in which the doors are closed, as when a car is being retarded for a stop or a slow-down.

The brake valve also embodies a pneumatic sanding feature, whereby sand may be applied to the rail in any position of the handle by the mere pressing down of the handle.

The emergency valve operates to apply the brakes, open the front door, lower the steps, unlatch the rear door and blow sand onto the rails should the emergency



line be ruptured from any cause or should the operator make an emergency application. In addition, the valve operates to cut off the power to the motors should the motorman for any reason remove his hand from the controller handle with the power on. The supply limiting valve for the sander cuts off the flow of main reservoir air through the emergency valve to the sand box during emergency application when the main reservoir



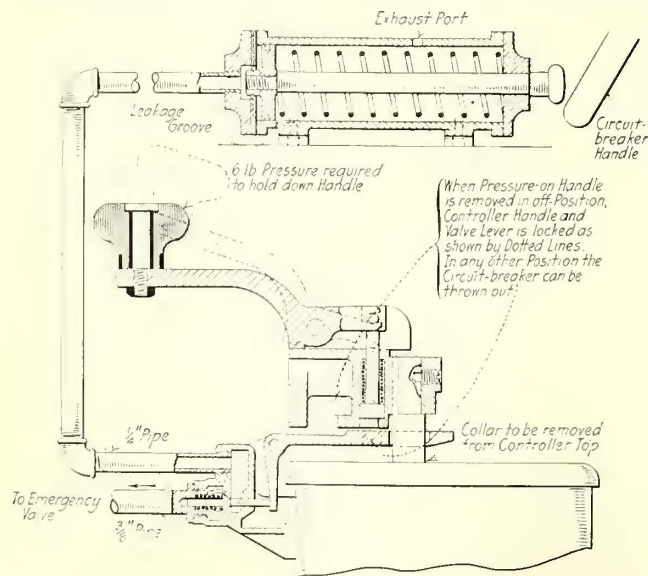
DETAILS OF DOOR AND STEP CONTROL CYLINDER

pressure has been reduced thereby to a predetermined safe pressure for the operation of the brakes. This valve is omitted if the automatic sanding feature is not desired, and in this case the sand valve connection in the emergency valve is plugged.

THE SAFETY CONTROL DEVICES

The essential safety control devices are the pilot valve and circuit breaker cylinder operated by the controller handle, the rear door unlatching device, the door and step controller and a double check valve which prevents the escape of air from the door and step controller through the brake valve in case the doors are opened by the emergency valve operating automatically or normally.

The controller handle attachment is illustrated in an accompanying drawing, the handle and valve being so



CIRCUIT-BREAKER CONTROL ACTUATED BY CONTROLLER HANDLE

designed that they can be applied to any type of manually-operated power controller. As explained above, if for any reason due to accident or carelessness the operator's hand is removed the brakes are automatically applied, the power circuit opens, the front door opens and the rear door unlatches.

The door and step controller is in the form of a double-acting cylinder, a portion of the piston rod of which has a rack machined thereon. This meshes with a pinion the shaft of which is connected by a series of rods and levers to the car door and steps.

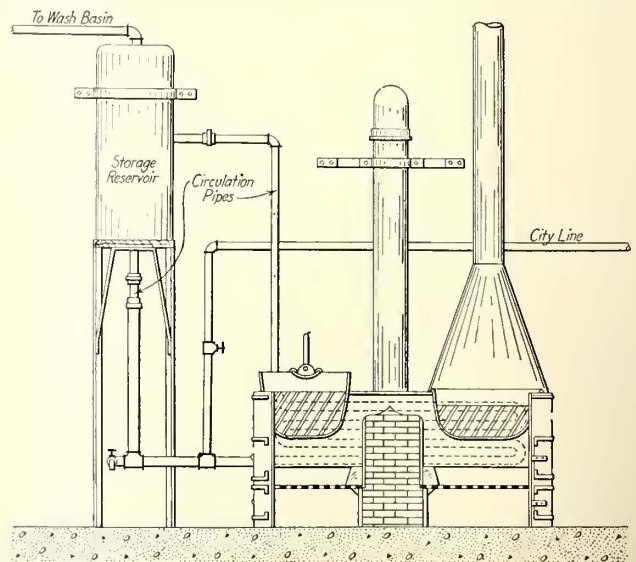
In addition to the safety features a rear sander cut-off valve is provided to prevent waste of sand on the rear sander in emergency applications. This is automatically taken care of by the brake valve in normal operation, but there must be some provision to cut off the supply of air to the rear sander when an emergency application is made. Hence, a valve is interposed between the emergency valve and the sander, and is so installed in connection with the brake valve that it is closed when the brake valve handle is removed and open when the handle is in position on the rotary valve key. Hence the rear sander is cut out and only the sander on the operative end of the car is effective. Door controller cut-off valves are also provided to permit automatic opening of the front door when an emergency application is initiated, either by the brake valve or the emergency valve, but to permit unlatching only of the rear door.

Babbitting Furnace Heats Water

BY R. H. PARSONS  
Electrical Foreman

An economical method of obtaining hot water is always possible in shops where babbitting furnaces are used. It can be provided by installing coils of pipe within or around these babbitting furnaces as shown in the illustration herewith.

In the plan illustrated the coils were connected to a large cylinder formerly used as a car air reservoir, and taps were made to the city water line and to the wash basin. The space between the furnaces and the wall was utilized for the heating coils. If it had been desired to pipe the water to distant points in the building, an additional cylinder or reservoir could have been installed near the wash basin and connected to the heating coils in the same manner as the original one,

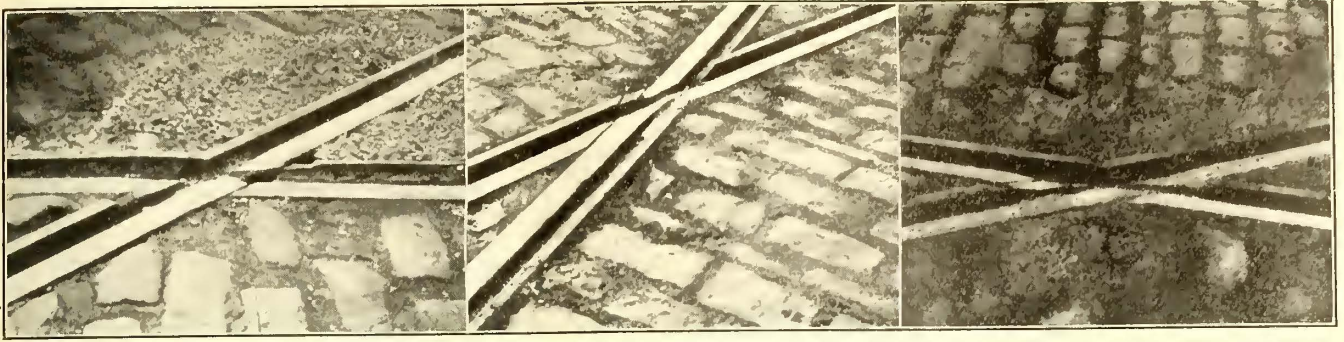


BABBITTING FURNACE UTILIZED FOR HEATING WATER Heating Coil Is Between Back Wall of Furnace and Wall of Room

thus overcoming the necessity of drawing off a quantity of cold water each time before the hot water begins to run.

To keep up this equipment no extra fuel nor attendants are necessary, and hot water is available all the time.





FIGS. 1, 2 AND 3—FROGS THAT HAVE BEEN IN SERVICE FROM TWO TO THREE YEARS AND ARE SUBJECT TO A TRAFFIC OF FROM 145,000 TO 411,000 CARS PER YEAR

## Home-Made Frogs

### Scrap Iron and Joint Plates Converted into New Frogs by Arc-Welding

BY C. BENHAM, JR.

Assistant Engineer New York State Railways, Rochester Lines

Frequently unforeseen failures of special work occur in pieces which must be replaced on the shortest possible notice, making it impossible to resort to the usual course of ordering the piece from a special work manufacturer. Large properties that make a regular practice of manufacturing their own special work can readily take care of such emergencies but lines not so equipped are left to their own devices.

Before arc welding came into use, a number of frogs were made by this company by bolting rails together and riveting the bottom flanges to a base plate on the same general plan as they are now made with the welder. These have worn remarkably well, the oldest one in the track at present having been placed in the summer of 1911. This frog has been subject to a traffic averaging 146,500 cars per year, but will soon have to be replaced. The frogs made with the welder are much more rigid than the bolted frogs, as there is no possibility of any nuts or rivets working loose. They also have a flange bearing through the center, and it is expected that these will wear a much longer time than the old type.

In making these frogs, the rail receiving the greatest traffic is not cut except at the head and guard to conform with the head and groove of the other rail. If the curved rail receives the lightest traffic it is first bent and then cut to fit. Standard joint plates bent to conform with the angle of the frog are used to fasten the rails together. Pipe separators are used to maintain the correct spread and the whole is bolted together and checked with the measurements, taken in the field, on the frog to be replaced. The base of the rail is then spot welded to the base plate at a number of points and the frog checked again before proceeding with the heavy welding. If the heavy welding is proceeded with immediately, there is great danger of the base plate buckling and drawing the whole frog out of shape. The plates at the center are welded top and bottom to the rail, the

welding at the bottom being heavy enough to weld the plate, bottom flange of the rail and the base plate all together.

The grooves are filled in with the welder at the point and about 8 in. along each arm to form a flange bearing and then ground down to a smooth running surface. A hard grade of steel is used to form the flange bearing, soft iron being used in welding the plates and rail together. This flange bearing is one of the most important points, since it is on this that the smooth riding and wearing quality of the frog depends. This feature can best be seen in Figs. 5, 6 and 7. The

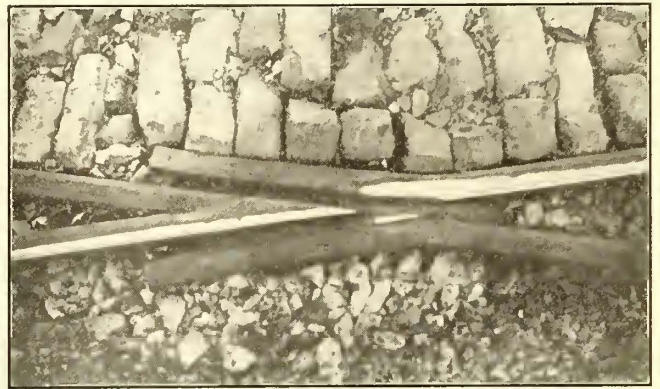


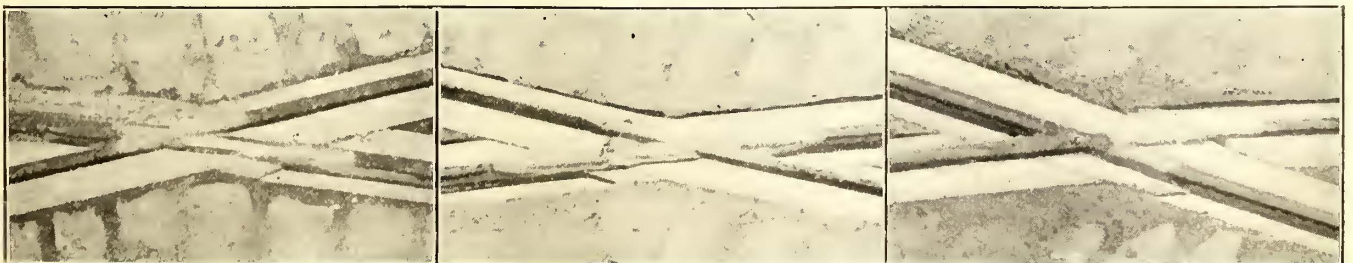
FIG. 4—FROG PLACED AT LAKE STREET AND DRIVING PARK

bolts are pulled up as tight as possible and the nuts welded so that there is no possibility of their working loose.

In the accompanying illustrations, Fig. 1 shows a frog at State and Central Streets placed in December, 1914. This piece is subject to a traffic averaging 41,100 cars per year. There was no flange bearing on this frog and it has worked loose. The fine material is buckwheat stone placed over temporary paving repairs.

The frog in Fig. 2 at State and Lyell Streets, was placed in June, 1914. A traffic of 146,500 cars per year passes over this frog.

The frog in Fig. 3, which was installed in the same



FIGS. 5, 6 AND 7—INSTALLATION OF FROGS SUBJECT TO A TRAFFIC OF MORE THAN 200,000 CARS PER YEAR



COST OF MATERIAL AND LABOR FOR MAKING A FROG

¼-ton scrap rail and joint plates, at \$13.....	\$4.30
Scrap base plate.....	3.00
40-lb. welding iron, at 5¼c.....	2.10
10-lb. welding steel, at 15¼c.....	1.50
Bolts.....	.60
<hr/>	
Total material.....	\$11.50
Blacksmith foreman, 24 hours, at 40c.....	\$9.60
3 helpers, 72 hours, at 30c.....	21.60
<hr/>	
Total labor.....	\$31.20
<hr/>	
Grand total.....	\$42.70

layout in October, 1913, is slightly loose, having no flange bearing.

The frog in Fig. 4 at Lake and Driving Park is made of 70 lb. A.S.C.E. rail and was laid in July, 1916. A traffic of 11,500 cars per year passes over this frog.

The frog in Fig. 5 at North and Central Streets was placed in May, 1916, and is subjected to a traffic of 227,500 cars per year.

The frogs in Figs. 6 and 7 at Clinton and Central

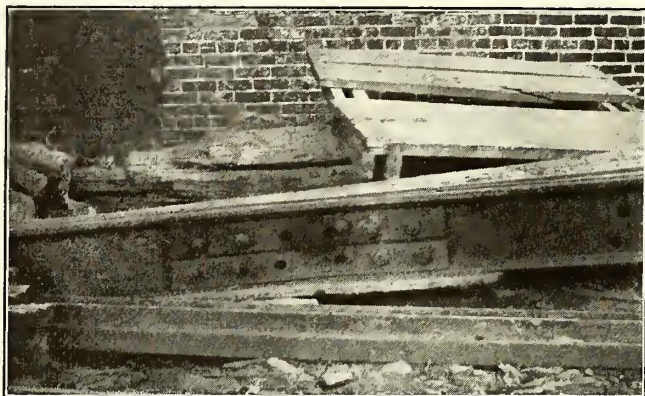


FIG. 8—FROG AFTER WELDING ON BASE PLATE BUT BEFORE WELDING JOINT PLATES

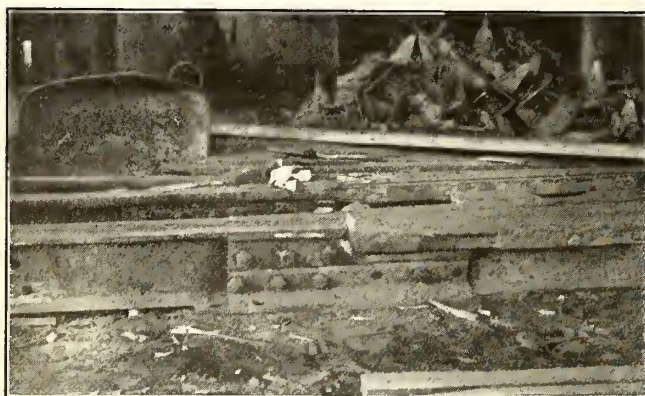


FIG. 9—REPAIR OF MATE

Streets were installed in November, 1915. A traffic of 211,500 cars per year passes over these frogs.

Some of these frogs have been laid too recently to show much wear, but a close inspection showed that they were absolutely solid and were wearing very evenly, having a good flange bearing.

Fig. 8 shows a frog after being fitted together with base plate welded to the rails but before the plates at the center were welded.

Another example in the repair of special work is shown in Fig. 9, showing a mate that has been repaired by joining a piece of rail on the single end. The ball of the rail at this end had broken off, although otherwise the piece was in fair condition. The single end was cut off close to the casting, an old joint plate cut to fit the casting and the new rail and welded to each, and a base plate welded across the joint similar to the base plates on the bottom flanges.

The rail for these frogs is usually taken from pieces of odds and ends that have no more value than scrap except for this purpose; the plates at the center are usually standard joint plates taken from the scrap pile, and the base plate is bought from a local scrap iron dealer at a little over scrap prices, so that the cost is unusually low, as shown in the accompanying table.

This, of course, does not include cost of electricity used in welding or any overhead charge.

## Providing for Closer Gear Centers in Motor Design

The Author Shows Some of the Conditions Imposed on the Designer by Changes in Car Design

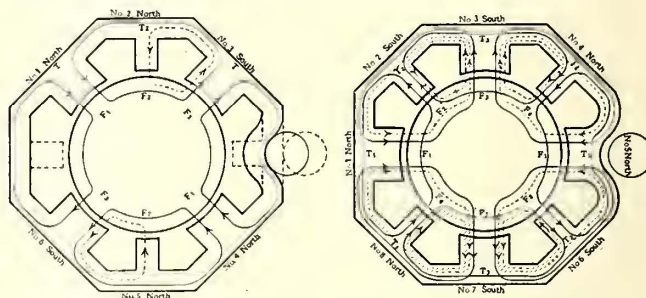
BY F. W. MC CLOSKEY

Railway Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Certain features of the design of the modern street car motor depend directly on the design of the car. Size of wheels, length of wheel base, position of brake rods, etc., are frequently the deciding factors in the selection of armature diameter or type of field windings. Other important design features of the motor may also be affected.

### MOTORS FOR SURFACE CITY CARS

The use of small wheels has introduced new problems in motor construction, one of the first being to overcome the handicap of shorter gear center distance.



1—Distribution of Magnetic Flux in a Four-Pole Motor Having Two Commutating Poles

2—Distribution of Magnetic Flux in a Motor Having Four Main and Four Commutating Poles

One way of doing this is to omit the commutating pole located on the axle side of the motor and proportion the remaining commutating poles so that they will produce the same effect with regard to commutation as would be obtained ordinarily with the full number of poles.

In city service where economy of power requires that the accelerating current be as low as possible, it is desirable in most cases to use the maximum gear reduction possible; that is, it is desirable to use as small a pinion as is consistent with the required strength under the teeth and as large a gear as will permit proper clearance beneath the gear case. A reduction in wheel diameter requires a corresponding decrease in the diameter and number of teeth of the gear to maintain sufficient clearance beneath the gear case. Using a minimum sized pinion, as before, to maintain maximum reduction, this decrease of gear diameter results in the shortening of the gear center distance, which means bringing the center of the armature closer to the center of the axle. This, in turn, results in a restriction of space in the axle region and a difficulty in obtaining room for the field winding. Omitting the commutating pole on the axle side permits the armature to be brought nearer the axle. If, however, only one pole is omitted an unbalanced magnetic pull results, which in most cases can be obviated best by omitting the opposite pole as well.



In a machine having four commutating poles and four exciting poles, about 70 per cent of the ampere-turns on the commutating poles serve simply to neutralize the magnetomotive force of the armature. The remaining 30 per cent are for the purpose of producing sufficient field in the commutating zone to neutralize the sparking voltage in the short-circuited coils. Therefore, in omitting, say, two of the commutating poles, it is necessary only to add to the remaining poles the magnetising turns, or about 30 per cent of the turns of the poles omitted. In actual practice it is necessary to add a little more than 30 per cent and also somewhat to lengthen the commutating poles axially to take care of saturation, etc., but a considerable net saving in copper and iron is secured.

Efficient designs, using half as many commutating poles as main poles may be worked out for motor sizes up to about 50 hp. Above this size the commutating poles are apt to become bulky. This design, besides saving in space, has an advantage in reduced weight, copper loss and less likelihood of grounds, because of their being fewer coils to ground.

It is usual to think of the action of the commutating poles as being independent of the main poles. This is true only in the case of machines having the same number of commutating poles as main poles, and when the windings on the latter are symmetrical; that is, when each pole has the same number of turns. The flux distribution in a four-pole motor having two commutating poles is diagrammatically represented in Fig. 1. It is of interest to note the distribution of flux in different portions of the frame, as compared with that of a non-commutating pole machine. It is obvious that between poles 3 and 4 the flux will be the same. Between poles 2 and 3 the total flux carried by the frame is greater than on non-commutating machines by one-half of the commutating pole flux. Between poles 1 and 2 it is less by one-half of the commutating pole flux. It therefore follows that the frame may be made of smaller sections between poles 3 and 4 than between poles 1 and 2, or poles 2 and 3. The latter two sections will, however, be made the same because with reversal of direction of rotation, the conditions between poles 1 and 2 will be the same as shown between poles 2 and 3 in the diagram.

#### MOTORS FOR ELEVATED AND SUBWAY CARS

In the design of railway motors of about 150 hp. and up, such as are used in elevated and suburban service, as a rule the motor space is not as restricted as in the case of surface cars. However, cases occasionally arise where the gear center distance must be made shorter than normally would be required.

The conditions here involved are different from those in the smaller motors for surface cars, in that it is customary to have a main pole at the axle instead of a commutating pole. One advantage of this is that the brushes and brush holders are more readily accessible, inspection being made usually from underneath the car instead of through a trap in the floor of the car, as is the case generally with street cars. The location of the main pole at the axle requires that the brush holders be rotated on the 45-deg. line, bringing them nearer the axle, where they are more readily inspected.

Shortening the gear center distance results in a reduction of the space for the main field windings at the axle side. This condition may be overcome by proportioning the exciting coil at the axle side with as many turns as the restricted space will permit, and designing the top and bottom coils with a greater number of turns, such that the sum of the ampere-turns on the side and top coils will be sufficient to produce the required flux. The coil on the other side of the motor opposite the axle

should, of course, have the same number of turns as that on the axle side.

In the above method of winding, the design of the commutating poles is somewhat influenced by the number of coils on the main field poles. With the same number of coils on all main poles the design of the commutating poles would be practically independent of that of the exciting coils.

The distribution of flux in the several magnetic circuits is shown in Fig. 2. From the diagram the following deductions are obvious: First, the flux in main poles 3 and 7 exceeds that in main poles 1 and 5 by an amount equal to twice the flux induced in each of the commutating poles by the unbalanced magnetomotive force due to  $T_3 - T_1$  turns on poles 3 and 7. Second, the flux in commutating pole 2 is weakened and that in commutating pole 4 is strengthened by the flux induced in them by  $T_3 - T_1$ . These two statements are equivalent to saying that the magnetic unbalance is proportional to the difference in the number of turns on the main poles. For, if the unbalancing of the main field turns is carried so far as to make the flux induced in pole 2 by the ampere-turns  $T_3 - T_1$  equal or exceed that induced in this pole by  $T_2$ , the flux in commutating poles 2 and 6 will be completely neutralized or even reversed.

These statements are all based on the assumption of unsaturated magnetic circuits. When the magnetic circuits are partly saturated, the difference between the fluxes in poles 1 and 3 and also in poles 2 and 4 will be reduced. In other words, the weakening of poles 2 and 6 is greater than the strengthening of poles 4 and 8, with a result of weakened commutating flux. This can be compensated for by additional turns on the commutating poles or by more liberal designs in other respects.

## Copper-Clad Steel Wire

The Method of Manufacturing This Bi-metallic Wire Is Described and Test Data Are Given

The Page Woven Wire Fence Company of Monessen, Pa., has secured the exclusive right to draw and sell "Aristos Copperweld" copper-clad steel wire, which is made from rods manufactured by the Copper Clad Steel Company, Pittsburgh, Pa.

"Copperweld" copper-clad steel is manufactured by taking a steel bar about 4 in. in diameter by about 30 in. long, pickling, cleaning and covering with a specially prepared flux. This bar is then placed into a mold which is  $5\frac{1}{8}$  in. in diameter by about 30 in. long. The bar and mold are then placed in a furnace and allowed to remain there until the desired temperature is obtained, when copper heated to a temperature of 1980 deg. is poured over the steel bar, filling the space between the bar and the mold. This forms a "copperweld" bar, which is  $5\frac{1}{8}$  in. in diameter by about 30 in. long. This bar is then reheated, hot rolled and drawn into wire.

This wire has an absolute weld between the copper and steel, without voids. It is of such a nature that torsions, twists, strains, hammering, etc., will not cause the copper covering to be separated from the steel center or core. Even changes of temperature from extreme heat to a sudden plunge in cold water have no effect, it is declared, on the weld. The material is, furthermore, proof against external corrosion to the same extent that copper is, and as the weld is said to be perfect no moisture can enter between the two metals—hence electrolysis can never take place.

After the wire is drawn it is given the most severe tests for bending qualities, breaking strength, torsion, elongation and conductivity.

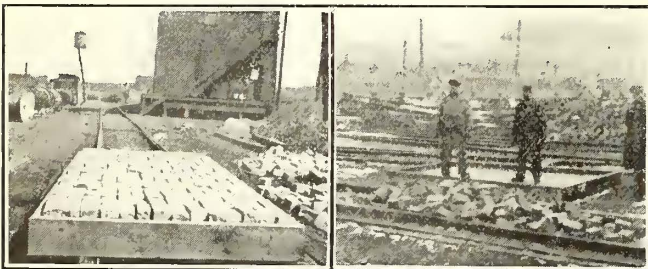


According to the claims of the maker, the wire has a tensile strength about 60 per cent greater than hard-drawn copper wire of the same size, and will stand approximately 126 per cent more strain than copper wire before reaching its elastic limit. The wire also weighs approximately from 7 per cent to 10 per cent less than copper wire of the same diameter and length, and is therefore not only cheaper in first cost but, on account of its greater strength, cheaper in maintenance. The wire is furnished in two grades of conductivity, namely, 40 per cent and 30 per cent, and also in a mechanical grade. Under special arrangements higher grades of conductivity can also be made. The material is manufactured in sizes of from 4/0 to 17 B & S gage. Smaller sizes can also be furnished under special arrangements. The material can also be furnished in weatherproof insulation and in rubber-covered twisted-pair forms.

This wire can be used to advantage on electric railways for trolley wire, signal wire, telephone wire, dead soft annealed tie wire, ground rods, and suspension strands. It is also used for automatic block signals, telephone systems, bond wires, series arc circuits, and transmission lines by railroads and power companies.

## Measuring Granite Block Yardage

The large quantity of granite block used for paving in the electric railway track allowance has introduced the question of the most economical way of measuring the yardage furnished by the granite block manufacturers as a basis for payment. In the issue of the ELECTRIC RAILWAY JOURNAL for May 20 Charles H. Clark, engineer maintenance of way, Cleveland (Ohio) Railway, described the results he had obtained by measuring the yardage of granite blocks by weight instead of by count. The substitution of this method for that employing a standard yardage frame has been so successful that this company has now adopted the weight



GRANITE BLOCKS SET IN STANDARD FRAME, AND BEING WEIGHED ON TRACK SCALE

method as standard. Whenever a car of granite block is unloaded every tenth block or every twenty-fifth block is thrown in a separate pile, and when the unloading is completed this pile of block is placed upon a track scale and weighed. A view of the granite block in the process of being weighed is shown.

Where a track scale or a scale of sufficient capacity is not available, the standard frame is quite generally used. Prior to the adoption of the weighing method of measuring granite block yardage, the Cleveland Railway used a standard frame of 8 sq. yd. capacity. This frame was 6 ft. x 12 ft. in size and built of 3-in. plank. A view of this standard frame filled with granite block is illustrated. As in the case where blocks are weighed, every tenth to every twenty-fifth block is thrown in a separate pile as the car is unloaded and the average number of blocks per square yard, as determined after all these blocks cast aside have been set in the frame, represent the number of square yards the company pays for.

## Improved Paint Gun Applicable to Railway Work

Portability, Lightness and Adjustability Are Qualities for Which the Designers Aimed in This Equipment

A large proportion of the railway equipment which requires painting is either so inaccessible or so irregular in shape that it is difficult to use the ordinary paint brush. The paint gun has, therefore, found an important field here, and even for use on large and exposed surfaces the speed and quality of the work done by the paint gun have made it a practical and popular tool. The Spray Engineering Company, Boston, Mass., has just placed on the market a portable paint gun having several special features which are said to simplify the operation, at the same time giving improved results in the quality of the finish of the work.

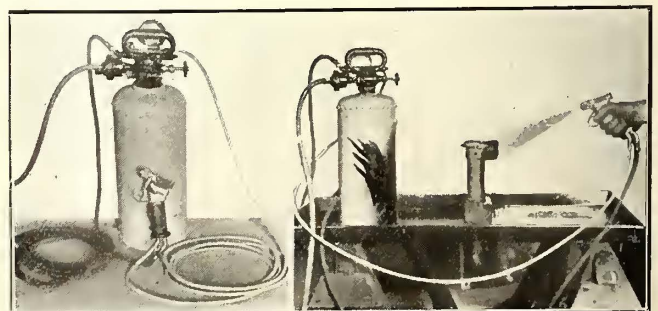


PAINT GUN SHOWING DETAILS OF ADJUSTMENT

As shown in the accompanying illustrations, the outfit consists of the paint gun proper, connected by flexible hose to a portable unit which comprises the control head and pressure tank. The gun has two adjustments, a round cap at the nose which screws out and in, thus regulating the flow of paint, and a knurled stem at the rear which regulates the amount of air used. These two adjustments determine the proportion of the air paint for any class of work, while the control trigger regulates the rate at which this mixture is sprayed. The weight of the gun is a little more than a pound.

The control head comprises an air strainer, a tank pressure gage, and a reducing valve. The function of this valve is to make the tank pressure independent of the air supply pressure. In this way both the air and the paint can be supplied to the gun at constant pressure, adjusted to suit the material which is being used. The tank has a plug in the base by which it can be filled or emptied without disturbing the control head. The construction of the apparatus is rugged throughout and designed to stand hard usage.

While the word "paint" has been used in referring to the material to be sprayed, it is understood that the outfit can also be used with varnishes and lacquers of different thicknesses. Owing to the wide range of ad-



PORTABLE PAINT GUN; OPERATION OF SPRAYING A SMALL IRON CASTING

justment to suit the material being used, this paint gun is serviceable for many classes of work. The painting of car bodies, trucks, brake rigging, fenders and metal work which is hard to reach with a brush is an instance in which the paint gun could be used.



## LONDON LETTER

## Edinburgh Considering Electric Haulage—Details of Services of London County Council Tramways in War Time

## —Miscellaneous Financial Reports

*(From Our Regular Correspondent)*

The annual conference of the Municipal Tramways Association will be held in London on Sept. 21 and 22 at the Surveyors' Institution. Following a meeting of the executive council, the conference will open on Thursday morning, when Peter Fisher, general manager of the Dundee Corporation Tramways will deliver his presidential address. This will be followed by a paper entitled "Some Notes on Passenger Transportation in Large Cities" by J. M. McElroy, general manager Manchester Corporation Tramways. In the afternoon a joint paper on "Utilization of Tramways for Goods Traffic" by G. W. Holford, general manager Salford Corporation Tramways, and W. Clough, general manager Bury Corporation Tramways, will be discussed. On Friday morning there will be another meeting of the executive council and also a meeting of the managers' section, after which the annual business meeting of the association will be held. It has been decided that no social functions shall take place, and therefore no arrangements have been made for the usual association dinner or excursion.

The Corporation of Edinburgh has asked for a report from tramway experts on the question of converting its whole tramway system to electric haulage at the termination of the present lease of the lines to the Edinburgh & District Tramways. The present method of traction, which is by cable, was adopted before the electric system was fully developed, and was favored because it did not disfigure the streets—particularly Princes Street—with poles and overhead wires. But traveling with it is slower than with electrically propelled cars in other cities, and there are frequent stoppages caused by faults in the cables, or mistakes made by the drivers in gripping or slipping the cables at the stopping places or at corners. The corporation hopes to be able to have the electric cars ready to start at midnight on June 30, 1919, when the lease of the present tramway company comes to an end. Its experts, however, have asked for further time to investigate the whole matter, which is, they state, very complex. It is understood that the committee of the corporation which is dealing with the subject will, in consequence, ask for an extension until September, when, it is hoped, the policy of the corporation may be agreed upon.

The Corporation of Bristol is seeking powers to extend, for a further period of one year from Oct. 31 next, the time during which it shall be entitled to exercise its option of purchasing the Bristol tramway undertaking. While many ratepayers who are opposed to purchase have not changed their views, they are not likely to embrace the opportunity offered to them of giving notice of opposition.

The general purposes committee of the Middlesbrough Town Council has appointed a sub-committee to consider the question of taking over the electric tramway system in the district. The powers of the local electric tramways company expire in 1918, and six months' notice of any intention to purchase must be given to the tramways company. Many things, it was said, might happen before 1918. There was the possible variation in the distribution of coal after the war, and the substitution of benzol and petrol. This might revolutionize the whole question of street traction, and was one of the many points that would have to be considered by the committee.

The London County Council tramcars are carrying more traffic at the present time than they have ever done before. A recent weekly return showed a record revenue of £52,300. Facilities for getting out beyond the crowded parts of the town by means of motor buses have recently been very greatly restricted, and the trams have in consequence benefited. Great success has attended the system of car trailers, which was greatly extended recently in order to save labor.

Details respecting some of the services rendered by the London County Council Tramways in connection with the war have been given in a report presented at a recent meeting of the council. Of the 11,500,000 passengers carried by the council's cars, only a small proportion represents pleasure

traffic. The majority of the passengers use the tramcars for traveling to and from their work in connection with the industry and commerce of London, while tens of thousands use the cars to reach munition works in various parts of the areas served by the tramways system. Of the various passenger carrying services the council's tramways were alone in a position to expand the normal services to an extent at all commensurate with the rapidly growing needs of Woolwich. As an instance of the efforts made by the tramways undertaking to further the nation's interests in connection with the war, the changes in the Woolwich tramway services may be mentioned. In July, 1914, just before the outbreak of war the maximum number of the council's tramcars arriving at a certain point during the busiest half hour was forty-one. This number has now been increased to eighty-six, an addition of 110 per cent. The number of cars arriving at the same point each day before the war was 975, but the number is now 1,595, an increase of over 63 per cent. During the busiest hour to-day accommodation is provided for 13,688 people, as compared with 4094 before the war, an increase of 234 per cent. The accommodation provided by motor omnibuses in this district, compared with that provided before the war, shows only a slight increase.

The Woolwich district is not being served to the neglect of other parts of London in which the tramways operate. Other changes have been made enabling the tramways management to meet the altered requirements arising out of the war. The authority obtained to carry an excess number of passengers has proved of considerable assistance in meeting the needs of the arsenal workers. To meet the shortage of men it became necessary to employ women on work formerly done by men, more especially as conductors. To-day there are 1072 women conductors employed on the council's cars. With the same end in view, and to increase as far as practicable the accommodation required by the traveling public, the construction of trailer cars has been expedited as much as possible. Although, the report concludes, during the last two years the problem of meeting the requirements of the traveling public has been a difficult one, the needs of the country have been borne in mind; the services of officers and employees have been lent to the government for national work; from the beginning of the war men have been encouraged to join the forces of the Crown, and substantial allowances have been made to the men enlisting or to their dependents, involving a charge on the undertaking of more than £168,700. This sum will be increased to more than £260,000 by the end of the current financial year if the war continues until March 31, 1917.

The interim dividends of the Metropolitan District Railway, the City & South London Railway and the London Electric Railway were about what had been expected, and being only interims no figures to show how the companies have fared as regards revenue during the last period are available. As the last two railways stood to get a larger proportion of the common pool during the last six months, it was only reasonable to expect larger dividends. The City & South London Railway paid at the rate of 1.5 per cent on the ordinary capital, as compared to nil for the corresponding period of last year, while the London Electric Railway has increased its rate of distribution from 1 to 1.5 per cent. A little disappointment was felt that the Metropolitan District Railway has not been able to increase its rate of dividend on the second preference stock beyond the 3 per cent paid at this time last year, but it is probable that an extra sum has had to go into the line, running, as it does, such a frequent service of trains.

The gross profit on the Wolverhampton tramways undertaking for the last year amounted to £24,893. On motor char-a-banc account a sum of £1,459 was realized, the two sums representing a gross profit of £26,353. A considerable amount of maintenance and renewal work held in abeyance was unavoidable, owing to the depleted labor market and the impossibility of obtaining delivery of certain materials. The mileage run during the year was 1,156,591, as compared to 1,181,309 in 1914-15, the operating cost amounting to 1.573d. per mile as compared to 1.463d. in the previous year. Passenger receipts amounted to £58,250 (an increase of nearly £4,000), and the passengers carried numbered 13,296,146. The motor char-a-bancs covered 119,865 miles.

A. C. S.



# NEWS OF ELECTRIC RAILWAYS

## BAY STATE LOSES 6-CENT FARE CASE

Massachusetts Commission Will, However, Allow Increases on Rural Lines—Criticises Management of Company and Advises Use of Earnings Upon Property

Six-cent fares throughout the system of the Bay State Street Railway, Boston, Mass., were refused on Aug. 31 by the Massachusetts Public Service Commission in a decision which censured the company for mismanagement and urged that dividends be suspended until accumulated earnings should be sufficient to rehabilitate the property. While the company will not be allowed to increase fares in any of its fifteen principal districts, however, the commission suggested that it would give consideration to a request for fare increases in strictly rural sections. The commission virtually assured the company that a new schedule of rates for rural lines "within certain restrictions" would be approved by the commission without further hearing and become effective within thirty days of the time of filing. Thus the main issue of a 6-cent fare is closed in a case that has been pending since November, 1915.

Relative to the districts where the commission concludes that there should be no fare increase it said:

"There is no evidence before the commission which would justify it in permitting the regular unit of cash fare to be increased in the populous centers which are already carrying their fair share of the burden. We also have grave doubt whether an increase in the 5-cent unit in this thickly settled, short-haul territory where jitney competition is so feasible and so prevalent would be of material benefit to the company. It is not a policy which street railway companies generally in this country have thought it wise to adopt. Any increase in the unit cash fare must, therefore, upon the evidence, be disallowed in the present 5-cent zones within or from the centers of the following cities: Boston (including Hyde Park), Brockton, Chelsea, Everett, Fall River, Haverhill, Lawrence, Lowell, Lynn, Malden, Melrose, Quincy, Revere, Salem and Taunton.

"The other lines operated by the company, in general, form part of the interurban routes as distinguished from what may be called urban and suburban portions of the system and are located in less populous districts. If the company wishes to increase the prevailing fares upon these lines (interurban districts), it is just and reasonable in our judgment for it to do so. Certain restrictions upon the discretion of the management in this respect, however, should be indicated."

In regard to proposed zone changes, etc., the commission said:

"The company, in its schedule of proposed fares, has in certain cases provided for an increase of the unit cash fare beyond 6 cents, has introduced certain new fare zones and has made certain alterations in existing zones and transfer privileges. The commission is of the opinion that no changes of this character can be allowed at this time."

The commission, in its voluminous report of forty-eight printed pages on the case, criticised the management of the Bay State Street Railway for the manner of keeping accounts and for failure to provide adequately for depreciation, attributed the weakness of the Bay State system to the original error in judgment of the present owners, said that the property had been allowed to run down in a manner that could not be justified, and stated that "the company has failed to satisfy our minds that additional net income cannot be secured through more efficient management and operation."

Regarding dividends the commission added:

"In order to place the future earning power of the system upon a more stable basis the company must expect temporarily to suspend dividends upon its common stock and turn back earnings into the property. This may seem a drastic prescription, but the situation clearly calls for it."

## BROOKLYN WAGES ARE INCREASED

Employees' Benefit Association Enthusiastically Approves New Plan of Departmental Trustees for Meeting With Management

The Brooklyn (N. Y.) Rapid Transit Company on Aug. 29 announced a general increase in the wages of its employees in the transportation department effective on Sept. 1. This action was taken by the directors of the various operating companies in recognition of the demonstration of loyalty which the employees gave during the recent attempts of outsiders to stir up dissatisfaction in connection with the New York strikes. The increases affect 9216 employees of all classes, from car cleaners to superintendents. The additional cost to the company will amount to about \$650,000 a year.

The new rates for motormen range from 26 cents to 42.5 cents an hour. The minimum rate applies to beginners on the surface lines and the maximum to those in service more than ten years on the elevated and subway lines, the rates gradually increasing to the maximum according to the years of service. Inasmuch as an unusual percentage of the employees of the system have been in service for many years, a large proportion of the total will receive the maximum rates of pay. Elevated and subway motormen will continue to be chosen from those having good records on the surface lines. The present time allowances are also continued, whereby on the surface lines conductors and motormen working more than eight hours a day but less than ten are paid for ten hours' work, and on the elevated and subway lines motormen, conductors and guards working more than seven hours and less than ten receive ten hours' pay.

The following table presents a comparison of the old and new rates as they affect the men engaged in the operation of the cars:

### SURFACE CONDUCTORS AND MOTORMEN

	Present Rates Per Hour (Cents)	New Rates Per Hour (Cents)
First year .....	25	26
Second year .....	25	27
Third year .....	26	28
Fourth year .....	27	29
Fifth year .....	27	30
Sixth year .....	28	31
Seventh year .....	28	32
Eighth year .....	28	32
Ninth year .....	28	32
Tenth year .....	28	32
Eleventh year .....	29	33
Twelfth year .....	29	33
Thirteenth year .....	29	33
Fourteenth year .....	29	33
Fifteenth year .....	29	33
After fifteen years.....	29	34

### ELEVATED AND SUBWAY MOTORMEN

First year .....	30	34
Second year .....	32.5	35
Third year .....	32.5	36
Fourth year .....	32.5	38
Fifth year .....	32.5	39
Sixth year .....	35	40
Seventh year .....	35	42
Eighth, ninth and tenth years.....	37.5	42
After ten years.....	40	42.5

Conductors on elevated and subway lines who now receive from 23 cents to 25 cents an hour will be advanced from 26 cents to 28 cents an hour, depending upon the years of service, and guards who now receive from 20 cents to 23 cents an hour will receive from 22 cents to 25 cents an hour.

The company also announced on Aug. 29 that the members of the Employees' Benefit Association had ratified by a very large majority the proposed amendments to the constitution of that organization creating in each one of the large departments of the system a set of departmental trustees who would constitute a committee to voice any changes of conditions desired by the employees of such department. This plan, announced by President T. S. Williams on Aug. 17, as previously noted in the *ELECTRIC RAILWAY JOURNAL*, has been enthusiastically received by



the employees. Up to Aug. 29 more than 94 per cent of the members of the association working in the transportation department and more than 86 per cent of the entire membership of the association in whatever department employed, had signed proxies to be voted for the plan of departmental trustees at the special meeting of the association on Sept. 28, when the amendments will be formally adopted.

The plan provides that in case any question arises in respect to any matter affecting working conditions or employment which the departmental trustees may consider worthy of attention, they will arrange for a hearing of the question at issue with the employee or employees affected and the head of the department or his authorized representative. At such hearing the employee or employees affected will have opportunity to discuss fully and in the presence of the departmental trustees the conditions to which exception is taken.

Following such hearing, the departmental trustees will confer with the head of the department or his authorized representative to see whether an agreement can be reached covering the question or questions at issue. In the event that no such agreement can be reached, then the departmental trustee or trustees and the head of the department will respectively prepare and sign statements of the facts and conclusions drawn therefrom, which will be submitted to the president of the Brooklyn Rapid Transit Company for final decision.

On Aug. 30 members of the Employees' Benefit Association in the surface transportation department, the elevated and subway transportation department, the mechanical department, the department of way and structures, the electrical department and the freight department held a special election for acting departmental trustees. According to the announced results, thirty-nine of such trustees were elected in the various departments out of 140 candidates nominated by their fellow-employees. The aggregate vote represented was more than 98 per cent of the employees entitled to vote in the different departments. Thus the men elected take office under the virtually unanimous indorsement of their fellow members in the association. The acting departmental trustees will take office immediately and upon the adoption of the pending amendments to the constitution and by-laws of the association will become officially the departmental trustees of the association to hold office until the next annual meeting.

The Employees' Benefit Association has more than 10,000 members, including fully 90 per cent of the men in transportation service. While the departmental trustees are elected by the members of the association, their good offices are available for any employee or employees on the system.

**MR. WHITRIDGE RETURNS**

**Commission Charges Said to Be Baseless—Third Avenue Railway Cannot Pay Higher Wages**

A meeting of the directors of the Third Avenue Railway, New York, N. Y., on Aug. 30 was attended by Frederick W. Whitridge, president of the company, who had returned from Scotland on Aug. 28. It was the first time Mr. Whitridge had met with the directors since the recent strikes were called on the company's lines. He received power from the board to take charge of the negotiations with the ex-strikers, which have been in the hands of Edward A. Maher, Sr., vice-president and general manager of the company, and after the meeting was over he issued a statement to the effect that he would meet representatives of the employees on Aug. 31 to consider with them the twenty-six requests for changes in rules and regulations. Continuing, he said in part:

"Some of these requests are, I think, superfluous, as the things have already been done. Some of the others may fairly be discussed, and a few the company will be obliged to reject. The request for an increase in wages the company will also be unable to meet. Since Jan. 1 of this year the wages have been increased about \$250,000. I had every reason to suppose at the time of my last conference with the men in July that this was substantially satisfactory, and I hope to be able to induce the men to proceed without now asking for an unreasonable further increase, and thus avoid the delay and expense of arbitration. If the men are not

willing to meet me upon these lines, I am, of course, prepared to undertake such an arbitration and to pay our share of the expense thereof.

"So far as the personal attacks on myself are concerned, which the Public Service Commission for the First District of New York has seen fit to make, I have only to say that those attacks were quite as improper and baseless as any of the others which have been made upon me by this body."

**ANOTHER INTERBOROUGH WAGE INCREASE**

**New York Company Raises Pay of All Class of Workmen for Third Time in Eight Months—Individual Working Agreements for Men**

The Interborough Rapid Transit Company, New York, N. Y., announced on Aug. 30 the third increase in the wages of its employees that has been made this year. The new increase, effective Sept. 3, will affect 12,000 employees and will amount to approximately \$1,250,000 a year. This is in addition to annual increases amounting to \$200,000 made on Jan. 1 and \$300,000 made on Aug. 1 of this year. It thus makes a total annual increase of \$1,750,000 in the company's payrolls during the last eight months. The working day has also been reduced from ten hours to nine.

The present increase applies to shop, powerhouse, transportation and other classes of workmen in the employ of the company. The new rates per day of nine hours for the most important divisions of the transportation group follow:

Conductors:	
First year .....	\$2.80
Second year .....	2.90
After second year .....	3.00
Guards:	
First year .....	\$2.40
Second year .....	2.50
Third year .....	2.60
After third year .....	2.70
Motormen:	
First year .....	\$3.50
Second year .....	3.75
Third year .....	4.00
Fourth year .....	4.20
Fifth year .....	4.20
Sixth year .....	4.40
After tenth year .....	4.50
Overtime for conductors, guards and motormen to be paid actual time up to ten hours; over ten hours, time and one-half.	

The new scale of wages has been circulated among the employees with a view of establishing a working day and a satisfactory wage rate that will cover a period of not to exceed two years or until such time as the city becomes interested in the financial results of the operation of the elevated roads and the subway. Separate working agreements have been distributed among the men in the various departments showing in detail the hours that constitute a day's work in all branches of the business and the pay per day that will be given to the men, together with provisions for extra time and overtime. The company has not used and does not propose to use any influence whatever over anyone in its employ as to whether he shall or shall not sign the individual working agreement. It is entirely voluntary on his part whether he does so or not, and there will be no discrimination or any act on the part of any officer of the company permitted because any men do not desire to sign.

This individual working agreement contains the following clauses:

"1. The Interborough Rapid Transit Company employs the undersigned for the wages and hours set forth on the annexed schedule in the subway, until the beginning of initial operation as defined in Subway Contract No. 3, or on the elevated, until the beginning of operation of any part of the railroads as defined in the Elevated Railroad Certificate and (provided the Public Service Commission shall approve when such operation shall begin) until Aug. 31, 1918.

"2. The undersigned agrees to work for the company in such positions as may be assigned to him from time to time (provided there shall be no reduction in position except for good cause) for such wages and hours for such periods.

"3. It is further agreed that if the company shall increase the wages or change the hours set forth on the schedule, the undersigned shall have the benefit of such increase or change notwithstanding this agreement to the contrary.

"4. If, after five years' service in any one class, for physical causes beyond the control of the undersigned, he shall be



assigned to a lower position, he shall then receive at least the low rate wages on the schedule of the class from which he is transferred."

In regard to the above matters, Frank Hedley, general manager of the company, issued a statement on Aug. 30 which said in part:

"Large numbers of Interborough Rapid Transit Company employees have voluntarily come to the president's office and to my office and indicated their desires to have such a working agreement executed that they can be assured that their positions are safeguarded and that the traveling public of New York can be assured that the rapid transit lines controlled by the company will be protected against interference with the continuity of its service for at least a fixed period.

"A few days ago President Shonts received a communication signed by a number of this company's employees who asked for a conference. A conference was arranged for these men to meet to-day. At this conference the question was immediately raised as to whether the employees of the Interborough Rapid Transit Company have a legal and moral right to organize, and I said that I would be glad to hear the grievances or demands of the employees on the assumption that the principles which had been agreed upon in so far as the New York Railways was concerned would also apply to the Interborough Rapid Transit Company. The New York Railways agreement provides that committees of the men have a right to have their individual committeemen, if they desire represented also by spokesmen, appear before the officers of the company to present their cases and, further, that should disputes arise with the management which cannot be settled with the employees the questions in dispute shall be arbitrated, excepting, however, all matters relating to efficiency. Of course, the same procedure will be followed on the Interborough lines.

"The spokesman for the employees at this meeting, Mr. Fitzgerald, brought up the question of wages for several classes of employees, and at this point I handed to him a printed copy of the working agreement between individual employees and the Interborough Rapid Transit Company. This agreement was formulated in conference with the committees representing each of the departments of the road, which committees as a whole represent every department of the system, and these committees stated that they would recommend the terms of the agreement for execution by the individual employees. The agreement is therefore the result of collective bargaining with the chosen representatives of the employees. The unrest or excitement that has prevailed on the Interborough Rapid Transit Company more or less for the last two or three weeks led the management to decide that a change in the working hours of many of its employees and an increase in the rate of wage were the essential things, and while these agreements provide for such changes they do not close the door for our men to continue their negotiations with the management for other requests that they have made. In fact, I invited them to continue their negotiations with me and with their superior officers with the view of arriving at a determination of all discussed matters to the complete satisfaction of our employees and the company."

#### STRIKE FOLLOWS BANGOR WAGE INCREASE

E. C. Ryder, president Bangor Railway & Electric Company, Bangor, Me., on Aug. 23 refused to sign a contract with the local carmen's union which involved recognition of the union and submission of disagreements between the men and the company to a board of arbitration. President Ryder stated that this involved a division of authority to which the company could not assent under any conditions. This demand on the part of the union was made in the face of a recent general increase of 2 cents an hour in the wages of conductors, motormen and carhouse employees, as announced in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

In accordance with votes taken at two meetings, the first on the evening of Aug. 25 and the second at an early hour on Aug. 26, a portion of the conductors and motormen of the company went on strike at 9 a. m. on Aug. 26. During the forenoon there was a limited service on the local lines. President Ryder stated that the company had kept absolute faith with the employees in not importing operatives while negotiations were on, and for that reason it found

some difficulty in keeping up its schedule. It expected, however, to be in a position on Monday, Aug. 28, to run its cars on schedule time.

On Monday the company maintained partial service with a few loyal employees, a few veterans and some new men, but service was withdrawn at night. Since then the length and the amount of service have been gradually increased. Strikers making personal application for reinstatement up to 5 p. m. Wednesday were promised preference, and by Tuesday night five had returned. The company asserts that the strike is practically over as far as it is concerned.

#### STRAW VOTE ON DALLAS VALUATION

City Officials and Utility Representatives Agree to Submit Point of Valuation to People in Hope of Settling Franchise Controversy

The controversy between the city of Dallas, Tex., and traction and electric lighting interests over the valuation that is to be fixed in the new franchises will be referred to a straw vote of the public. This arrangement has been made under an agreement reached between the city officials and the representatives of the traction and lighting interests, J. F. Strickland and C. W. Hobson, who propose to head the new companies that are to take the street railway systems and the electric lighting plant out of the hands of present owners and operate them on a service at cost basis.

The model service at cost franchise approved by the voters of Dallas at an election held on April 4 has been held up by an election contest. This model franchise fixed a valuation of \$7,100,000 for the traction and lighting properties exclusive of the Oak Cliff lines, which are controlled by Stone & Webster and are operated separately by the Northern Texas Traction Company. This was the valuation fixed by E. W. Bemis, utility expert, who made an investigation for the city. The utility interests maintained that their properties are worth \$8,500,000 and outlined their position in a long statement issued to the people of Dallas and signed by Messrs. Strickland and Hobson, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

Following the issuance of this statement, Mayor Henry D. Lindsley and City Commissioners A. C. Cason and Manning B. Shannon, representing the city, issued a statement outlining the city's position in the controversy. This statement, before being issued, was submitted to Messrs. Strickland and Hobson and approved by them as being a true and impartial account of the controversy and the efforts at settlement.

The big point in dispute is that of valuation. It was agreed that this point should be submitted to the voters of Dallas in a straw vote so that a preference might be expressed for the \$7,100,000 or the \$8,500,000 valuation. The traction interests will pay all costs of this vote, and the returns will be made to the city secretary and will be counted by an impartial board composed of one member of the staff of each newspaper published in Dallas.

The statement issued by Mayor Lindsley and the city commissioners is in part as follows:

"As to the question of valuation, the investigation of Mr. Bemis showed, to the satisfaction of a majority of the Board of Commissioners, that the entire electric light property and the entire street railway properties east of the Trinity River were worth approximately \$6,600,000. To this sum there was added by the Board of Commissioners \$500,000 to cover all equities of every character. Stone & Webster, prior to the election, offered to accept a valuation of \$8,500,000, which is the exact figure Messrs. Strickland and Hobson are offering to accept as a valuation adjustment. There is, therefore, a difference between the valuation now claimed by the owners of these public utilities and the valuation actually placed on them by Mr. Bemis of nearly \$2,000,000.

"It is to be remembered that there were no differences whatever between Mr. Bemis and the engineers of Stone & Webster with regard to actual quantities involved or to the unit value of these quantities. The only differences came in considering proper allowance for overhead, construction, financing, etc., expenses, and as to whether depreciation accrued should be deducted from the properties



involved or not. Stone & Webster claimed 36 per cent for such overhead expense and Mr. Bemis claimed that 20 per cent was a reasonable allowance. Stone & Webster asserted that there should be no deduction for accrued depreciation. Mr. Bemis claimed that that which had in part ceased to exist should be deducted in measuring value.

"The negotiations which have led up to the final status outlined in the Strickland-Hobson statement and in the Mayor's statement, although extending over a long period, have not at all delayed the final consummation of these franchise matters. The suit which was brought to contest the April election has not been settled. This case will come up for trial before the three district judges of Dallas County on Sept. 1. If the decision of these judges is appealed from, the city expects a final judgment by the higher courts during the month of October of this year. The administration, of course, is in no way responsible for this litigation. It has done everything within its power and will continue to do everything within its power to win this suit and to make the verdict of the people, as expressed at the polls in April of this year, operative.

"Furthermore, it will be necessary, before any franchises become finally binding, that they be voted by the people of Dallas at a regular election. The next regular election is the first Tuesday in April, 1917. Any franchises passed by the Board of Commissioners at this time would be subject to a referendum vote by the people. Such referendum could be demanded by 500 qualified voters of Dallas. There is no question whatever—and all parties who are interested in the settlement of this matter agree as to this—that any adjustment of these franchises now, other than as distinctly voted on in April, 1916, would be subjected to a referendum vote. Such vote could only be legally held in April, 1917.

"We would not be willing, under any circumstances, to submit the Strickland-Hobson plan to the people of Dallas, either for a 'straw vote' or at a regular election, until there has been reached a definite, written agreement with Messrs. Strickland and Hobson covering every detail of these franchises, and there would be exacted by us four bonds in the aggregate sum of \$1,000,000, conditioned that the agreements relative to the expenditure of \$2,000,000 within the city of Dallas within eighteen months should be faithfully carried out, and conditioned that the agreement to build the two interurbans should be carried out.

**Plan of One Day Off in Ten Turned Down.**—Employees of the Tri-City Railway Company, Davenport, Iowa, by a margin of five votes, have rejected a proposition to take one day off in every ten instead of every fifteen as is the present plan.

**Wages of Gorge Men Increased.**—The Niagara Gorge Railway, Niagara Falls, N. Y., has granted a voluntary increase in wages to some of its platform men who have been in the company's service for many years. Some of the increases to platform men are as much as 3 cents an hour. Other employees were granted increases up to \$10 a month.

**Aurora Line Negotiating New Labor Contract.**—Practically all the questions involved in the negotiations for a new working agreement between the Aurora, Elgin & Chicago Railroad, Aurora, Ill., and its employees are being settled in conference. It is understood, however, that the question of wages will be submitted to arbitration after the other difficulties are settled. The old labor contract expired June 1, 1916.

**Hearing on Change in Fiscal Year.**—The Interstate Commerce Commission has set Nov. 13 for a hearing in regard to the change of the end of the fiscal year for common carriers by rail from June 30 to Dec. 31, and it has invited all interested parties to be present. At the meeting of the executive committee of the American Electric Railway Accountants' Association, held in Chicago on Feb. 3, a resolution was adopted favoring this change, in accordance with the suggestion of the American Railway Accounting Officers.

**Political Posters Prohibited on Detroit Lines.**—Political candidates have been informed through a recent issue of *Electric Railway Service*, the company publication of the Detroit (Mich.) United Railway, that they will save con-

siderably in their printing bills if they will announce to their workers not to attempt to place cards, posters and the like on the property of the company. Instructions have been issued that political advertising matter must not be posted or distributed, and if posted unknown to officials of the company it will be torn down and destroyed as soon as discovered.

**Demands of Birmingham Men Being Considered.**—On Aug. 19 representatives of the newly organized employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., presented demands for a recognition of the union, a rearrangement of the present wage scale and a regulation of working hours. On Aug. 21 the announcement was made that the union had been recognized and that the whole incident was closed as far as public interest was concerned. It only remained to arrange the details of wages and hours.

**Partial Payment Stock Plan Grows in Public Favor.**—Sales of preferred stock of the Northern States Power Company to customers of that organization, made under the partial payment plan, are on the increase. During June and July stock at a par value of \$31,000 was sold to 135 customer investors. This would indicate that the popularity of the partial payment plan is steadily growing. A detailed description of the plan followed by this and other properties of H. M. Byllesby & Company, Chicago, Ill., in selling securities to patrons was published in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12.

**Higher Wage Scale for Philadelphia.**—The co-operative committee of the Philadelphia (Pa.) Rapid Transit Company at a meeting held on Aug. 23 in company with the management determined that the condition of the 22 per cent fund was such as to make possible an advance of 1 cent an hour to all of the conductors and motormen of the company. Effective on Sept. 1 the new hourly scale reads as follows: New men, 27 cents; after one year's service, 28 cents; after two years' service, 29 cents; after three years' service, 30 cents; after four years' service, 31 cents; after five years' service, 32 cents.

**No Cause for Trouble at Toledo.**—A committee of the Central Labor Union, Toledo, Ohio, reported to that body on Aug. 24 that, after making a thorough investigation, it had found no cause that would justify any radical action on the part of the union against the Toledo Railways & Light Company. The recent complaints, the report said, were made by four or five men. There may be some minor troubles, it continued, but these can all be handled in a satisfactory manner. A committee of the street car men will meet President Coates at an early date to consider some of these matters, as noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 26.

**Harrisburg Strikers Secure Jitney Referendum.**—The striking trolley men of the Harrisburg (Pa.) Railways during the last week concentrated their energies on procuring signers for the referendum petition to repeal the present jitney ordinance and to pass a new one, cutting the bond from \$2,000 to \$1,000, and reducing the license fee from \$50 to \$10. That they were successful is shown in the fact that only 1751 signers were needed to compel action and 2800 names were on the referendum paper on Aug. 30. If the City Commission refuses to accept the provisions of the new jitney ordinance the people will be given the right to vote upon the ordinance at the November election.

**Seventy-five Thousand Dollars of Business Lost by Strike.**—Towns along the line of the Buffalo & Southern Railway, Buffalo, N. Y., assert that they have lost more than \$75,000 in business since the strike on the company's property, which has been in effect since last May. The line has been very seriously crippled by law-breaking strikers and their sympathizers. Nathan A. Bundy, receiver, is making an effort to operate a few cars between the Buffalo city line and Gardenville, Hamburg, Orchard Park and Ebenezer. New York bondholders have been asked to come to Buffalo and investigate the situation. Governor Whitman has also been requested to appoint a commission to investigate the trouble.

**Chattanooga Car Strike Ends.**—The strike of some conductors and motormen of the Chattanooga Railway & Light Company, which led to violence compelling a suspension of



night service during part of last week, was settled on Aug. 25 by the strikers agreeing to go back to work pending arbitration. The only points thus far granted by the company are the recognition of the union and the reinstatement of twenty-one discharged employees. While no difficulty is expected in reaching a final settlement, there are two items that may have to be put into the hands of arbitrators. These are the increase in wage scale and the closed-shop provision. Conferences are now being held, and if no agreement is reached arbitration will be used.

**Remedy for Internal Fissures in Rails Discovered.**—A. H. Smith, president New York Central Railroad, New York, N. Y., has announced that P. H. Dudley has discovered a positive cure for internal fissures in steel rails, a defect which has baffled engineers for a number of years. After experiments covering a considerable period of years, Mr. Dudley has concluded that such fissures are caused by imperfect processes of manufacture and not by excessive wheel loads. In order to eliminate these, new specifications governing the manufacturing process have been developed. In addition to the usual methods, these specifications require reheating of the finished product by a special method. In announcing this discovery President Smith stated that through the use of Mr. Dudley's specifications the actual breakage of rails in service has been reduced from one in 600 to one in 142,000.

**Gap Between Cleveland and Pittsburgh Closed.**—The last gap in the interurban lines connecting Cleveland, Ohio, and Pittsburgh, Pa., was closed on Aug. 24, when the Cleveland, Alliance & Mahoning Valley Railway opened service between Alliance and Warren, Ohio. A passenger may now make the trip by using the Northern Ohio Traction & Light line between Cleveland and Ravenna. At the latter place he would take a Cleveland, Alliance & Mahoning Valley Railway car for Warren, where he would change to the line of the Republic Railway & Light Company to reach Youngstown. Youngstown, New Castle and Pittsburgh are connected by interurban lines and the trip could be thus completed. Some years ago there was much talk of through service between Cleveland and Pittsburgh, but a small gap existed in the line that was never closed. The new line provides a different route from the one originally considered.

**New Franchise Ordinance Passed in Henderson.**—Henderson, Ky., has passed an ordinance providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical, and the Evansville company has stated that it does not plan to bid for the privilege of operating under it. Some of the features of the new measure are: Half-fares for school children while on their way to and from school; 3-cent fares for all passengers between 6 a. m. and 7 a. m. and between 6 p. m. and 7 p. m.; a fifteen-minute schedule for the first five years and a ten-minute schedule for the remaining fifteen years of the life of the franchise; four years for making all necessary repairs and overhauling the present tracks in the event the franchise is purchased by the present operator, and the changing of the present routeing in some respect.

**Wage Increase Asked in Louisville.**—The Louisville (Ky.) Railway has been waited on by a committee of employees, who asked that an increase in the scale of wages be considered by the company. The conference with President T. J. Minary was friendly. The employees said they realized that the company's earnings had fallen off in late years, but the cost of living had gone up and they urged that the matter of an increase be taken up if possible. As soon as the members of the executive committee return to the city, Mr. Minary said, the subject will be considered. The men are now being paid from 21 to 24 cents an hour. A woman stockholder wrote to one of the Louisville newspapers in regard to the proposal, asserting that the holders of common stock, many of whom depend on it for a living, should be given first consideration. The common stock, she said, is paying 4 per cent, no increase having been granted in years, while the men have been advanced several times of late. She added that if the street-car men are not satisfied the company should employ women, many of whom could be found to operate the lines.

## Financial and Corporate

### TRACTION COLLATERAL FOR BRITISH LOAN

The list of American securities which are to serve as part of the collateral for the loan of \$250,000,000 to the British government has been made public by J. P. Morgan & Company. The total number of American securities, which are valued at \$100,000,000, is 503, including 442 bonds and sixty-one stocks. The stocks are made up of thirty-six steam-railroad issues, five public-utility issues (including the Manhattan Railway), and twenty industrial issues. The bonds include 320 steam-railroad issues, ninety public-utility issues, and thirty-two miscellaneous issues, including industrial, municipal and other bonds. The ninety public-utility bond issues comprise forty-one electric railways and forty-nine other utilities. Included in the electric-railway list are the following issues:

American Power & Light 10-yr. 6s, 1921.	Manhattan Ry. cons. 4s, 1990.
Brooklyn Rapid Transit secured 5 per cent notes, 1918.	Michigan United Rys. 1st ref. 5s, 1936, Series A.
1st & ref. M. 4s, 2002.	1st ref. 5s, 1936, Series B.
5s, 1945.	New York Rys. 1st real estate ref. 4s, 1942.
B'way & 7th Av. RR. 1st cons. M. 5s, 1943.	New York, Westchester & Boston Ry. 1st M. 4½s, 1946.
Chicago Railways 1st M. 5s, 1927.	Northwestern Elevated Ry. 1st 5s, 1949.
Commonwealth Power, Ry. & Lt. conv. 6s, 1918.	New York State Rys. 1st cons. 4½s, 1952, Series A.
Detroit United Rys. 1st cons. 4½s, 1932.	Portland Ry., Light & Power 1st ref. 5s, 1942, Series A.
Duluth Street Ry. 1st M. 5s, 1930.	Portland Ry. 1st & ref. s. f. 5s, 1930.
Eastern Power & Light Corp. conv. 5s, 1918.	Public Service Corp. of N. J. gen. M. 5s, 1959.
Federal Light & Traction 1st lien s. f. 5s, 1942.	Puget Sound Traction, Light & Power 6s, 1919.
Georgia Light, Power & Rys. 1st lien 5s, 1941.	Rochester Railway M. 5s, 1930.
Georgia Ry. & Elec. 1st cons. 5s, 1932.	St. Louis, Springfield & Peoria RR. 1st and ref. 5s, 1939.
Interborough-Metropolitan coll. tr. 4½s, 1956.	San Joaquin Light & Power Corp. 1st and ref. 6s, 1950.
Interborough Rapid Transit 1st 5s, 1966.	Springfield Ry. & Light 1st lien s. f. 5s, 1926.
Kentucky Traction & Term. 1st & ref. 5s, 1951.	Third Avenue RR, 1st M. 5s, 1937.
Louisville Ry. 1st cons. 5s, 1930.	Tri-City Railway & Light coll. tr. 1st lien 5s, 1923.
Lynn & Boston Ry. 1st M. 5s, 1924.	1st ref. 5s, 1930.
Newport News & Hampton Ry., Gas & Electric 1st & ref. 5s, 1944.	United Light & Railways 1st & ref. 5s, 1932.
New Orleans Ry. & Light gen. 4½s, 1935.	Virginia Ry. & Power 1st & ref. 5s, 1934.
	Washington Ry. & El. cons. 4s, 1951.

### IDAHO CONSOLIDATION REPORTED

It is reported that the hydroelectric and steam-generating properties in southern and western Idaho, with their transmission and distributing systems and some allied electric railways which were financed about a year ago through the Northern Securities Corporation, have been consolidated under the name of the Idaho Power Company, with a capitalization of \$17,000,000. The Electric Investment Corporation, which was organized to assist in the consolidation, will be dissolved. The Boise Valley Traction Company, organized to take over the electric railway lines, will remain in existence, but all its stock will be held by the new company.

The new company is organized under the laws of Maine, but twelve of its sixteen directors are residents of Idaho. Companies merged into the Idaho Power Company include the Idaho-Oregon Light & Power Company, the Idaho Railway, Light & Power Company, the Idaho Power & Light Company, the Great Shoshone & Twin Falls Water Power Company, the Southern Idaho Water Power Company, the Jerome Water Works Company, together with a number of properties controlled by these corporations. The new company will operate in every city and town in the great Snake River Valley, with the exception of the two supplied with government power.

F. F. Johnson, Boise, is president, and William T. Wallace, vice-president and general manager. George E. Claffin and D. F. McGee, New York, are also vice-presidents, with E. P. Summerson and A. E. Smith of the Electric Bond & Share Company assistant secretaries and assistant treasurers. G. M. Dahl, of the Electric Bond & Share organization, is a director and member of the executive committee.



ANNUAL REPORTS

International Traction Company

The comparative income statement of the International Traction Company System, Buffalo, N. Y., for the years ended Dec. 31, 1914 and 1915, follows:

	1915		1914	
	Amount	Per Cent	Amount	Per Cent
Gross passenger earnings....	\$6,564,631	95.9	\$6,492,212	96.0
Receipts from other sources..	275,343	4.1	268,368	4.0
Total .....	\$6,839,974	100.0	\$6,760,580	100.0
Operating expenses .....	\$3,480,543	50.9	\$3,601,800	53.2
Taxes .....	425,484	6.2	423,632	6.3
Total .....	\$3,906,027	57.1	\$4,025,432	59.5
Net earnings from operation.	\$2,933,947	42.9	\$2,735,148	40.5
Interest .....	\$1,681,468	24.6	\$1,645,400	24.3
Rentals .....	47,971	0.7	45,379	0.7
Sinking fund and amortization of debt, discount and expense	137,521	2.0	132,601	1.9
Total fixed charge.....	\$1,866,960	27.3	\$1,823,380	26.9
Balance for renewals, replacements and dividends.....	\$1,066,986	15.6	\$911,767	13.6
Renewals and replacements reserve .....	396,582	5.8	359,244	5.4
Surplus .....	\$670,404	9.8	\$552,523	8.2

The gross earnings of the system for 1915 showed an increase of \$79,393 or 1.2 per cent as compared to 1914, while the operating expenses and taxes decreased \$119,404 or 2.9 per cent, so that the net earnings from operation gained \$198,798 or 7.2 per cent. All of the saving in expenses came in the operating group, taxes showing a slight increase. A considerable portion of the saving in operating expenses was caused by the modification of the contract under which the company receives electrical energy and which will be a continuing source of economy in operation.

The fixed charges for 1915 showed an increase of \$43,579 or 2.4 per cent over those of the preceding year, this arising from interest accrued on additional bonds issued for improvements and the acquisition of additional property and also from higher rental and amortization charges. The balance remaining for renewals, replacements and dividends was \$155,218 or 17.0 per cent greater than in 1914, while the amount set aside for the renewal and replacement reserve increased \$37,338 or 10.4 per cent.

The lines of the system were not subjected to jitney competition during the last year, for only one jitney appeared in Buffalo. State and municipal authorities passed regulatory legislation which is a safeguard for the future against irresponsible competition from this source. The first two months' operation in 1916 showed a marked increase in gross receipts and the management looks forward to a prosperous year.

Lethbridge Municipal Railway

The commissioners' and auditors' reports of the City of Lethbridge, Alta., for the calendar year, 1915, contain the following data regarding the operations of the Lethbridge Municipal Railway during 1914 and 1915:

	1915	1914
Expenditures .....	\$71,582	\$83,255
Revenue .....	41,740	46,053
Deficit .....	\$29,841	\$37,202
Gross receipts .....	\$41,020	\$45,333
Operating expenses .....	38,199	48,810
Operating ratio (per cent).....	93	108
Net earnings (exclusive of interest, sinking fund, insurance and taxes).....	\$2,821	.....
Net loss (exclusive of interest, sinking fund, insurance and taxes).....	.....	\$3,477
Passengers carried .....	844,307	1,054,848
Average daily receipts .....	\$112	\$124
Transfers .....	49,938	184,481
Car miles .....	294,164	357,938
Revenue per car mile (cents).....	14.19	12.87
Total cost per car mile (cents).....	24.33	23.26
Passengers per car mile.....	2.87	2.95
Average fare per passenger (cents).....	4.77	4.22

The auditors state in their report that the result of the operation of the street railway for 1915 was a net deficit revenue of \$29,841, which was provided for, as in recent years, by taxation. In spite of a diminished revenue this result is said to be a considerable improvement over that in

1914. This is largely attributable to reduced operating charges resulting from the change to the one-man system of cars put into effect in the latter part of that year. It was found necessary during the year, owing to the increased cost of electrical power, to increase the charges to this department for that service from 2 to 2.75 cents per kilowatt-hour, which meant an added charge of \$4,054 for power.

Philadelphia & Western Railway

The gross revenues of the Philadelphia & Western Railway, Upper Darby, Pa., for the year ended June 30, 1916, totaled \$491,488, an increase of \$68,681 over those of the preceding year. Most of this increase came in passenger revenues, which gained \$60,491, although freight revenues in rising \$879 to a total of \$1,882 showed a high percentage gain. The operating expenses at \$234,818 showed an increase of \$24,778, this increase being well distributed among the various operating groups. The operating ratio decreased 1.9 per cent during the year to 47.78 per cent. The maintenance items aggregated 18.5 per cent of the gross revenues and 40 per cent of the operating expenses. The operating income of \$256,669 for the year showed a gain of \$43,902. Taxes increased \$8,700 to a total of \$18,000, but other deductions from income decreased so that the net income for the year, amounting to \$106,319, showed an increase of \$40,893. During the year the company carried 3,370,468 passengers, an increase of 438,775, and ran 1,376,691 car miles, an increase of 100,984. The earnings per passenger car mile amounted to 33.5 cents, an increase of 2.1 cents, and the expenses per revenue car mile were 16.75 cents, an increase of 0.55 cent. There was expended for additions and betterments during the year \$14,432.

Glasgow Corporation Tramways

The working of the Glasgow Corporation Tramways for the year ended May 31, 1916, resulted in an ordinary income of £1,157,336. The working expenses, including payments to dependents of employees at war, totaled £773,442, leaving a net revenue of £383,894. The ordinary income of the preceding year was £1,076,877 and the working expenses £735,897, the net revenue of £340,890 for the last fiscal year thus showing a substantial improvement over the preceding. After adding interest on investments the income of £465,097 was applied to the payment of interest, sinking funds, income tax, parliamentary expenses and depreciation, the total amount so used being £421,549. The net income of £43,548 was paid over to the common good.

The gross revenue for the last fiscal year showed an increase of £95,834, and the average traffic revenue per car mile increased from 10.61d. to 11.049d. The working expenses, excluding expenditures incurred on account of the war, showed an increase of £8,833. The allowances paid to dependents engaged at the front was £68,550 for the year. During the year £62,175 was expended on the upkeep of the tramway track in ordinary repairs. In addition to this, £68,681 was set aside out of the year's revenue to meet the cost covering renewals of track, this sum being calculated at the rate of £350 per mile of single track. The total cost of ordinary repairs to the power plant and sundry machinery during the year was £6,678, and £23,045 was charged against revenue to cover depreciation.

During the last fiscal year, with 650.65 cars in average use on a fourteen-hour day as compared to 628.20 in the preceding year, the car mileage amounted to 24,063,309 car miles as compared to 24,214,460 car miles in 1915. The passenger traffic increased from 336,260,758 in the preceding year to 363,371,464 in the last fiscal year, and the receipts from £1,070,694 to £1,149,264, so that the average traffic revenue per car mile showed a gain from 10.61d. to 11.05d. The percentage of the working expenses to traffic receipts in the last fiscal year was 60.3 per cent as compared to 63.9 per cent in the preceding year. The average total revenue per car mile was 11.127d. in 1916 and 10.674d. in 1915, and the average fare paid per passenger was 0.761d. and 0.764d. respectively. The number of passengers per car mile increased from 13.887 in 1915 to 14.516 in 1916, while the number of passengers per mile of single track rose from 1,697,243 to 1,827,757. The amount expended on capital account during the last fiscal year was £83,448.



## NORTHERN OHIO CONTROL SOLD

## 1000 Shareholders to Profit Through Sale of Stock at Par to Eastern Interests

E. W. Moore, vice-president Northern Ohio Traction & Light Company, Akron, Ohio announced on Aug. 25 that his own interests and those of Henry A. Everett had been sold to E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, contingent upon their obtaining 95 per cent of the common stock now outstanding. These men own more than 30 per cent of this stock. In all there are about 1000 stockholders, and their average holdings are ninety shares each. The agreement is that the price shall be par, or \$100 per share. Following is the statement issued by Mr. Moore at that time:

"A contract has been entered into between the holders of the Northern Ohio Traction & Light Company common stock aggregating a majority for the sale of the stock with the understanding that all holders of common stock may participate on exactly the same price and terms. The price is par, and the dividends payable on Sept. 15 will go to present holders. The sale is contingent upon 95 per cent of all the stock coming in.

"Notices are being mailed to-day requesting deposit of the stock with the Citizens' Savings & Trust Company as trustee. The bank will issue participating certificates. The terms are \$3 a share, to be paid on notice by the trustee that 95 per cent of the stock is on deposit; \$47 a share payable thirty days later, and the remaining \$50 a share to be paid on or before one year later at 6 per cent interest payable quarterly. The trust company certificates will have all of the stock so purchased as security. They will be in negotiable form and usable in place of the stock. Possession of the property will not be turned over to the buyers until a full 50 per cent has been paid."

The buyers have expressed the intention of carrying out all the betterments and extensions that have been planned by the present owners. The \$4,000,000 of forty-year 5 per cent bonds recently sold to N. W. Halsey & Company will be distributed by the National City Bank of New York. While the plans of the buyers, outside of the extensions and betterments, have not been made known, it is believed that there will be no material change in the management. As yet no announcement has been made as to whether or not the purchased company will become a subsidiary of the Commonwealth Power, Railway & Light Company, but this is quite possible.

Lancaster & Southern Street Railway, Millersville, Pa.—Henry A. Hitner's Sons Co., Philadelphia, Pa., which recently purchased at public auction the property of the Lancaster & Southern Street Railway, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26, states that plans are on foot for the reorganization of the railway.

Lincoln Railway & Heating Company, Lincoln, Ill.—The Lincoln Water & Light Company has taken a sixty-day option on the property of the Lincoln Railway & Heating Company, with the result that the former may provide a continuance of street-car service if certain franchise stipulations are granted by the city. A part of this plan is that the Chautauqua extension, heretofore operated as a separate property, be consolidated with the Lincoln Railway & Heating Company, and that adequate service, with a 5 instead of a 10-cent fare, be made to and from the Chautauqua grounds. It is said that the owners of the Chautauqua extension are willing to donate their line if first-class service be granted to the assembly grounds. It will be remembered that the Illinois Public Utilities Commission gave the Lincoln Railway & Heating Company the right to discontinue business provided the City Council of Lincoln would concur in the suspension of street-railway service. It is believed that the new plan will provide for uninterrupted service.

New York (N. Y.) Railways.—The interest on the New York Railways 5 per cent adjustment bonds for the six months ended June 30, as declared by the directors, is \$19.81 per \$1,000 bond, as compared to \$13.70 for the corresponding period of last year. Judge A. N. Hand in the United States District Court on Aug. 25 filed an order granting the petition of the Farmers' Loan & Trust Company in the old Metropolitan Street Railway litigation and

directing that the offer of the New York Railways providing for the settlement of a distributive rate of \$350 for each of 121 refunding bonds with two coupons attached, dated April 1 and Oct. 1, 1908, amounting to \$42,350 less \$5,309 for compensation of the trustee and various disbursements, shall be accepted. It is provided in the order that \$16,483,000 of the refunding bonds in the possession of the New York Railways shall be submitted to the Farmers' Loan & Trust Company and stamped as paid.

Ohio Traction Company, Cincinnati, Ohio.—The \$200,000 of 6 per cent notes of the Ohio Traction Company due on Sept. 1 will be paid off at maturity at the office of the Pennsylvania Company for Insurances on Lives & Granting Annuities, Philadelphia, Pa.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Henry L. Doherty & Company has announced that the executive committee of the Cities Service Company will recommend to the board of directors that the privilege of depositing Toledo Traction, Light & Power Company stocks for exchange for Cities Service Company securities, which expires on Sept. 1, be extended until Sept. 15.

## DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1 3/4 per cent, preferred.  
Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

## ELECTRIC RAILWAY MONTHLY EARNINGS

HOUGHTON COUNTY TRACTION COMPANY,  
HOUGHTON, MICH.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '16	\$26,656	*\$15,862	\$10,794	\$5,266	\$5,528
1 " " '15	24,589	*14,071	10,518	5,561	4,957
12 " " '16	304,420	*169,739	134,681	65,606	69,075
12 " " '15	265,298	*168,278	97,020	67,041	29,979

## JACKSONVILLE (FLA.) TRACTION COMPANY

1m., June, '16	\$50,081	*\$33,705	\$16,376	\$15,419	\$957
1 " " '15	50,516	*35,921	14,595	14,593	2
12 " " '16	615,181	*420,015	195,166	179,273	15,893
12 " " '15	645,282	*447,568	197,714	166,043	31,671

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY,  
LEWISTON, ME.

1m., June, '16	\$72,030	*\$43,039	\$28,991	\$16,094	\$12,897
1 " " '15	67,446	*40,379	27,067	16,011	11,056
12 " " '16	763,749	*502,356	261,393	192,253	69,140
12 " " '15	703,897	*459,876	244,021	187,543	56,473

## NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.

1m., June, '16	\$149,460	*\$97,610	\$51,850	\$28,692	\$23,158
1 " " '15	134,483	*89,537	44,946	27,588	17,358
12 " " '16	1,831,954	*1,117,769	714,185	339,682	374,503
12 " " '15	1,819,725	*1,057,471	762,254	324,459	437,795

## PADUCAH TRACTION &amp; LIGHT COMPANY, PADUCAH, KY.

1m., June, '16	\$24,201	*\$22,917	\$1,284	\$7,132	†\$5,848
1 " " '15	21,769	*13,835	7,934	7,500	434
12 " " '16	301,486	*191,154	110,332	88,440	21,892
12 " " '15	292,512	*186,459	106,053	91,775	14,278

## PENSACOLA (FLA.) ELECTRIC COMPANY

1m., June, '16	\$24,320	*\$13,407	\$10,913	\$7,712	\$3,201
1 " " '15	21,510	*11,745	9,765	7,136	2,629
12 " " '16	277,248	*153,976	123,272	88,722	34,550
12 " " '15	248,544	*153,340	95,204	86,988	8,216

## PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.

1m., July, '16	\$2,214,928	\$1,221,475	\$993,453	\$815,267	\$178,186
1 " " '15	1,939,905	1,095,694	844,211	816,596	27,615

REPUBLIC RAILWAY & LIGHT COMPANY,  
YOUNGSTOWN, OHIO

1m., July, '16	\$326,707	*\$196,867	\$129,840	\$72,305	†\$57,768
1 " " '15	250,907	*\$143,990	106,917	57,620	†49,459
7 " " '16	2,260,626	*1,340,305	920,321	483,394	†438,796
7 " " '15	1,707,826	*1,060,293	647,533	389,923	†258,537

## SAVANNAH (GA.) ELECTRIC COMPANY

1m., June, '16	\$68,110	*\$46,860	\$21,250	\$23,368	†\$2,118
1 " " '15	63,749	*41,847	21,902	22,971	†1,069
12 " " '16	789,536	*\$31,538	257,999	279,644	†21,645
12 " " '15	813,074	*526,557	286,517	277,344	†9,173

## TAMPA (FLA.) ELECTRIC COMPANY

1m., June, '16	\$73,379	*\$42,418	\$30,961	\$4,396	\$26,565
1 " " '15	77,003	*41,898	35,105	4,378	30,727
12 " " '16	975,227	*519,656	455,571	52,255	403,316
12 " " '15	986,799	*507,367	479,432	52,836	426,596

TWIN CITY RAPID TRANSIT COMPANY,  
MINNEAPOLIS, MINN.

1m., July, '16	\$80,859	\$50,215	\$30,644	\$145,046	\$215,656
1 " " '15	793,496	497,120	296,376	144,650	151,726
7 " " '16	5,890,274	3,662,780	2,227,494	998,433	1,229,061
7 " " '15	5,398,033	3,532,136	1,865,897	986,133	879,764

\*Includes taxes. †Deficit. ‡Includes non-operating income.



## Traffic and Transportation

### TENTATIVE STANDARDS FOR WASHINGTON

Public Utilities Commission of District of Columbia Will Consider Adoption on Sept. 6

The Public Utilities Commission of the District of Columbia has issued tentative regulations regarding standards of electric railway service in the district, with the announcement that the formal public hearing for the purpose of considering their adoption will be resumed on Sept. 6. The tentative provisions are as follows:

"Non-rush traffic is hereby defined as that existing from 9:15 a. m. to 3:45 p. m. and from 6:30 p. m. to 10:45 p. m. on mid-week days, and from 9:15 a. m. to 12 noon, and from 6:30 p. m. to 10:45 p. m. on Saturdays. Rush traffic is hereby defined as that existing from 6:30 a. m. to 9:15 a. m. on mid-week days and Saturdays, and from 3:45 p. m. to 6:30 p. m. on mid-week days. Mid-week days are hereby defined as Monday to Friday, inclusive, legal holidays excepted.

"The standard for non-rush traffic shall be on the average 100 seats per eighty passengers carried during a period of one hour, the hour period to be measured commencing on the hour and on the quarter hour points of the hour. The standard for rush traffic shall be on the average 7 sq. ft. of available standing floor area per passenger carried above the number for which seats are furnished during a period of one-half hour, the half hour period to be measured commencing on the hour and on the quarter hour points of the hour. (Accompanying tables indicate the seating capacity and the available standing floor area of the passenger cars now being operated in the District of Columbia.)

"The following traffic is specifically excepted from the application of the standards set: Traffic during all periods of week days not included above and all traffic during Sundays and legal holidays. During these periods and days excepted, the commission will require reasonably adequate and satisfactory service.

"Street railways shall operate all passenger cars in the District of Columbia in accordance with schedules on file with the commission. This shall not be construed to prevent additional cars from being placed in service for special demands. Schedules shall be filed with the commission not later than the date on which they are to become effective. However, schedules reducing any service during periods of week days not included above and on Sundays shall not be filed unless accompanied by the results of observations made on two consecutive days of similar character and covering the same period of days as covered by the reduction in service, and shall not become effective until approved in writing by the commission.

"Observations to determine whether service rendered complies with the standards shall be made only at specified observation points. A compliance observation at any of these observation points shall be the average of the results of observations made on three consecutive days (omitting periods and days specifically exempted from these standards), during identical hour periods, in the case of non-rush traffic, and during identical half-hour periods, in the case of rush traffic.

"Each street railway operating in the District of Columbia shall make compliance observations as provided in the preceding section at observation points, during periods, and in directions specified, once during January, once during April, once during July and once during October of each year, and shall submit the results to the commission on prescribed forms not later than the tenth day of the month following.

"In addition to these periodic compliance observations required, each street railway shall make such observations as will keep it in touch with the demand for service in the District of Columbia and also shall make and submit results of such observations as the commission may direct in writing from time to time. The Bureau of Transit and Equip-

ment Inspection will make such observations from time to time as may be advisable.

"When it comes to the knowledge of the commission through compliance observations made either by a street railway or by the Bureau of Transit and Equipment Inspection that the service furnished at certain observation points is below the standards, the commission may serve on the street railways involved a non-compliance notice, submitting a copy of the results of such observations. Within seven days after the receipt of such notice, the street railway shall file with the commission a schedule which provides for service complying with the standards when compared with the results of the observations submitted, which schedule shall then become effective immediately.

"If, in case a non-compliance notice is based on the commission's observations, the street railway submits, within the seven-day period noted, compliance observations differing materially, in the opinion of the commission, from the commission's observations, joint observations shall be made by representatives of the commission and the street railway and the results of such joint observations shall then be substituted for those determined by the previous observations in question. If such joint observations are authorized by the commission such authorization shall act as a stay of the non-compliance notice so far as it refers to the period and line in question.

"The commission recognizes the fact that frequency of service is also an element of reasonably satisfactory service. The commission may, therefore, require a change in any schedule in which the frequency of service is found to be not reasonably satisfactory."

### SAN FRANCISCO JITNEY ORDINANCE UPHOLD

Court Refuses Permanent Injunction Against Market Street Operation—Test Case Fails

Superior Judge Crothers, in a decision rendered on Aug. 23, upheld the validity of the ordinance barring jitney buses from Market Street, San Francisco, from Sixth to Fremont, between the hours of 10:30 a. m. and 4 p. m. This ordinance was noted in the *ELECTRIC RAILWAY JOURNAL* of July 29 and Aug. 12.

Judge Crothers' decision dissolved the temporary injunction previously issued restraining police regulation, and refused a permanent injunction. It was based primarily upon two grounds, the first being that the Supreme Court of California recently held in the case of Sullivan vs. the San Francisco Gas & Electric Company (148 Cal. 368) that "an injunction should not be issued to enjoin the enforcement of an invalid law where the enforcement does not deprive the plaintiff of property rights, but merely interferes with plaintiff's business." The other reason for the decision was cited as follows: "The right of the governing body (Board of Supervisors) to enact legislation for the reasonable regulation of traffic on city streets is not open to question, and is not questioned by the authorities cited by counsel for plaintiffs. The right of the city to regulate and control the jitney bus traffic has been presented to the highest courts in many states, and although the statutes and ordinances involved have provided almost every conceivable form of restriction, they have in every instance been held to be valid and enforceable." Judge Crothers added: "The right of the legislative body to regulate jitney bus traffic upon the public streets is a matter which, under the decisions cited above, rests in the judgment and discretion of that body, and the courts have no authority to interfere unless it is conclusively apparent that the restriction is purely arbitrary and not in the interest of traffic along or across the street, or for some other reasonable, lawful purpose."

The ordinance went into immediate effect, and on Aug. 24, to provide a test case, a member of the Jitney Bus Operators' Union violated the law and was arrested. On Aug. 25, counsel for the union made application for a writ of habeas corpus from Judge Cabaniss of the superior court, the application being based on the contention that the permit to operate is a franchise and that a franchise under the charter does not become effective until sixty days after it is granted. This application was denied by Judge Cabaniss without argument from the prosecution. The petition was:



then taken to the Supreme Court, where Judges Angellotti, Sloss, Lawlor and Melvin, sitting in consultation, denied the writ without rendering an opinion. This establishes the legality of the ordinance.

### WHO USES THE STREETS?

#### Seattle Check Shows Passenger Automobiles Are 67 per Cent of Traffic—Street Cars Only 14 per Cent

Recently the City Superintendent of Public Utilities of Seattle, Wash., ordered a check of traffic on Second Avenue. The check was made from 7 a. m. to 7 p. m., and consisted of a count of all vehicles passing a point between University and Union Streets. The results of the count, as announced in the Aug. 24 issue of *The Electrogram*, the company publication of the Puget Sound Traction, Light & Power Company, follow:

	Northbound	Southbound	Total
Passenger autos .....	2,494	2,698	5,192
Commercial autos, trucks, etc. ....	562	460	1,022
Teams .....	249	210	459
Street cars .....	539	532	1,071
Total for all vehicles.....	3,844	3,900	7,744

This information gives a good idea of who uses the streets and to what extent. Passenger automobiles, including private machines, taxicabs and jitneys, far outnumber all other vehicles put together. They total 67 per cent of the traffic. Street cars represent about 14 per cent of the traffic. Auto trucks and delivery wagons comprise 13 per cent. Teams represent about 6 per cent. These figures for Second Avenue are said to be probably a reasonable basis for estimating the proportions of street use in other portions of the city. In any event, they represent the downtown traffic.

Of all this traffic, the street cars, comprising but 14 per cent of the whole, are the only street users which pay special taxes for the use of the streets. The street cars pay for paving that portion of the streets between their tracks and a strip on each side. No other form of traffic pays for any portion of the paving.

The street car company pays one-half of the salary of the city's traffic officers at busy corners. Yet only 14 per cent of the traffic which these men regulate is street car traffic, and the other 86 per cent pays no part of the officers' salaries. A large portion of the automobile traffic, which forms 67 per cent of the street users, is jitney bus traffic. These users of the streets pay no portion of paving cost, no portion of traffic officers' salaries. They make free use of the streets for profit.

### SACRAMENTO JITNEYS HARD HIT

With the possible exception of a few cars, Sacramento, Cal., is without a jitney service, all operators having withdrawn on Aug. 12, when Superior Judge Malcolm C. Glenn dissolved the injunction against the city ordinance regulating the operation of jitneys. Immediately upon the dissolution of the injunction, which had been in effect since July 21, 1915, 170 members of the Jitney Association declared that they would withdraw their cars from the streets. About eighteen private operators also expressed their decision to cease work rather than to take a chance of running afoul of the new ordinance.

The present jitney ordinance, which provides for an annual license of \$40, a bond of \$10,000, a fixed route and a fare not higher than 5 cents, was adopted last year by the City Commission. Before it went into effect the Jitney Association, through its secretary, A. P. Michaelson, asked that an injunction be issued. Judge Glenn issued the injunction and City Attorney Yell immediately appealed to the Supreme Court. This court just recently handed down an opinion which opened the way for Mr. Yell to ask for the dissolution of the injunction.

The jitney operators, however, have not given up the fight. Unless the City Commission agrees to make certain modifications in the new jitney ordinance, the Jitney Association has decided to invoke the initiative and submit a new ordinance to the people of Sacramento.

The Sacramento *Star* has made the following editorial comment on the situation:

"A greater burden is now upon the street railway company. The people have become accustomed to handy service

and rapid transit. If the street railway can, in a large measure, meet the public demand the jitney soon will be forgotten.

"If the jitney men wish to come back they must form a reliable association and be ready to submit to regulation. That the drastic ordinance now in effect can be modified is generally believed. But the jitney men have lost an opportunity and it is unlikely they will regain the prestige they once had.

"So we must fall back on the street railway and ask its officers to meet the public demand. The company has shown a fine spirit in the last year. If this is maintained we predict good relations between the corporation and the people."

### MUTUAL INSURANCE FOR JITNEYS

#### New Orleans Operators Complete Arrangements for the Formation of Bonding and Insurance Company

Jitney interests in New Orleans, La., have completed plans for the formation of the Automobile Mutual Liability Indemnity Association, a mutual society to insure against loss or damage any automobile engaged in the jitney business and to protect members from loss by legal liability or damage to property resulting from a collision in which a jitney automobile figures.

Operation of the proposed corporation is to begin as soon as \$25,000 of premiums has been paid in. A sum in excess of \$25,000 already has been subscribed by members of the association, and, allowing for some subscriptions which may not materialize, organizers of the mutual indemnity society are confident that the \$25,000 required by the State law will be on deposit in a New Orleans bank in a short time.

It is said that assurances have been received from the city authorities that bonds given by such an organization as the one proposed will be accepted from jitney owners. The bond required for operation of a jitney under the city ordinance is \$5,000.

The terms of members will be three years, with the privilege of renewal. Any member may be expelled for cause on five days' notice, and in such case the unexpired proportion of assessments for the year will be returned. In case of any claim against the company in excess of the surplus fund, extra assessments will be made against members. Each member will possess one vote without regard for the amount of stock in the company he has subscribed for.

Raising the \$25,000 capital necessary to incorporate the association has involved the mortgaging of many cars that will be used as jitneys. Members of the jitney association not only pledged as large sums in cash as each felt he could afford, but in addition all will offer mortgages to make up the securities needed. Of the \$25,000 required only \$10,000 must be cash. The rest may be negotiable paper.

**Kansas City Adopts Loading Signs.**—The Kansas City (Mo.) Railways has arranged for painting arrows on the pavement at loading points at downtown intersections, to show the exact spot at which passengers may board.

**Atlantic City Regulates Jitneys.**—Atlantic City on Aug. 24 assumed complete supervision over jitney buses. The ordinance regulating their use outlines routes and fares and other matters. Violations of the ordinance are punishable by fines up to \$100 or imprisonment for ninety days. The route along the principal thoroughfares covers about 3 miles, and automobiles must continue to the end. Five-cent fares are to prevail, except that 10 cents may be charged from midnight until 5 a. m.

**New Bathing Beaches Help Railway Traffic.**—The construction of municipal bathing beaches along the shore of Lake Erie near the Buffalo, N. Y., city line has greatly increased Saturday and Sunday traffic over the line of the Buffalo & Lake Erie Traction Company between Buffalo and near-by towns on the lake shore. Estimates by company officials place the total number in bathing on Sundays at more than 75,000, a large percentage of whom use the company's lines to reach the municipal beaches. All available cars have been pressed into service, and the company has leased a number of interurban cars from the International Railway to use during the rush hours.



**Jitney Overloading Prohibited in El Paso.**—The City Council of El Paso, Tex., has passed an ordinance prohibiting overloading of automobiles used in the jitney service here. During the street-car strike the jitneys were inclined to haul as many people as could find room in the cars, and this condition led to the drastic law that has been passed. Under the new law jitney drivers are allowed to carry only the regular carrying capacity of their cars; that is, a five-passenger automobile is allowed to haul but four passengers. Sitting on the doors or standing in the cars or on the running boards is prohibited. Jitney men assert that the law will put them out of business.

**Proposed Franchise for Portland Jitneys.**—Commissioner Daly of the department of public utilities has completed his revision of the proposed franchise for the operation of jitneys over what is known as the Hawthorne Avenue route sought by the Union Motor Bus Company, and will present it to the Council for consideration at the next meeting. This franchise when approved by the Council will serve as a model for other franchises for the operation of jitneys. The franchise provides for a five-minute headway between 7.30 a. m. and midnight on week-days and a fifteen-minute headway between 9 a. m. and midnight on Sundays, a license fee of \$6 a quarter, a 5-cent fare and a monthly inspection of machines.

**State Official Praises Louisville Safety Work.**—Those in charge of the safety work of the Louisville (Ky.) Railway were highly pleased with the compliment paid the work by Robert T. Caldwell, chairman of the State workmen's compensation board, which recently began work. Mr. Caldwell, in a recent address before the Louisville Rotary Club, emphasized the accident-prevention phases of compensation systems, and said that the co-operation of manufacturers would go a long way in the direction of preventing injuries to their workmen. In this connection he used as an illustration the efforts of the Louisville Railway and its men in co-operating with the public to reduce accidents, and said that the work accomplished by the company was marvelous.

**Seattle Council to Consider Jitney Regulation.**—Initial steps for the regulation of jitney buses in Seattle were taken by the City Council recently when a committee of three members was appointed by President A. F. Haas to submit a report and such ordinances as it deemed necessary. The committee was named after the Council had gone into session as a committee of a whole to discuss the report submitted by the assembly of improvement and civic clubs, prepared by A. V. Bouillon, Edgar J. Wright, J. A. Paine and other club representatives. A letter from the Puget Sound Traction, Light & Power Company asking the Council to take some steps to regulate jitney competition was submitted by A. L. Kempster, manager of the company. Accompanying the communication was a huge stack of printed petitions containing 41,751 signatures. An affidavit certifying to that number was made by Mr. Kempster's chief clerk. These petitions were mentioned in the ELECTRIC RAILWAY JOURNAL of Aug. 26.

**Official Report on South Cambria Accident.**—John P. Dohoney, investigator of accidents of the Public Service Commission of Pennsylvania, on Aug. 26 presented to the commission a comprehensive report on the head-on collision which occurred on the Southern Cambria Railway on Aug. 12, in which twenty-six people were killed and a score injured. According to Mr. Dohoney, the death of the two motormen prevented the obtaining of more definite information as to the causes of the disaster, but it seemed that the air brakes failed and the hand brakes were broken in trying to stop one of the cars. The investigation made, it was said, had developed the fact that the daily mechanical inspection of the cars was not thorough. Mr. Dohoney therefore recommended that the commission instruct the company to see that the brakes were inspected daily and also frequently tested during the day. Chairman Ainey of the commission stated that the commission would direct the bureau of engineering to make a careful examination of the tracks, grades, safety devices, etc., in use and the condition of the cars and property of the company with a view to determining what further orders or recommendations should be made to provide maximum safety.

## Personal Mention

George A. Smith has been appointed assistant general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa.

C. N. Stannard, secretary of the Denver Gas & Electric Light Company, Denver, Col., was recently appointed to the committee on traction matters of the Denver Civic Association.

J. W. Atkins has recently been made engineer of power station of the Savannah (Ga.) Electric Company, being transferred to Savannah from the Blackstone Valley Gas & Electric Company of Pawtucket, R. I.

Joseph A. West, formerly chief engineer of the Ogden (Utah) Rapid Transit Company and the Ogden, Logan & Idaho Railway, has been appointed chief engineer of the Sumpter Valley Railroad of Oregon.

R. T. Guernsey has been appointed traveling freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa. The position of commercial agent at Cedar Rapids has been abolished.

Ernest Gonzenbach, who recently resigned as general manager of the Empire United Railways, Syracuse, N. Y., has been elected vice-president of the Allen Seed Company of Sheboygan, Wis., and has moved to that city, which was formerly his residence.

P. J. Kealy, president Kansas City (Mo.) Railways and colonel of the Third Regiment M. N. G., after a month's leave of absence has returned to his regiment at the border. Colonel Kealy was rejected temporarily by the federal army authorities on account of physical examination, but will now be re-examined.

Alfred F. Townsend has been appointed local manager of the Stone & Webster properties in Beaumont and Port Arthur, Tex. Mr. Townsend has been associated with Stone & Webster for the last fifteen years and identified during that period with the public service utilities at Lowell, Mass.; Ponce, Porto Rico; Sydney, Nova Scotia, and with the Glace Bay Railway. For the last seven years he has been manager of the Woonsocket (R. I.) Electric Machine & Power Company.

W. B. Voth, recently chief engineer and purchasing agent of the Empire United Railways, N. Y., is a native of Milwaukee, Wis., and a graduate in the electrical engineering course of the University of Wisconsin in 1897. After several years in the construction and operation of hydroelectric properties in Wisconsin, he was appointed resident engineer in Sheboygan in 1904 for the building of a steam power station, the reconstruction of the commercial and street lighting system and the building of a single-track interurban railway. After the completion of this work he remained to operate the line as general superintendent. About two years ago he became chief engineer and purchasing agent of the Empire United Railways.

John F. Vaughan has been retained by the banking house of Estabrook & Company, Boston, Mass., as consulting engineer in connection with the redevelopment of a 20,000-kw. hydroelectric plant at the Canadian Sault, and has opened an office at 185 Devonshire Street, Boston, for the practice of consulting engineering. Mr. Vaughan has been employed for about fifteen years by the Stone & Webster Engineering Corporation and has been active in connection with power transmission and hydraulic problems, having served as chairman of the hydraulic section of the National Electric Light Association prime movers committee. He was engaged in steam railroad electrification work with the late N. H. Heft before joining the staff of Stone & Webster, taking part in the initial engineering associated with the Nantasket Beach line and other pioneer third-rail work. He is the inventor of the Vaughan hydraulic flow meter.

Walter Alexander has been appointed chairman of the Wisconsin Railroad Commission to succeed Halford Erick-



son, who resigned from that position in May. Mr. Alexander has been a member of the commission since February, 1915, previous to which he was for thirteen years assistant district master mechanic and district master mechanic of the Chicago, Milwaukee & St. Paul Railway. He was born in Glasgow, Scotland, in 1872, and was brought to this country in 1873. He served an apprenticeship as a machinist and draftsman with the Chicago, Milwaukee & St. Paul Railway, later being employed as a fireman on the same road. He entered the University of Wisconsin in 1893, and graduated from the course in mechanical engineering in 1897. For three years he was an instructor in engineering at the University of Wisconsin, one year at Armour Institute and one at the University of Missouri. He then returned to railway work as assistant district master mechanic of the Chicago, Milwaukee & St. Paul at Minneapolis, Minn. Two years later he was transferred to Milwaukee, Wis., to a similar position, and later was promoted to district master mechanic at that point.

**Britton I. Budd**, of the governing committee of the Chicago (Ill.) Elevated Railways, and president of the elevated railroads controlled by that company, has been elected president of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Budd thus adds to his responsibilities as operating head of 184 miles of elevated railway, more than 160 miles of high-speed suburban and interurban railway. Mr. Budd was born at San Francisco, Cal., on Sept. 7, 1871. He was educated in the public schools of Chicago and at the Shattuck School, Faribault, Minn. He entered railroading in the engineering corps of an Ohio railroad, and was with the Intramural Railroad at the World's Fair, Chicago. In 1894 Mr. Budd entered the service of the Metropolitan West Side Elevated Railway, Chicago, as a clerk in the storekeeper's office, and was storekeeper for five years. In 1899 he was made purchasing agent, a position he held until April, 1907, when he was appointed general manager. In February, 1910, Mr. Budd was elected president of the Metropolitan West Side Elevated Railway, and in 1911 became operating head of all the elevated railways in Chicago.

**Samuel Insull**, president of the Commonwealth Edison Company, Chicago, Ill., has been made chairman of the board of directors of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Insull is one of the foremost men in the public-utility field in the United States. He was born in London, England, in 1859. In February, 1881, he became private secretary to Thomas A. Edison, of whose business affairs he had full charge for many years. When the various Edison manufacturing concerns, with the Edison Electric Light Company, were consolidated into the Edison General Electric Company, Mr. Insull became second vice-president in charge of manufacturing and selling, and when the company was consolidated in 1892 with the Thomson-Houston Company as the General Electric Company he became second vice-president of the latter company. Mr. Insull, besides the interests already noted, is connected with the Middle West Utilities Company as president, the Chicago Elevated Railways as trustee, the Chicago & Oak Park Elevated Railroad as receiver, the Metropolitan West Side Elevated Railway as chairman of the board, the Northwestern Elevated Railroad as chairman of the board, the South Side Elevated Railroad as chairman of the board, the Sterling, Dixon & Eastern Electric Railway as president, the West Penn Traction & Water Power Company as president, the West Penn Traction Company as president, the West Penn Railways as president, the Twin States Gas & Electric Company as president, the Wheeling Traction Company as president, and the People's Gas, Light & Coke Company (Chicago) as chairman of the board.

#### OBITUARY

**Walter Chur**, president and general manager of the American Railway Supply Company, New York, died on Aug. 29 at his home in East Orange, N. J., from heart disease.

**James A. Leslie**, for the last twelve years superintendent of the Fourth Street Division of the United Railways of St. Louis, died on Aug. 18. He is survived by a widow and seven children.

## Construction News

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

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

#### RECENT INCORPORATIONS

**Northwestern Connecting Railway, Meadville, Pa.**—Chartered in the interests of the Northwestern Pennsylvania Railway, to construct a line between Silverling's Corners and Cambridge, Pa., 3½ miles. Incorporators: Charles M. Hatch, vice-president and general manager, and A. A. Culbertson treasurer, Northwestern Pennsylvania Railway, Erie.

#### FRANCHISES

**Mill Valley, Cal.**—The Superior Court of Contra Costa County has declared the franchise of the Marin County Electric Railway in Mill Valley forfeited owing to the failure of the company to construct the line. [May 6, '16.]

**Bridgeport, Conn.**—The appeal of the Connecticut Company relative to the abandonment and removal of its tracks on East Washington Avenue, from Main Street to Noble Avenue, has been denied by the Public Utilities Commission of Connecticut. The petition was also refused by the mayor and Common Council of Bridgeport.

**Henderson, Ky.**—An ordinance has been placed by the Council of Henderson providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical and the company has stated that it does not plan to bid for the privilege of operating under it. Further reference to the franchise is made on page 416.

**Methuen, Mass.**—The Bay State Street Railway has received a franchise from the Council to relocate its track on Lowell Road.

**Newark, N. J.**—The Public Service Railway has asked the Board of Works for a fifty-year franchise to construct a double-track line on Roseville Avenue, from Orange Street to Bloomfield Avenue.

**Dunkirk, N. Y.**—Claiming it has been operating the Dunkirk belt line at an annual loss of \$17,000, officials of the Buffalo & Lake Erie Traction Company appeared before the City Council of Dunkirk and urged approval of its application to abandon this service and take up the track. Decision was reserved.

**Cincinnati, Ohio.**—The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad is seeking a renewal of its twenty-five year franchise. The company proposes to float a \$1,000,000 bond issue with which to build a 6½-mile extension into Cincinnati when the rapid transit terminal is completed if the renewal is granted.

#### TRACK AND ROADWAY

**Visalia Electric Railroad, Exeter, Cal.**—A contract has been awarded by this company to Robert Sherrer Company, San Francisco, for grading 20 miles of line. Work has been begun at Strathmore on the new extension of the Visalia Electric Railway, and the line will be built immediately into the El Mirador country. The next move of the company will probably be the branch into Lindsay, the plans for the routing of which the company is now working out. Work has already been begun on the Santa Fé branch southward. The present terminus of that line is in Lindsay, although the orchards to the south are being penetrated by crews of workmen and the trees in the line of the route are being uprooted.

**Municipal Railway of San Francisco, San Francisco, Cal.**—A contract has been awarded to the United States Steel Products Company, San Francisco, under contract No. 86, for furnishing and delivering rails and rail joints for the Twin Peaks Tunnel line.

**Bridgeport & Danbury Electric Railway, Danbury, Conn.**—It is reported that several capitalists are going over the



proposed route of this company's line to Danbury, with a view to constructing the road and investing in the proposition. The cost of building the line is estimated at \$400,000.

**Atlanta & Anderson Electric Railway, Atlanta, Ga.**—The enactment of the interurban act by the General Assembly makes possible the construction at an early date of the Atlanta & Anderson Electric Railway, to extend from Atlanta through northeast Georgia and connecting at Anderson, S. C., with the interurban line of the Piedmont-Northern Railway. A charter for the new railway company will soon be applied for. J. L. Murphy, Atlanta, is interested. [July 22, '16.]

**Pocatello Traction & Interurban Company, Pocatello, Idaho.**—W. K. Palmer, of the W. K. Palmer Engineers Company, Kansas City, is going over the proposed route of the Pocatello Traction & Interurban Company, preparatory to making preliminary and location surveys. The purpose of the company is to develop a project for building a heavy electric traction line for freight and passenger business. The proposed line will connect with the present line of the Ogden, Logan & Idaho Railway at Preston, Idaho, and extend north through Downey, Pocatello, Idaho Falls, Ashton and Yellowstone, Mont., with a possible connection north to the Northern Pacific Railroad in Montana. The line will be from 200 to 250 miles in length, as nearly as can be determined at the present time. It will include single track of standard heavy construction and catenary overhead. All trains will be operated by electric locomotives, with power from one of the present established systems in operation in that vicinity. The project is entirely independent of any of the present railroad systems, and will make freight its first consideration. [July 15, '16.]

**Union Traction Company of Indiana, Anderson, Ind.**—This company is installing new rails in the curve at the corner of Thirteenth and Meridian Streets, Anderson. The construction of new track on South Meridian Street will be begun soon.

**Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.**—The necessary right-of-way has been acquired by this company for the double-tracking of its line from the Indianapolis city limits to the motor speedway, 1 mile.

**Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.**—It is reported that this company is considering the construction of an extension to Evanston.

**United Railways & Electric Company, Baltimore, Md.**—This company has completed and placed in operation its extension of the St. Paul Street line to Guilford, 1 mile.

**Berkshire Street Railway, Pittsfield, Mass.**—About \$25,000 will be spent by this company in improvements in Pittsfield during this summer. New tracks are being laid in Tyler Street and West Street.

**Detroit (Mich.) United Railway.**—Work preliminary to the construction of this company's new line on Hamilton Boulevard in Highland Park from the city limits to the Six Mile Road, for which permission was recently voted by the electors of the village, was begun last week. The line will be double-tracked and constructed in the center of an ornamental parkway to be created by the village. Work will begin within two weeks on the construction of a double-track extension of the West Warren line from its present terminus to the city limits. It is expected that the line connecting Victor Avenue with Forest Avenue East will be in operation within thirty days. Starting from the easterly terminus of the new line, the cars will run west to Gratiot Avenue, there taking the Gratiot tracks to Mount Elliott Avenue, following this line to Harper Avenue, where they turn west over the tracks of the Grand Belt route along Milwaukee Avenue as far as Chene Street and Jos. Campau Avenue, then going north on this line to the Davison Road, where they will turn west over the tracks now being constructed to Oakland Avenue and then north on Oakland Avenue to Victor Avenue to the big Ford Motor Company's plant. The entire line will be double-tracked except that portion of Jos. Campau Avenue between Caniff Road and Davison Road.

**New York Municipal Railway Corporation, Brooklyn, N. Y.**—The contract for the installation of tracks on the

Broadway-Fourth Avenue system in Manhattan and Brooklyn, from Fifty-ninth Street, Manhattan, to a connection with the Flatbush Avenue extension of the Interborough Rapid Transit Company, has been awarded to T. H. Reynolds Contracting Company, New York, at \$288,400. The work includes the installation of about 25 miles of single track, the city furnishing rails and most other materials, the contractor furnishing labor, concreting materials, and a small amount of cast-iron pipe. Bids will be received by the Public Service Commission for the First District of New York until Sept. 13 for the construction of Section No. 1-B of Route No. 12 in Brooklyn.

**Interborough Rapid Transit Company, New York, N. Y.**—Bids will be received by the Public Service Commission for the First District of New York until Sept. 8 for the supply of four portions of special work for use in the construction of the Pelham branch of the subway. Bids will also be received by the commission until Sept. 8 for the installation of tracks for the Seventh Avenue branch of the Seventh Avenue-Lexington Avenue line in Manhattan and Brooklyn.

**Piedmont & Northern Railway, Charlotte, N. C.**—This company will construct an 8-span, deck-plate girder bridge, 700 ft. long and 55 ft. above normal water, across the Catawba River, at Mt. Holly, to replace the structure recently destroyed by flood. The contract for steel work has been awarded the Virginia Bridge & Iron Company, Roanoke, Va., and the contract for masonry to Thomas Sheahan, Hagerstown, Md. The cost of the structure is estimated at \$125,000.

**Bartlesville, Okla.**—The W. K. Palmer Engineers Company of Kansas City is now engaged in making location surveys and preparing plans and specifications for an electric interurban railway to connect Bartlesville with Nowata, Welch or Blue Jacket and Miami. The line will be about 70 miles long, and will consist of standard heavy construction, with catenary overhead, and will carry both freight and passengers. The road will probably generate its own power. All arrangements for capital have been made. D. F. Mason and F. M. Overless, Bartlesville, are interested.

**Oklahoma & Interstate Railway, Oklahoma City, Okla.**—A party of four capitalists from Philadelphia, who will furnish the capital for the construction of the Oklahoma & Interstate Railway, were recently expected to arrive in Kansas City to go over the lines of the northern division of the line. This part of the system has already been located by the W. K. Palmer Engineers Company, Kansas City. It is expected that arrangements will be made to go forward with the construction at once. John R. Rose, Oklahoma City, president. [April 29, '16.]

**London, Ont.**—Surveys are being made by engineers of the Ontario Hydro-Electric Power Commission for an electric railway from London to Owen Sound, 175 miles, and they will prepare estimates of the cost as soon as possible.

**London & Port Stanley Railway, London, Ont.**—Announcement has been made by the London Railway Commission, operating the London & Port Stanley Railway on Lake Erie, of certain improvements, including a grain elevator to cost \$100,000, a new tea house, and a public bathing house containing one thousand rooms; also about 12 miles of double tracking.

**Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.**—Work has been begun on this company's proposed line from Womelsdorf to Myerstown, and it is expected that the line will be placed in operation within a year. Leroy R. Valentine, Womelsdorf, president. [Aug. 5, '16.]

**South Carolina Light, Power & Railways Company, Spartanburg, S. C.**—This company has awarded to the J. G. White Engineering Corporation, New York, a contract for the consulting engineering in connection with the design and erection of a concrete dam 600 ft. long and 45 ft. high, on the Broad River, near Gaston Shoals, approximately 30 miles from Spartanburg. This dam will be in connection with the company's hydroelectric development at Gaston Shoals.

**Marlin-Temple Interurban Company, Marlin, Tex.**—In connection with its proposed electric railway from Marlin to Temple, this company will construct three bridges. S. D. Hanna, Temple, chief engineer. [Aug. 19, '16.]



**San Antonio (Tex.) Traction Company.**—This company is acquiring additional land and is building siding and extra tracks at and leading to all depots in San Antonio, to provide facilities for handling the crowds to and from the depots and the business section of the city.

**Wisconsin Interurban System, Madison, Wis.**—This company has awarded a contract to John T. Adams, Columbus, Ohio, for grading on the section of its interurban line from Madison to Stoughton. J. E. Jones, Madison, president and general manager. [May 27, '16.]

#### SHOPS AND BUILDINGS

**Southern Pacific Company, San Francisco, Cal.**—This company has awarded a contract to Lindgren Company, San Francisco, for the construction of a ten-story office building at San Francisco. It is stated that the structure will cost about \$2,000,000.

**Arkansas Valley Interurban Railway, Wichita, Kan.**—It is reported that this company plans the construction of a new carhouse.

**Michigan Railway, Kalamazoo, Mich.**—This company contemplates the construction of a 7-story terminal station at Grand Rapids. The building will have a large waiting room, and cars will enter the terminal over eighteen tracks.

**Cleveland & Youngstown Railroad, Cleveland, Ohio.**—It is reported that this company, which proposes to construct a line between Cleveland and Youngstown, contemplates the construction of a freight terminal and warehouse at Broadway and Orange Avenue. The structure will be 150 ft. x 400 ft., six stories high, and will be of reinforced concrete, brick and steel. The cost is estimated at \$1,000,000. W. J. Watson & Company, Leader News Building, Cleveland, are the architects and engineers. W. E. Pease, Cleveland, engineer for the company.

#### POWER HOUSES AND SUBSTATIONS

**Bangor Railway & Electric Company, Bangor, Me.**—A new substation will be erected by the Bangor Railway & Electric Company at East Corinth, to be used for the extension of the company's lighting and power service in the vicinity.

**Bay State Street Railway, Boston, Mass.**—It is reported that this company contemplates the construction of an extension to its generating station at Quincy Point, making the station twice its present size. It is stated that five turbines will be installed of the same capacity as those now operated. The cost of the addition to the building is estimated at about \$70,000.

**Iron River, Stambaugh & Crystal Falls Street Railway, Iron River, Mich.**—A report from this company states that it will purchase a 300-kw. rotary converter.

**Beaver Valley Traction Company, New Brighton, Pa.**—The powerhouses of this company at Junction Park and Economy will be abandoned. Power will be generated from Brunots Island. Three substations will be built by the company and transformers installed.

**Nashville Railway & Light Company, Nashville, Tenn.**—This company has installed a 2000-kw. motor-generator set at its central station, consisting of a 2800-kva., 2300-volt, three-phase synchronous motor, direct-connected and unit-mounted with a 200-kw., 600-volt generator and 150-kw., 250-volt exciter. This replaces two 500-kw. and one 1000-kw. rotary converters. The motor-generator set is connected to the station buses, and can be driven either by the local steam units or by energy from the Tennessee Power Company's Ocoee hydroelectric plant. The new equipment is designed to take care of a 50 per cent overload, so that the peak load of the railway traffic may be cared for without surplus installation, on the basis of a fairly average load. A 500-kw. motor-generator substation has also been installed to improve service on the West Nashville lines, which were formerly operated by power from a 7-mile transmission line. As a result considerably faster schedules have been arranged. This motor is also synchronous. The high-tension line is operated at 13,200 volts, 60 cycles, three-phase and the motor is rated at 700 kva., with a 500-kw. generator and 11.5-kw. exciter, unit-mounted. The set is capable of running continuously for twenty-four hours and of running two hours on 50 per cent overload.

## Manufactures and Supplies

### WESTERN AND NORTHERN CEDAR SHIPMENTS ABOVE AVERAGE

**Pole Line Construction Less Than Indicated Early in Year, Due to High Cost and Delayed Deliveries of Fittings**

It now appears that the transmission line construction during 1916 will total less than for several past years. High prices for line wire and pole fittings and the slow deliveries of these essentials have, in turn, caused a reduction in pole shipments for this purpose. However, the Western Red Cedar and the Northern White Cedar Associations report that for the first six months of 1916 the demand for cedar poles has been better than that of an average half-year.

In many respects the conditions surrounding the marketing of Northern and Western Cedar during the first half of the year were similar. At the beginning of the year indications were numerous that 1916 was to see a strong demand for poles. Producers and distributors received many inquiries for prices and estimates on expected pole requirements. Evidence was plenty that pole line construction which had been held back since the European war started would be pushed to completion during 1916. Indications pointed to a boom demand.

As time went by, however, it became evident that slow delivery of other materials used in pole lines were delaying some of this construction. This particularly affected the larger undertakings, such as long-distance projects.

This is the situation as it exists to-day. The companies operating in both the Northern and Western cedar-producing sections have felt the car shortage to some extent, but the cedar companies generally have been able to make quite satisfactory deliveries. Shipments of Western red cedar have frequently traveled across the country from Idaho and Washington in quick time.

Both Northern and Western cedar producers report a steadily widening market for cedar poles. Cedar is being shipped more and more into territory hitherto controlled by local woods. The use of Western red cedar poles is said to be increasing in outlying districts of large cities where beauty of pole line is demanded. Electrical construction, in cities particularly, is demanding a straight, sturdy, symmetrical pole of light weight that will carry a heavy load. That Northern white cedar meets this requirement satisfactorily is shown by its increased use for such purposes by large companies operating in big cities.

The cedar companies report collections as satisfactory, and the production of western and northern cedar is said to be normal.

### RAPID INCREASE IN EXPORTS OF SUPPLIES

**Value of Railway Materials and Equipment Exported Shows Increase of More Than 100 Per Cent Since 1914**

According to figures compiled by the Bureau of Foreign and Domestic Commerce, railway materials and equipment valued at \$75,000,000 were exported from the United States in the last fiscal year. The exports of this class have more than doubled since 1914.

The material shipped to Russia, France and Spain, practically new foreign markets for this equipment, accounts for a large proportion of the increase. Figures for June exports, given below, show that Russia received over 67 per cent of the freight cars exported, France received over 68 per cent of the steel rails and Spain received 37 per cent of the steam locomotives.

Until very recently Canada and Cuba have been the foremost foreign markets for our freight cars; Cuba, Canada and Brazil the largest markets for exported locomotives, and Canada, Australia, Japan, Brazil, Argentina and Cuba the leading markets for our steel rails. At present we are sending unusual quantities of freight cars and other supplies to Russia chiefly via her Pacific frontier, and, of course, consignments are going also to France and Spain as well as to



our established markets in Cuba, Canada and Central America. The following figures for June exports indicate the present important markets for railway supplies; the total exports of freights cars for the month was valued at \$1,613,000 of which \$1,086,000 worth went to Russia. Steel rails to the value of \$1,730,000 were sold abroad during the month, the exports to France alone amounting to \$1,188,000. Of the \$721,000 worth of steam locomotives sold abroad, \$272,000 went to Spain.

The quantities of railway material exported during the fiscal year ended June, 1916, as compared with the fiscal year 1914, are shown in the following table:

Classes of Railway Material Exported	Fiscal Year	Fiscal Year
	1916	1914
Railway cars .....	\$26,660,000	\$11,178,000
Rails for railways.....	17,687,000	10,259,000
Locomotives, steam .....	12,666,000	3,692,000
Locomotives, electric .....	455,000	437,000
Engine parts (all kinds).....	7,274,000	3,357,000
Switches and other track materials....	5,262,000	2,534,000
Ties .....	2,435,000	2,565,000
Railroad spikes .....	1,399,000	346,000
Car wheels .....	742,000	414,000
Telegraph instruments .....	149,000	137,000
	\$74,729,000	\$34,919,000

### NOVEL AND SUCCESSFUL EMPLOYMENT METHOD

#### Newspaper Advertisement for Labor in Cleveland Brings Satisfactory Results

Selling a job to a worker is a new way to get good, earnest applicants for shop jobs in these times of scarce labor. The Lincoln Electric Company, Cleveland, needs men and does not feel that it should be called upon to bid for men against concerns that offer only temporary jobs at munitions manufacture, so it is successfully gathering into its organization good, earnest workers by advertising salesmanship. Space 4 in. high and two columns wide is used in the local papers. Portraits of workers are shown with descriptive titles about their service, as for example, "Age twenty-three, worked two years, now making \$25 a week with bigger pay ahead."

The text of the advertisement reads as follows:

"Learn the electrical business.

"This week we will give twelve young men (eighteen years or over) a chance to learn the electrical business in our plant.

"We will teach them a line of work so that they can always get good positions elsewhere. We guarantee steady work here to good men.

"Good pay while learning.

"In two months' time a bright boy can be earning high wages. Pay according to work done. Should be able to speak, read and write English and must be quick with hands. Manual training school or shop training will help, but not necessary.

"Only twelve chances open. Come to general office and ask for Mr. Meeks.

"The Lincoln Heater Company, East Thirty-eighth Street and Kelley Avenue."

These advertisements inserted frequently have brought good young men to the plant, those who have their future in view and are desirous of getting into work where they can grow, rather than disregard the future for immediate salary. It is pointed out that this is a simple method which any electric railway might follow if it desired to increase its forces.

### EUROPEAN LUMBER MARKETS TO BE INVESTIGATED

At a conference held in Chicago on Aug. 21 the Government, through the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the lumber manufacturers of the United States decided to co-operate in sending abroad a corps of experts to study the condition of European lumber markets with a view to a great expansion of the field of the American producer. As a result of this conference the immediate passage of the Webb bill now pending in Congress will be urged. The passage of this bill will remove any question of the legality of the organization of foreign sales agencies to secure and distribute orders for American goods to be sent to foreign countries.

Detailed reports of conditions abroad show that Belgium, France, England, Scotland, Italy and Spain have exhausted their supply of lumber. Russia has great supplies of standing timber, chiefly Baltic pine, but owing to its lower quality it is not suited to the demand. Conditions in Germany have not been estimated. In order to secure the great volume of foreign lumber business when the rebuilding of these nations commences at the end of the war the American lumber industry must go after the trade systematically, with an advance knowledge of the needs of the various nations. It is hoped that the investigators and agents can be on their way abroad by Nov. 1.

### CAR COUPLERS IN DEMAND

The market for car couplers seems to be increasing faster than the number of cars ordered would indicate. Boston has placed a large order with the Ohio Brass Company for Tomlinson radial couplers. This calls for 200 surface car coupler equipments, including the air coupling attachments, and eighty-four heavy type coupler equipments for the elevated division. Moreover, 400 fifteen-point electric train-line couplers have been ordered for multiple-unit service in the East Boston Tunnel. This is sufficient equipment for 100 cars. The Toledo Railways & Light Company has ordered 120 coupler equipments to include air and five-point electric connections.

Coupler orders from interurban roads are frequent but of course do not call for such large quantities as the city road orders. Interurban type couplers totaling nearly 1000 in number have been sold by the Ohio Brass Company so far this year. The interurbans seem to be running more two-car trains than before and according to the opinion of the coupler manufacturers multiple-unit and trailer service in the cities also is on the increase.

### PRICE OF ZINC MAKES COST OF EXTRUDED BRASS TROLLEY EARS PROHIBITIVE

The jump in the price of zinc of more than 240 per cent since 1914 has forced such an increase in the price of extruded brass trolley ears that some roads which, from the service standpoint, greatly favor the extruded ear have found it necessary on the score of lower first cost to return to the use of cast bronze ears. The yellow brass from which extruded ears are made contains about 40 per cent zinc, while ordinary bronze ears are cast from a mixture containing about 5½ per cent zinc and about the same amount of tin. The increase in the price of tin has been around 40 per cent, and copper about 125 per cent, while zinc has shown an increase as high as 245 per cent. Thus, with the much larger content of zinc and its great increase in cost to the overhead manufacturer, he has been forced to price extruded brass ears so high that their exceptional service qualities are outweighed by the lower first cost of cast bronze ears.

### ROLLING STOCK

Ithaca (N. Y.) Traction Corporation has ordered one snow sweeper from The J. G. Brill Company.

Waterville, Fairfield & Oakland Railway, Waterville, Me., is reported to have purchased two cars.

Boston (Mass.) Elevated Railway has ordered from the Laconia Car Company 100 sets of arch bar trucks for center-entrance surface motor cars.

Northern Ohio Light & Traction Company, Akron, Ohio, is in the market for fifteen all-steel, interurban passenger motor and trail cars similar to those ordered early in the year from the Jewett Car Company.

Ogden, Logan & Idaho Railway, Ogden, Utah, has ordered three new all-steel interurban motor cars from the American Car Company. These cars will be equipped with four 115-hp. motors and will have an overall length of 65 ft. Delivery is expected about Sept. 15.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has ordered one 50-ft. observation parlor trail car, two 42-ft. 2-in., center-entrance, interurban cars of steel side-girder construction, and one 42-ft. 6-in., double-truck



city car body from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Gary & Interurban Railroad, Gary, Ind., noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 12 as contemplating the purchase of ten or twenty cars, is having specifications prepared for six motor cars which will be approximately 42 ft. long, 8 ft. 4 in. wide, center-entrance type, double-end operation, double trucks and four motors. Specifications are also being prepared for fourteen trail cars which will be approximately 43 ft. long, center-entrance type and double-end operation.

#### TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the New York, New Haven & Hartford Railroad for a large number of trolley-wire splicers.

Arc Welding Machine Company, New York, N. Y., will have an exhibit at the New York Electrical Exposition featuring electric welding of iron and steel. A special type of self-regulating generator will be used.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has recently added three mechanical engineers to its sales force in the field. Herbert H. Cummings will be located in Chicago, Russell B. Pratt in Milwaukee and Fred L. Stevenson in Detroit.

Johnson Fare Box Company, Chicago, Ill., through its general Eastern agent, the U. S. Metal & Manufacturing Company, has received an order for sixty fare boxes from the Public Service Railway, Newark, N. J., and an order for twenty-five from the International Railway, Buffalo, N. Y.

Holden & White, Chicago, Ill., have received an order from the Milwaukee Northern Railway for fifteen Wasson air-retrieving trolley bases. The Fort Dodge, Des Moines & Southern Railroad has ordered four of these bases for use on new cars being built by the McGuire-Cummings Manufacturing Company.

Railway Improvement Company, New York, N. Y., has received an order from the General Electric Company for seventeen C. & S. coasting recorders for the Melbourne, Brunswick & Coburg Tramways Trust. This company has also received an order from the Capital Traction Company for 100 No. 3 sanitary strap covers.

Peter Smith Heater Company, Detroit, Mich., reports that it has recently received the following orders: Two type 3-C hot water heaters, St. Joseph Valley Railway, five No. 2-P for the Chicago & West Towns Railway, and twenty of the same type for the Michigan Railway. Also twenty-five No. 3-P for the Madison Railways.

Frank J. Engel and Herman P. Hevenor have formed a co-partnership for carrying on an engineering and contracting business under the firm name of Engel & Hevenor, with offices at 220 Broadway, New York. Mr. Engel was recently with the Boston & Albany Railroad and Mr. Hevenor with the New York, New Haven & Hartford Railroad and previous to that with the Brooklyn Rapid Transit Company.

Roller-Smith Company, New York, N. Y., announces that the O. H. Davidson Equipment Company, Ideal Building, Denver, Col., will handle Roller-Smith apparatus in Colorado, Wyoming, New Mexico and parts of the state of Montana, Idaho, Arizona, Texas and South Dakota. The O. H. Davidson Equipment Company, having specialized in the sale of apparatus, is well equipped to handle the Roller-Smith Company's various lines of instruments, meters and circuit breakers.

Safety Car Devices Company, St. Louis, Mo., reports that it has received orders for fifty light-weight air brake equipments for one-man cars, although the majority of these have not yet been installed. The installation of eight sets of equipment for the City Light & Traction Company, Sedalia, Mo., has recently been completed. This company will have complete double-end equipment which operates the door as well as the brakes from the motorman's brake valve handle on exhibition at the electric railway convention at Atlantic City.

#### ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a new price-list, dated Aug. 23.

Pelton Water Wheel Company, San Francisco, Cal., has issued bulletin No. 9, describing and illustrating the Pelton-Doble centrifugal pump.

Cutler-Hammer Clutch Company, Milwaukee, Wis., has issued Bulletin 12 describing and illustrating its high-duty lifting magnets, circular type.

Crouse-Hinds Company, Syracuse, N. Y., has issued bulletin No. 1000-E describing, illustrating and giving the prices of its various types of condulets.

Peter Witt, Cleveland, Ohio, is distributing an illustrated circular entitled "The Car Rider's Car," which describes in detail the construction and advantages of the front-entrance, center-exit, pay-enter, pay-leave car.

Portland Cement Association, Chicago, Ill., has issued a booklet on "Concrete Swimming and Wading Pools and How to Build Them," and another entitled "Concrete Sewers." Copies of these publications may be had upon request.

American Steel Foundries, Chicago, Ill., has issued a booklet entitled "Making Davis Wheels." It shows in a brief pictorial way how the Davis steel wheel is made, and emphasizes the precautions used in the manufacture of a high-grade steel casting.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued a booklet entitled "Better Electric Motors." Numerous illustrations show various applications of S. K. F. bearings. This company is also distributing a pamphlet which contains testimonial letters from sixteen electrical engineers located in various parts of the United States.

William B. Scaife & Sons Company, Pittsburgh, Pa., has issued a catalog entitled "Water Purification for All Purposes," which illustrates the various types of water-softening-and-purifying apparatus manufactured by it, and discusses water purification as applied to various industrial uses. A large number of illustrations show installations of water-purifying equipments.

Imperial Brass Manufacturing Company, Chicago, Ill., has issued a handbook on welding and cutting, the text of which is free from technical language. As stated in the preface, the purpose of this booklet is "to give an elementary knowledge of the apparatus, its use and how to properly keep it in good working condition." This book is given free to all purchasers of Imperial equipment and is sold to others at \$1 per copy.

Smith-Ward Brake Company, New York, N. Y., has recently issued four illustrated pamphlets, one on the application of S. W. B. automatic slack adjusters for M. C. B. trucks, one for maximum traction trucks with brake beams, one for clasp-brake trucks, and one for trucks equipped with brake beams of the class of Brill 27-E., Standard 0-50 and Taylor S. B. This company has also issued a pamphlet on the new brake-lever strut it has recently placed on the market.

Peter Smith Heater Company, Detroit, Mich., has just issued its first electric gravity heater catalog, containing thirty-six pages of descriptive matter and illustrations of this product which has recently been added to the other heater equipment manufactured by this company. A number of large orders for the Peter Smith electric gravity heaters have already been filled, and all these heaters are being sold under a guarantee against defects in material and workmanship. The catalog describes in detail the heater elements and the various types of standard electric gravity heaters, which include the truss-plank type, double and single coil panel heaters, cross-seat heaters containing double and single coils, single-coil and four-coil cab heaters, four-coil platform heaters, switches and fuses. Copies of this catalog may be had upon request.

Company Sells 2000 Tons of Old Rails.—The Louisville (Ky.) Railway chose a timely occasion to dispose of its accumulation of old rails, selling about 2000 tons of this material last week at \$15 a ton and enriching the treasury of the company to the extent of \$30,000. The company has been holding its rails against a rise in the market, having decided to do so about four years ago, when the price for scrap was low. During this time the rails have been stored at various points about the city.