

ELECTRIC RAILWAY JOURNAL



THE PANTASOTE COMPANY

Peoples Gas Bldg., Chicago 11 B'way, N. Y. Monadnock Bldg., San Francisco



Can You Operate Under This Condition?

Do you expect this condition during the next few months?

If so, what have you done to prepare for it?

Have you forgotten your previous experience with heavy snows?

Have you come to the conclusion that the only safeguard against this condition is a proper balance between the number of equipments in operation and your Renewal Part Stock?

If you have come to this realization and have placed in your store-room a sufficient quantity of parts based on a complete study of your maintenance requirements you are "Sitting Pretty."

But! Are you sure that your renewal parts on hand, or on order, are sufficient to cover your requirements for a definite period? If so, you are then insured against the ravages of snow with the resultant overloading of your equipment.

An investment in an adequate Renewal Part Stock will show a saving in your maintenance.



Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

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Westinghouse

ELECTRIC RAILWAY JOURNAL

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By C. T. DeHORE.
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The "Journal" Brought Him Back

"PERMIT me to say that your JOURNAL is great stuff. I would hate to do without it, and when my copy gets sidetracked at the main office, as it does occasionally, there is a howl put up by the undersigned that would do credit to the zoo at feeding time. I tried to get away from the railway game a year or so ago, and let my subscription lapse. But shortly afterward I renewed the subscription and that settled things for me, as I couldn't stand the strain and had to get back in the railway business. I can assure you now that you have a devoted reader here, and I feel that I get my money's worth in information and pleasure."

Here is a man who left the field, and wanted the ELECTRIC RAILWAY JOURNAL for light reading! And the call of the industry, as given in the paper, was so strong that he had to heed it and get back into the harness. Need anything more be said?

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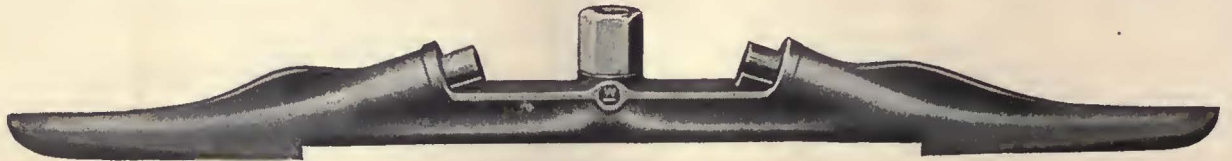
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16-inch Splicer, without boss



Standard Splicer, without boss



Standard Splicer, with boss



The Harder The Pull The Tighter The Grip

The corrugated, tapered chucks of the Westinghouse-Cleveland Trolley Wire Splicer, once slipped over the ends of the wires and hammered into place, have a permanent hold. The splicer is 50 per cent stronger than the strongest trolley wire.

The chucks, made of high-carbon steel, are split and threaded internally, so that the harder the wire pulls the tighter the grip.

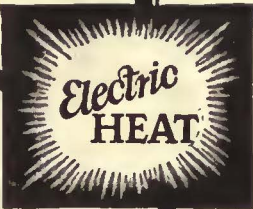
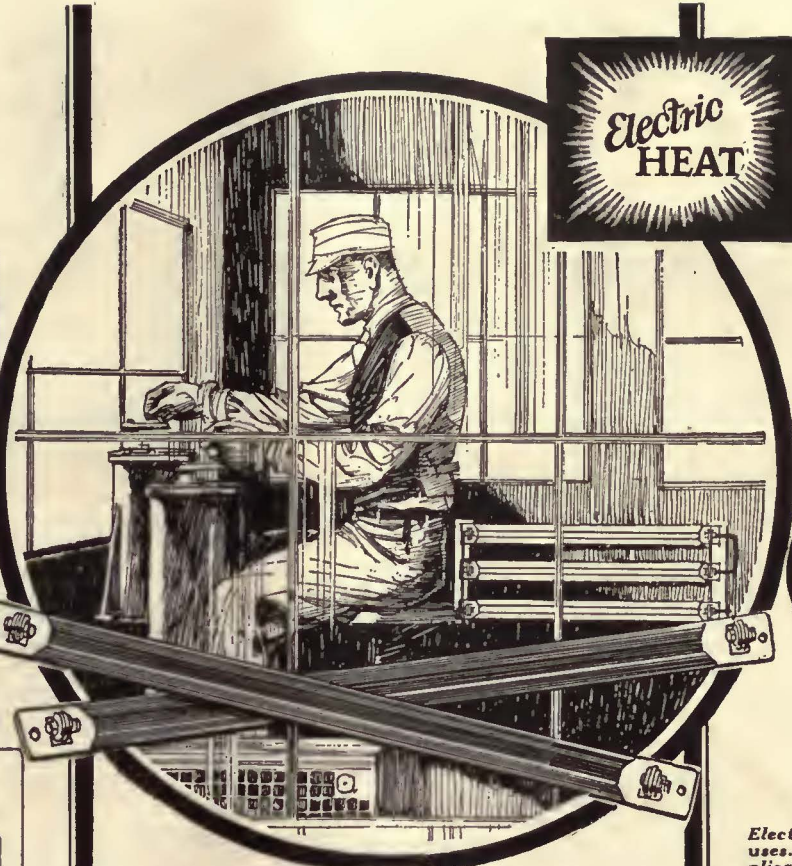
The splicer is easily removed to take up slack.

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East Pittsburgh, Pa.

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Electric heat has many uses. A few of these applications are suggested by the small sketches. Electric heat can be used in your business.

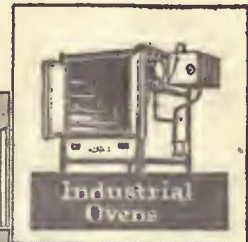
Strips of Electric Heat

Right now is the time to install them; when Jack Frost is beginning to reach out with his cold fingers to nip some of those exposed pipes — when the watchman begins to visit the boiler room frequently because his shanty is so cold — when you begin to realize it is almost cruelty to ask a man to work all day in a cold crane cab.

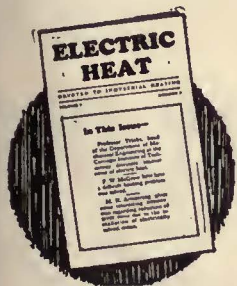
Westinghouse electric space heaters save all this inconvenience. They are inexpensive, easy to install, and do not cost much to operate. Let your electrician wire up a couple of space heaters in some of those hard-to-heat places, and see how nicely they take the chill off on a cold morning. No fumes, no dirt, no flames to start a fire. Just turn on the heat when you need it, and turn it off when you are through.

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An occasional publication containing accounts of heating installations of interest to every executive. We shall be glad to put you on the mailing list. Write for a copy today.

Westinghouse

Mr. Ong Agrees—

A traffic survey for the Los Angeles Railway Corporation made by Mr. Joe R. Ong, Piqua, Ohio, as reported in this paper on November 3, agrees with other authorities that:—

“A factor in adequate service is speed”

“People living in an automobile age demand speedy transportation”

In electric railroading, speed with comfort and safety is possible only on smooth track. Just another reason why the leading electric railway systems of the world buy and use the track grinders and welders shown on this page.

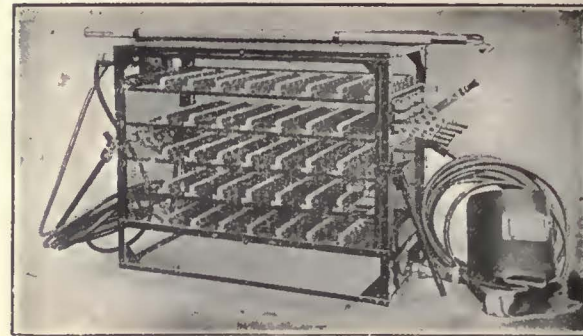
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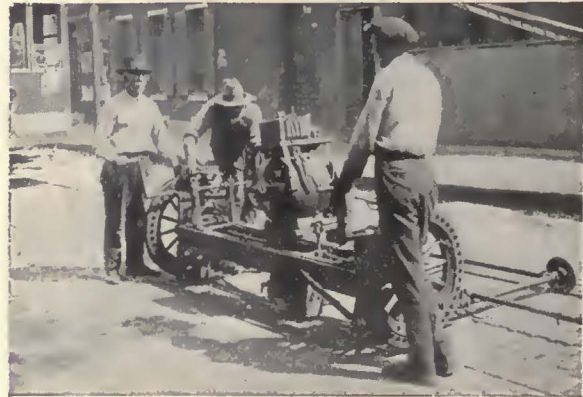
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“Ajax” Electric Arc Welder



“Universal” Rotary Track Grinder



“Atlas” Rail Grinder



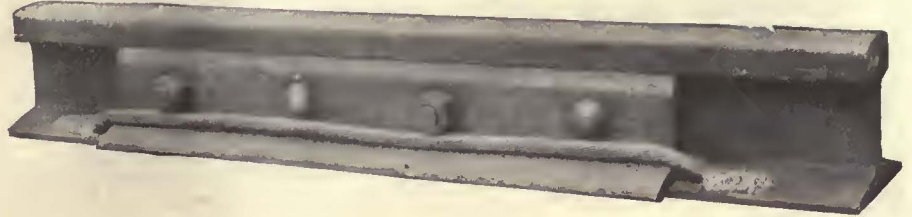
“Hercules” Rail Grinder



“Reciprocating” Track Grinder



The AW-8 Bond, shown above, for arc welding to the ball of the rail and the AW-7, at the right, for arc welding to the base of the rail are two popular O-B bonds.



Leaving the Back Door Wide Open with the Front Door Carefully Bolted

Neglect of the bonding of the rails is like leaving the back door wide open after the front part of the house has been carefully bolted against burglars. Much care and attention is given to the overhead—insulation of supports and hangers and attachment of ears, frogs, etc.

The rail circuit has just as much of a current carrying function as the trolley wire. The bonding should be just as carefully completed—it should be put on a par with the overhead.

O-B Arc Weld Bonds have been developed with the idea of giving the best possible in the way of material that will amply carry the current and persist after years of use. Design of terminals is to make welding as simple as possible and more certain.

Specially stranded copper cable of commercially pure annealed copper wires bought on rigid specifications—

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Let us help you institute a trial!

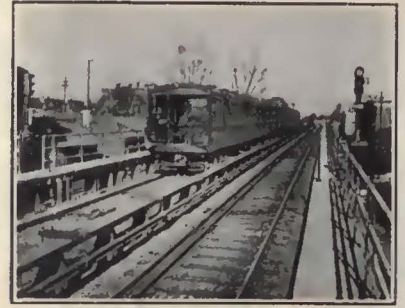
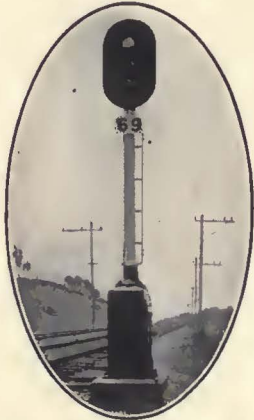
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Mansfield, Ohio, U.S.A.



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of New JerseyPhiladelphia Rapid Transit
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Annapolia Electric RailroadKansas City, Clay County
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IS ASSURED to Railways equipped with Union Automatic Block Signaling Systems. Return on the investment is secured by the direct and indirect savings produced.

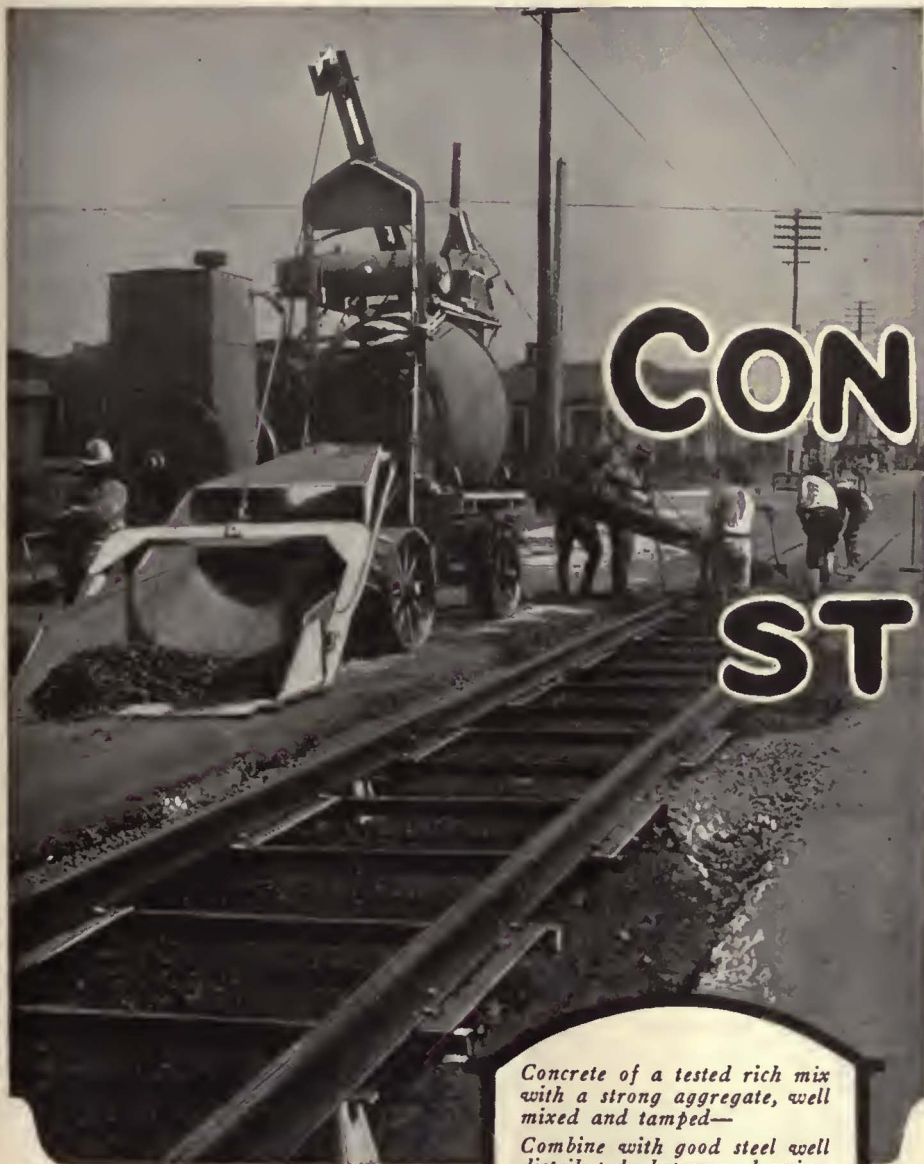
To be Complete—Safe, a signaling system must be based upon the sound principles of the Continuous Track Circuit, or in other words, a means must be provided whereby each car or train is responsible by its mere presence *anywhere* in the block or spacing section to *continuously* maintain one or more opposing stop signals in front of it as well as a stop signal behind it.

Local conditions govern each installation. Let one of our Engineers show you the benefits which Signals will produce for your Railway.

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Combine with good steel well distributed between bearing, reinforcement and tie members. These are the logical permanent materials for the foundation of the best paved track.

There is nothing in such construction to absorb water; to start cracks nor to rot and undermine the rail and joints.

When you hear that such construction is lower in first cost than wood tie construction, the rumor deserves intensive investigation.

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Long Lived
Track**

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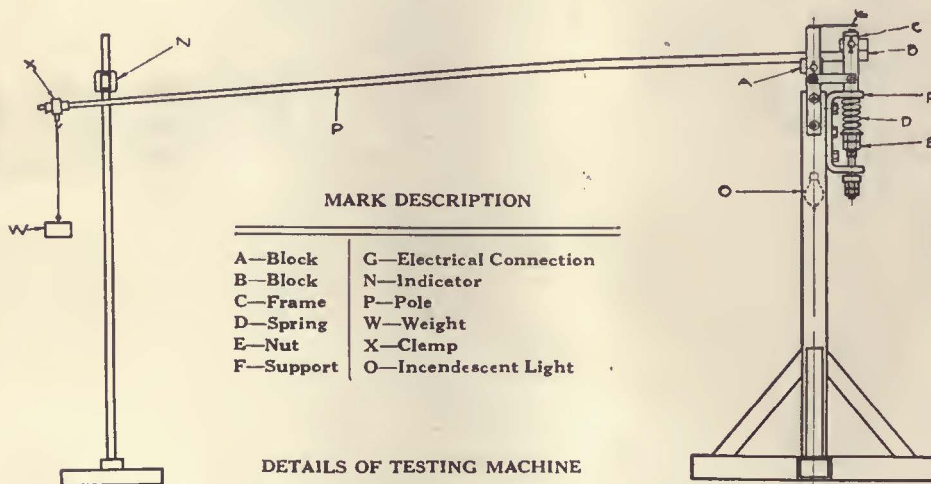
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Steel Twin Tie Track

The Test That Tells for your TROLLEY POLES

A TEST, approximating service conditions, is applied to every standard pole before it leaves the mill. This test is made on an improved testing machine in which the trolley pole is treated as a cantilever. This machine infallibly indicates the presence of a permanent "set" in the material, or any other imperfections which would impair the usefulness of a pole.

The base of the pole under test is set horizontally in the grips of the machine, after which a deflection gauge is set, corresponding to the height, from the floor line, of the free end of the pole under no load.



The proper weight for the pole being tested is then hung on the free end of the pole, and an adjustable electrical contact is set so that the tension on a spring in the testing machine, when the pole is so loaded, is sufficient to close the current of an incandescent lamp. After this adjustment is made, the weight is removed and the return of the trolley pole is checked with the deflection gauge.

After the first pole of a particular lot has been so tested and the proper adjustment determined for closing the electric current, the remaining poles of the lot are tested by placing them in the machine one at a time, the operator deflecting each pole sufficiently to cause the lamp to light; after which the pole is tested for permanent set or deflection.

Any pole that does not return to its original position after deflection is rejected.

This test is your assurance that
“SHELBY”

*Trolley Poles will meet your severest
conditions in a dependable manner.*

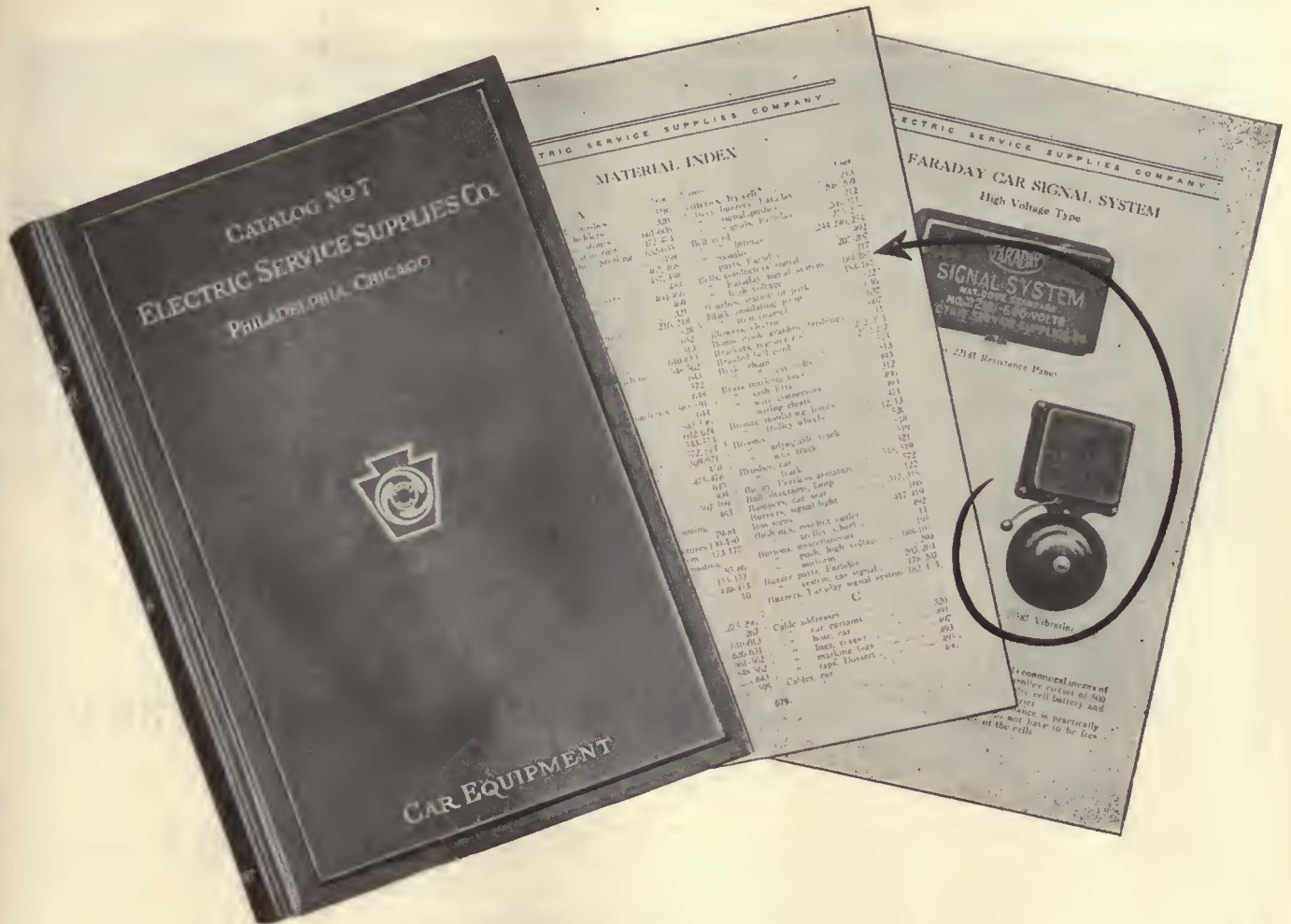
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The Variable Load Brake Arrives in Brooklyn

The Westinghouse Variable Load Brake has arrived in Brooklyn with the delivery of the first of the 200 new type cars for the Brooklyn City Railroad Company.

The entire 200 cars, which are of the double-truck, light-weight, one-man, two-man type, will be equipped with the Variable Load Brake and are therefore of more than ordinary interest to all street railway men.

The Brooklyn City Railroad Company adopted the Variable Load Brake after a careful study of its traffic problems in order to determine how schedules could be speeded up. With this brake, the new cars will be stopped within the shortest possible distance, with minimum loss of time, and the stopping distance (or time) will NOT increase as the load increases.

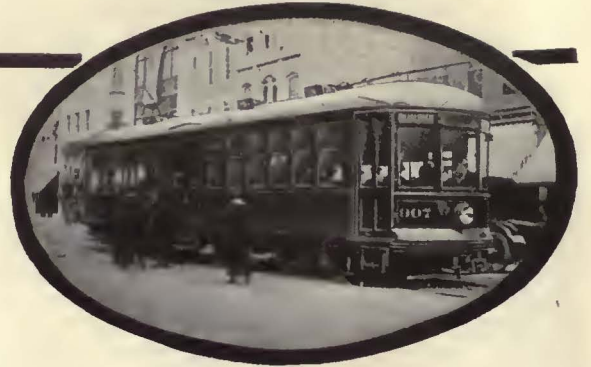
The Variable Load Brake is not only safer, but in heavy traffic it is essential also as a time-saver and a revenue-builder.

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Publication
T-2045



Westinghouse Traction Brake Co.
General Office and Works: Wilmerding, Pa.

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—stops and starts a day!

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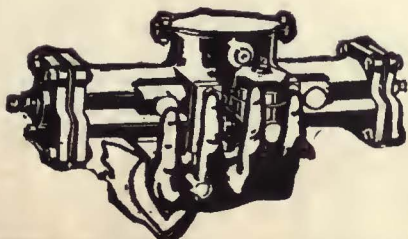
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Safety Interlocking Door Control
Multiple Unit Door Control



National Pneumatic Co., Inc.

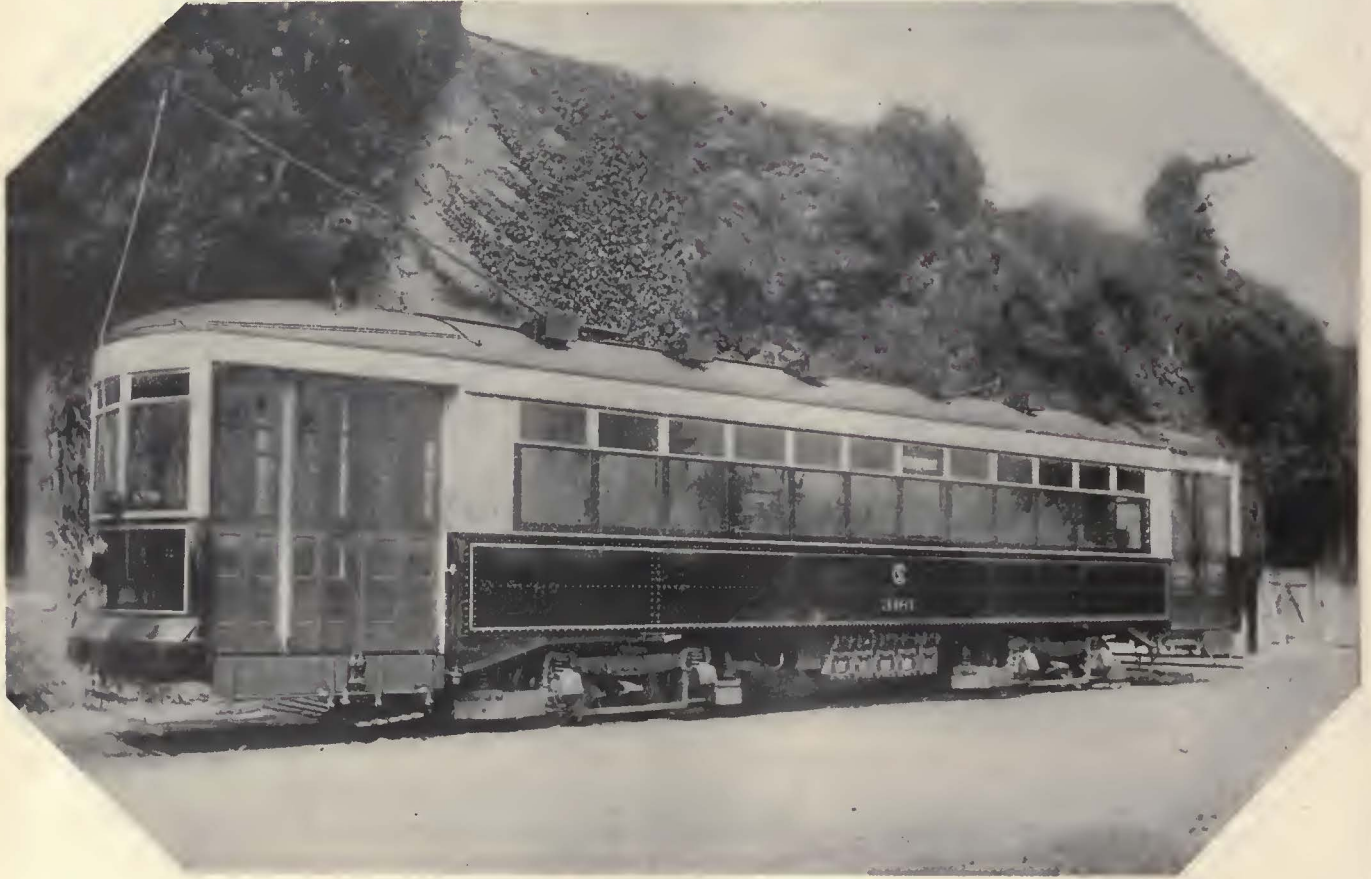
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Economy Electric Devices Company

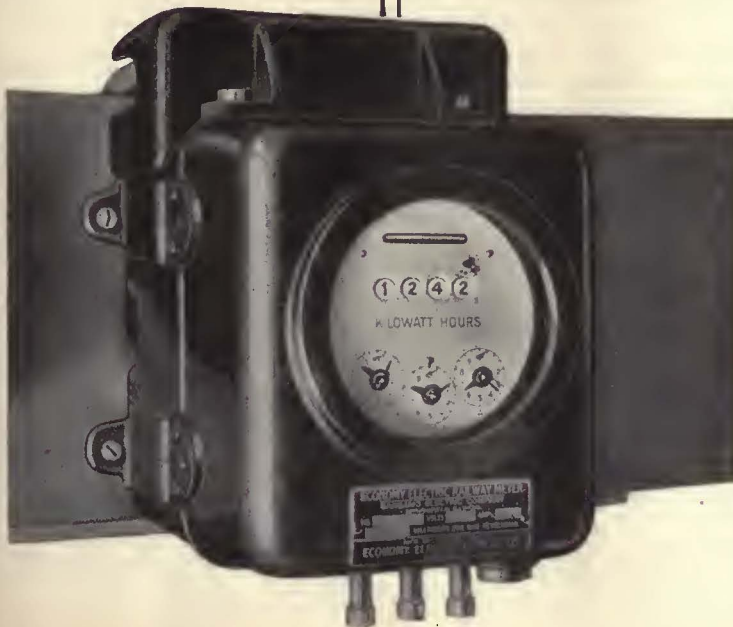
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 Faith has built Industry.
 Faith is the foundation of our
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Electric Railway Lubrication

Turbine Lubrication

The extremely low consumption of oil in this service—practically only that covered by leakage and the small amount due to evaporation and wear—makes the use of the best lubricants obtainable the only logical choice for selection. Good turbine oils will save many times their difference in first cost in the additional service received, over the greatest possible return of which cheap or unsuitable oils are capable.

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Of high flash-point, non-emulsifying and free from acid, Galena Turbine Oils have all the characteristics essential to successful results in circulating systems. Manufactured from strictly pure mineral oil of the highest quality produced, their matchless performance in service classifies them as the most durable and efficient lubricants marketed for this use.

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and Your Security!"*



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Chicago

and offices in principal cities





The best field coil is a new field coil

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Take G-E Coils for instance. They are filled with an asphaltum compound by the vacuum pressure process; the compound so penetrates the winding that it seals the coil against the entrance of moisture, improves its thermal conductivity and greatly increases its capacity.

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General Electric Company
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GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, Editors



View the Bus in Its Place

WE HEAR a lot about the bus—and perhaps rightly so. Like the faithful colored servant, it is a very helpful adjunct, if kept in its place. And like that servant it may “talk up” out of all proportion to its importance, relative to the master of the situation, the electric railway.

To be specific, the bus in 1922 was 0.09 per cent as important to the general public as the electric railway. It carried nine-hundredths of 1 per cent as many revenue passengers as did the trolley—in figures, 11,852,726 on the bus and 12,665,300,050 on the electric railway—eleven million against twelve billion—according to the Bureau of the Census.

But that was 1922, the bus enthusiast will say. Well suppose we allow a 100 per cent increase in bus passengers carried for the year 1923, which is known to be a very generous allowance. And suppose the railways hauled no more passengers in 1923 than in 1922. On this basis of comparison the bus in 1923 will have carried 0.18 per cent as many passengers as the electric railway—less than two-tenths of 1 per cent.

These figures show clearly the place of the bus in transportation importance. It is a tiny infant as yet, though growing with remarkable rapidity. But what an extravagant statement one makes when he says the day of the trolley has passed.

Insurance Is Good— Fire Prevention Is Better

FIRE insurance is a tremendously important thing for all electric railway companies, and they should be very certain that their properties are adequately protected—a condition, strangely enough, which often does not exist. But even more important than the assurance that the physical property loss will be reimbursed in case of fire, is the need for effort and attention expended in the direction of preventing fires. The fire insurance collected does not reimburse a company for the loss of revenue which occurs during the four months to one year period that may elapse before the property burned (cars, for example) can be replaced; nor does it compensate the public for the loss of service which it must suffer.

This is all by way of emphasis of the necessity for a regular inspection of the fire protection facilities installed on most railway properties and of the general housekeeping conditions over the property. For example, on a recent check-up of the conditions on a street railway system, it was found that only three automatic fire doors worked out of ten tested. A test of the company supplying the watchman service, wherein the regular ring-in at several boxes was skipped, failed to bring any response from the company for over an hour. Various other conditions were found over the property which not only contributed seriously to the fire hazard existing, but would have been cause for a material increase in the insurance rates on various pieces

of plant, had they been discovered by the insurance company's inspectors. It is a comparatively simple thing to install fire alarm systems, sprinkler systems, watchman protective service, automatic fire doors, and various other devices for minimizing the danger of fire. It does not take any great amount of managerial ability to get these things installed. But unless the manager supplies the incentive for eternal vigilance in keeping these things in working order they are of little use, and the company might better have saved the investment.

Every railway property should have a periodic, systematic check-up on the fire conditions. Fire prevention is the thing—insurance only for the truly unavoidable fire. Such a policy is always reflected in the rates a company is required to pay.

Transportation Field Needs to Be “Sold” to Faculties

LIKE some investment bankers who recommend today to their clients that electric railway securities should be avoided, the faculties of some of the universities are very lukewarm, if not completely negative, about the opportunity which the transportation field offers for young college trained men. Both classes of men are not keeping up with the progress made in this field in the last three years. The attitude of the bankers merely makes money a little harder to get, but this attitude on the part of faculties tends to deprive the transportation industry of a supply of good personnel for taking over the active positions of the industry in the future. The latter is the more important concern, for with the proper brains in the field, the money problem will take care of itself.

In view of all the advertising that has been given to the troubles of the industry it is rather natural, of course, that people not closely in contact with the everyday developments in the transportation field should at the present time have the idea that the field is not a promising one for the young man to enter. But while this impression is explainable, the industry should not be satisfied to permit it to continue, as there has been such a decided change for the better.

The airing given to transportation troubles was necessary as the only means of bringing about a public realization that conditions fundamentally wrong had to be corrected. The process of education thus given so much momentum by the dire necessity of the situation, has had a profound effect in the course of these few years in building up a public understanding of transportation. This has again placed the industry in a favorable position.

Furthermore, the transportation problems of the present day are so great and so varied, and they are increasing so much each year, that this industry offers opportunities for the exercise of engineering, financial, administrative and legal skill and vision beyond parallel in almost any other line of endeavor. The whole

fabric of industry in the United States is so thoroughly interwoven with transportation that its development is bound to continue at a very rapid rate—and in a much more enlightened way in the future in view of the public knowledge on the subject that has been gained. The United States already has more transportation facilities than any other nation in the world, yet with the advent of the motor bus and motor truck we have only made a beginning to date in comparison with the development that is in prospect during the next twenty-five years.

The steam railroads and the electric railways are going to make extensive use of the gasoline propelled vehicles, and the automotive industry sees this and is lining up with these major transportation agencies for the policy of co-ordination of the various transportation facilities. In addition there is coming a truly remarkable use of automotive vehicles in fields not now served by rail transportation, and independent of the railway companies. A vital aid to this development is the rapidly spreading acceptance of the philosophy that transportation is too vital a public service to permit its destruction through competition, and therefore development will be aided by the sounder doctrine of utilizing each kind of transportation in its proper sphere in relation to the other kinds, in order to secure the most economical results while supplying the kind of service demanded by the public.

All of this active development simply points to the great need for the highest caliber of men—which means that transportation holds forth an attractive future for the young college graduate.

The Light-Weight Car Is Revolutionizing Light Interurban Practice

THERE was a time when no interurban operator would consider the use of any equipment but that of a heavy type similar to steam railroad coaches. These cars had motor equipment geared for speeds of 50 m.p.h. or even higher, but on many properties the trolley voltage fell so low due to heavy draft of current that the maximum speeds attainable in ordinary service were far below this. The heavy cars also proved very destructive to track and roadbed.

A much saner view of light interurban service has been taken in recent years. The principle of the light-weight car, so successful in city service, has been applied with equally good results in the interurban field. The use of one-man operation in interurban service has also been found entirely practical on many lines, introducing a substantial economy. It has been found that a car with properly designed entrance and exit can save time at stops, and by virtue of a large reduction in weight, the motor capacity can be made less and high rates of acceleration and reasonable running speed can be attained without excessive line drop. This in turn often gives an actual improvement in the average schedule speed. For example, it has been found in practice, as noted again in an article in this week's issue, that a certain type of car embodying these improvements, and having a rated maximum speed of 45 m.p.h., could make the same schedule as the old heavy type geared for 60 m.p.h., and with somewhat more leeway. Furthermore, the material reduction in energy consumption, when a line is operated with the light cars, often avoids the necessity, which the company faced with its old cars, of increasing power plant and substation capacity. Or if power is purchased, the light cars make possible not

only a saving in the energy consumption, but they also reduce the maximum demand charge.

Every interurban manager using heavy cars will do well to study the results indicated in the article on page 927, and see if a similar plan for improved operation can be applied to his property. The use of these light cars is spreading at a remarkable rate. They afford an opportunity to give the public better service because of their lower operating cost; and more frequent headway will almost invariably create additional riding. More than one interurban that was a financial failure when operated along old-time methods has been placed on a sound basis and has been enabled to earn some return on the investment by getting rid of its old cars and substituting the light-weight one-man type.

Utility Debenture Bonds Are Sold on a 5½ per Cent Basis

ONE cannot read the pages of any financial paper, or the financial pages of any of our large metropolitan journals, without being impressed with the space given to public utility securities. One has only to compare this condition with that of ten or fifteen years ago to see the tremendous strides in public popularity which have been made by public utility securities as investments. Forty years ago the railroads presented the principal field for general security investment. Following this period came the industrials which now, if we include in this group the "motors," represent a large proportion of the securities whose sales are quoted on the exchanges. Up to the present most of the utility issues have been dealt in either locally or off the board in New York by investment houses, but that they are growing in public approval no one can deny. The fact that they are less subject to sudden fluctuations in business than the industrials and less affected by national labor movement than the steam railroads, commends them to the cautious investor.

In this connection there is food for thought that last month the investing public promptly absorbed an issue by the American Telephone & Telegraph Company of \$100,000,000 in 5½ per cent debentures on a 5½ per cent basis. This is a large issue, even in these days of gigantic companies and big loans, yet these bonds were simply debentures without side frills like the assumption of 2 per cent for federal income tax or the 4 mill Pennsylvania or Connecticut tax. There are not many utility companies that could hope to do as well as this, even on a smaller issue. The telephone company is a national organization with property in every city, a long record of dividend payments in the past and net earnings many times the interest on these bonds. Its securities naturally attract a better market than even those of its local subsidiaries.

Nevertheless, the success of the sale should be encouraging to all other utilities. The various telephone companies controlled by the American Telephone & Telegraph Company are subject to the same kind of regulation as the electric railways and power companies; indeed they are under the same regulators in most states. They have as customers the same people as ride on the trolley cars and use electric light. They are affected by the same economic laws in regard to the purchase of materials and the hiring of labor. If the public has come to consider telephone issues as among the most desirable investments on the market, this sentiment is likely to be reflected also in the purchase of the issues of other utilities.



This 50,000-Lb. Interurban Car of the Indiana, Columbus & Eastern Traction Company Seats Fifty-eight and Has a Baggage Compartment. Its Free-Running Speed Is 55 M.P.H.

Experience Shows Light Cars Increase Net of Interurban Lines

Operating Results Analyzed on Several Properties Over a Period of Six Years Show Material Reduction in Operating Costs as Compared with Heavy Cars—The Light Cars Take Less Power and Can Make Schedules Better—Revenue Increases Have Followed the Improvements in Service Made Possible

By C. T. DeHore

General Electric Company, Cincinnati, Ohio

MODERN light-weight cars designed especially for interurban service have now been used for a sufficient length of time so that definite results are available for comparison with previous records. In practically all cases the savings have far exceeded expectations and have shown the car of this type to be far superior to the heavy and expensive type which it replaced.

The writer's attention was directed to the subject about six years ago, when the Cincinnati, Lawrenceburg & Aurora Electric Railway put into operation seven 26,000-lb. interurban cars, equipped with four 25-hp. motors geared for 35 m.p.h. After the order was placed and while the cars were being constructed every one connected with the proposition waited "in fear and trembling" to see what had been bought and how it would perform. That is now a matter of history. The saving has run about \$40,000 a year.

After watching this installation the writer felt that there were wonderful possibilities in lighter-weight cars for all interurbans. The results obtained from actual operation from a number of installations at present under consideration are worthy of note.

In a number of instances the replacement of the heavy rolling stock with lighter-weight equipment has carried with it the abandonment of the railway company's old power plant and the purchase of power from a large central station. For instance, a small interurban road operating about 600,000 car-miles per year and using, say, 3,000,000 kw.-hr. may be generating its power in an old station for about 1.75 cents or a total

cost of \$52,500. To purchase such power at 1.5 cents from the central station would save \$7,500 per year. This might not be enough reduction in cost to justify making a change. If, however, by reducing the weight of the rolling stock the energy consumption could be cut squarely in two, the cost of 1,500,000 kw.-hr. at 1.5 cents would be \$22,500. This could not be compared with power generated in the old station at the previous rate, as the much smaller load would run up the cost per kilowatt-hour. The purchased energy for the light cars would show a saving of \$30,000 total as compared with the energy for the heavy cars from the small station, and under these conditions probably would justify the change.

On other systems purchased power has not been available, but due to the lighter load fewer generators have been used, materially cutting down the amount of coal consumed. On still others it has been possible to shut down substations completely and to reduce the number of units used in substations.

Where railway companies furnish light and power, the reduction in demand and consumption is extremely important, particularly where this business is growing and the released station capacity can be immediately put to use.

The primary object of the light-weight car is to reduce the operating costs to such an extent that better service can be given to the public, which means increased receipts and improved public relations. On some roads the business available does not warrant much increase in service, but the economies effected by

substituting car for car are very helpful in meeting bond interest.

Opposition has been shown to the so-called "light-weight" car by a great many operators, who were fearful that the car would not stand up. However, experience based on four to six years of operation of these cars has convinced the writer that such fears are ungrounded, and that the cars will stand up as well, or better, than the older heavy type of car.

In considering the "light-weight" car, it must be remembered that most of the weight saved has been in the trucks and motors, and what weight has been taken out of the body is useless weight from the standpoint of life and strength. For instance, one of the large city properties in the Central States recently purchased a number of 26,000-lb. passenger cars, seating fifty-two. It had some 33,000-lb. cars seating the same number, which were built nine years ago, and equipped with maximum traction trucks and two 65-hp. motors. It was decided to change these trucks and motors to four 25-hp. motors on 26-in. wheel trucks. This change reduced the weight of the car from 33,000 to 28,000 lb., or only 2,000 lb. more than the new light-weight car. The car builders advise that the remaining difference in weight was due to two things: First, the old car had a roof 8 in. higher than the new car; second, the excess weight of knee beams necessary to support the drop platform on the old type car.

The weights of passenger interurban cars in the Central States vary from 25,000 lb. to 102,000 lb. One truck equipped with two motors as used on some of the heavier cars weighs more than the entire car on other properties, and yet both cars are doing almost identical work. It is true that some of the heavier cars run faster than the light ones, but there ought to be some better way of getting a little more speed than to multiply the weight by four.

The number of light-weight installations has grown to such an extent that it is impossible for the writer to mention all of them or give the details of each, but the accompanying list covers a number of the interurban roads which have adopted the new idea. Specific references to some of these properties will show what results actually have been obtained.

Cincinnati, Lawrenceburg & Aurora—This is an interurban road 32.5 miles long operating half-hour serv-

ice through a thickly populated suburban territory. Seven 26,000-lb. cars equipped with four 25-hp. motors have been in operation on this property for about five and one-half years.

A recent inspection of the cars proves that they have held up well and are in excellent condition, clean and well painted. There are no signs of deterioration other than ordinary wear and tear, and their maintenance has cost less than 1.5 cents per car-mile, averaged over the entire period. For 1923 this item is at the rate of 1.45 cents per car-mile.

These cars have made a total of 2,900,000 car-miles, or 414,000 car-miles per car in the five and one-half years of operation. The schedule speed is 20 m.p.h., with the stops per mile averaging 1.5. Energy consumption is 1.63 kw.-hr. per car-mile, which includes all losses to the a.c. bus. At a cost per kilowatt-hour, including substation expense, of 1.32 cents the energy cost per car-mile is 2.2 cents. The a.c. maximum demand for six cars is 203 kw.

The operating costs per car-mile for these cars are as follows:

	Cents per Car-Mile
Maintenance of way and structures.....	3.55
Maintenance of equipment.....	1.48
Power.....	2.20
Conducting transportation (two-man operation).....	8.68
General and miscellaneous.....	3.60
Total.....	19.51

When this property purchased the light-weight cars it also shut down its old power plant and purchased two 200-kw. automatic substations. The net cost of making the change was \$60,000. The saving per year has run about \$40,000, or a total to date of approximately \$220,000. The cars have just been equipped with safety features, and are now operated by one man.

Kentucky Traction & Terminal Company—This installation, with headquarters at Lexington, Ky., is the most interesting that has come to the writer's attention. Here was a company with a considerable amount of money invested in about 100 miles of electric railway. Bus competition suddenly developed on each of its four interurban lines. Realizing that a 36-ton two-man interurban car is a poor weapon with which to fight a 5-ton one-man bus, a very thorough investigation was begun at once of the merits and operating

LIGHT-WEIGHT INTERURBAN CARS IN USE OR ON ORDER BY ELECTRIC RAILWAYS

Road	Number of Cars	Type	Number of Operators	Weight, Tons	Years in Service	Length of Line, Miles
Central States						
Cincinnati, Lawrenceburg & Aurora.....	7	Passenger	1	13	5½	32
Union Traction Company (Nashville).....	5	Passenger	1	14	4	28
Cincinnati, Milford & Blanchester.....	1	Express	2	16	4	29
Pittsburg County Railway.....	3	Passenger	1	15	3	25
Kentucky Traction & Terminal Company.....	3	Passenger	2	15	2½	70
Toledo & Western Railroad.....	12	Passenger	1	12½	1½	75
Youngstown & Suburban Railway.....	2	Freight	1	14	1	39
Western Ohio Railway.....	3	Passenger	2	13	1½	120
Fostoria & Fremont Railway.....	2	Passenger	1	14	1	22
Dayton, Springfield & Xenia Southern Railway.....	8	Passenger	2	17	1	20
Chicago, North Shore & Milwaukee Railroad.....	2	Passenger	2	17	1	35
Cincinnati, Georgetown & Portsmouth Railroad.....	4	Passenger	2	13½	1	60
Maumee Valley Railways & Light Company.....	2	Passenger	2	18	1	20
Northwestern Ohio Railway & Power Company.....	1	Passenger	1	12½	1	60
Pennsylvania-Ohio Electric Company.....	7	Passenger	1	12½	½	120
Indiana, Columbus & Eastern Traction.....	4	Passenger	2	17	*	300
Texas Interurban Railway (Dallas-Terrell).....	12	Passenger	1	17	*	30
Indiana Service Corporation.....	6	Passenger	2	25	*	78
Eastern Wisconsin Electric Company.....	6	Passenger	1	16	1	42
Chicago, Aurora & Elgin Railroad.....	6	Passenger	2	22	*	24
Cleveland, Southwestern & Columbus Railway.....	5	Passenger	1	18	*	220
Eastern States						
Bangor Railway & Electric Company.....	12	Passenger	2	16	*	66
Northampton Transit Company.....	6	Passenger	2	14	2½	25
Warren & Jamestown Street Railway.....	8	Passenger	1	17	½	22
Shore Line Electric Railway (Norwich, Conn.).....	4	Passenger	2	17	*	35
Conestoga Traction Company.....	5	Passenger	1	17	*	160

* On order.

† In service two months.

costs of light-weight interurban cars and motor buses. At the conclusion of the investigation it was decided to install light-weight cars, making them as comfortable and attractive as possible; to improve service by cutting headway from one and one-half hours to one hour, and to make a reduction in the rate of fare.

The results of the change were described at length in the *ELECTRIC RAILWAY JOURNAL* for Sept. 1, 1923, page 327. Some of the things that happened were that the company increased the car-miles 38 per cent, and the passengers carried increased 30.6 per cent. This was accomplished with a reduction of the ticket fares of 12.5 per cent, so that the passenger revenue was 12.7 per cent greater than before. The expenses per car-mile decreased 37 per cent, so that the net income from operation was 102.4 per cent greater with the new cars. The demand on the power station decreased 350 kw. Trains late decreased 64.2 per cent, and cars put out on account of such delays decreased 30 per cent.

The approximate cost of operation on this property is as follows:

	Cents per Car-Mile
Maintenance of way and structures	3.5
Maintenance of equipment	1.5
Power	3.4
Conducting transportation (one-man operation)	8.1
Traffic	0.5
General and miscellaneous	3.6
Total cost per car-mile	20.6

In the maintenance-of-way department prior to the installation of the light cars, the budget requirements per year were approximately 20,000 new ties. For the ensuing year, the requirement was only 9,000 ties.

Since the original installation of ten interurban passenger cars the company has purchased two additional interurban passenger cars, two light-weight interurban freight cars and twenty-seven light-weight single-truck city cars.

This property now has but one type of motor, wheel, axle, etc., for all of its forty-one new cars. All cars are operated by one man.

Cincinnati, Milford & Blanchester—This is an interurban road, 30 miles long operating hourly service. It also sells light and power. The new 30,000-lb. cars, equipped with four 25-hp. motors, have been in operation on this property for three years, with excellent results and low maintenance. These cars have averaged about 275,000 miles each and still have some of the original 26-in. wheels under them.

At the time the light cars went into operation the company also shut down its old 25-cycle power station and purchased 60-cycle power, replacing 1,100 kw. nominal rating in substations by 400 kw. The demand on the power station, which had previously required the railway company to run two 500-kw. engine-type generators, dropped to 315 kw. Since the change-over was made, the company has been able to go after the lighting and power business extensively, so that it has increased the lighting business over 200 per cent in the three years.

The cars are operated by one man with a fare-box system of collection. There are twenty-two fare zones, and no trouble has been experienced in making a schedule of 20 m.p.h. or in handling passengers.

As a result of the rehabilitation, this company has changed from a property that could not earn its bond interest to one that now pays a dividend on its common stock.

Cincinnati, Georgetown & Portsmouth—This road has about sixty miles of track; does a large carload freight business, and some light and power.

For a number of years the property has not been able to make any progress due to its obsolete power station, heavy cars and infrequent headway.

The management was changed about a year ago, and the new operators at once purchased four 12½-ton passenger cars, one express car of the same weight and four semi-automatic substations. The old plant was shut down and power purchased. The cars are equipped with safety features and are operated by one man.



This Interurban Car for the Maumee Valley Railways & Light Company Weighs 25,000 Lb. and Seats Forty-nine Passengers

The mileage has been increased about 25 per cent, and notwithstanding a considerable amount of bus competition, the railway is making a very satisfactory showing.

While the new system has not been in service long enough to make an exact comparison over a period of months, the following figures may be interesting:

	New System	Old System
Energy per car-mile, including locomotives, kw.-hr.	3.05	4.10
Cost of energy, cents per kilowatt-hour	1.21	1.74
Cost of energy, cents per car-mile	3.69	7.13
Power demand, in kilowatts	765	1,200

The reduction in power bill alone is now running at the rate of \$24,000 per annum, and in maintenance of equipment at the rate of \$3,600 per annum. These two items of saving will pay more than 30 per cent on the total investment, not considering any increased riding due to the 35 per cent increase in service. The results obtained have been so satisfactory that the company has ordered two additional cars.

Maumee Valley Railway—This company operates a belt line out of Toledo, having about twenty miles of track.

The company had been unable to make its operating expenses for some years past, and in 1921 was thrown into receivership, which lasted until December, 1922.

The old equipment was scrapped and replaced by seven 25,000-lb. cars equipped with four 25-hp. motors, single-end K control and safety features.

One-man operation was installed and six cars are now operated on fifteen-minute headway as compared to four old two-man cars on twenty-six-minute headway, an increase of about 42 per cent in service.

The public immediately showed that it appreciated the new cars and improved service by riding on them in considerably increased numbers. While the six-car schedule has only been in operation for ninety days, the indications are that the receipts have increased about 45 per cent. Serious bus competition has been encountered by this line. Whether or not the new cars and improved service, together with the new bus regulation recently passed by the Ohio State Legislature,

will curtail bus activities remains to be seen. If they do, this road will be able to pay its way and further increase its rolling stock and improve its service.

Some of the comparative figures are given below:

	Old Cars	New Cars
Number of cars in operation.....	4	6
Headway, minutes.....	26	15
Operating costs, cents per car-mile.....	33	23.5
Receipts per month, approximate.....	\$8,000	\$11,500
Expenses per month.....	8,250	8,100

The results have been so satisfactory that the directors have authorized the purchase of three more cars.

Western Ohio Railway—This was the first high-speed line to adopt the light-weight cars. The cars weigh 34,000 lb., seat forty-eight people, are equipped with four 35-hp. motors and have a free running speed of 45 m.p.h. They make a schedule speed of 25 m.p.h. in local service and 31 m.p.h. in limited. They have been



An Interior View of the Indiana, Columbus & Eastern Interurban Car

in service now for more than a year, and the average energy consumption at the car is running 1.27 kw.-hr. One rotary in each substation is now shut down, making a further reduction in power cost. A considerable reduction has been made in maintenance costs, both for labor and for material.

The running time has been cut slightly from what it formerly was. Even with this change the light cars geared for a maximum speed of 45 m.p.h. hold to the schedule better than did the old 35-ton cars geared for a maximum speed of 60 m.p.h. This is due to better line voltage, faster acceleration and quicker loading and unloading. For instance, in one of the winter months last year, with 2,220 trains, only twenty-one trains reached their destinations late, or less than 1 per cent.

Dallas-Terrell Interurban—This is a new road, 31.5 miles long, operating 16-ton cars with four 35-hp. motors. On the interurban section, 28 miles, the run is made in one hour.

Equipment maintenance has averaged 0.6 cents per car-mile, and energy used, including all losses, is running less than 2.5 kw.-hr. The railway is well satisfied with the results obtained; in fact, they have considerably exceeded expectations.

Indiana, Columbus & Eastern—This is the largest road in Ohio, and one which has a considerable amount of private right-of-way suitable for reasonably high-speed operation. Six combination baggage, smoker and main compartment cars, seating fifty-eight,

equipped with four 60-hp. motors, geared for about 55 m.p.h. have just been put in service.

While these cars are for use primarily on the Dayton-Union City division, which is 55 miles long, they are geared so that they are capable of making limited runs on the Dayton-Columbus and Springfield-Lima divisions, where schedule speeds of 35 m.p.h. and better are maintained.

Cleveland, Southwestern & Columbus—The latest and also one of the largest interurban roads to begin the use of the light-weight car is the Cleveland, Southwestern, operating more than 200 miles of track.

The Southwestern has recently placed an order for twelve 32,000-lb. cars, seating fifty, equipped with four 35-hp. motors, geared for 45 m.p.h. These cars will completely equip what is known as the "Main Line, Western Division," running from Cleveland to Elyria, Oberlin and Wellington, a distance of 42 miles.

The company is purchasing these cars primarily in order to give better service, it being the plan to run half-hour service out of Cleveland, every other car being a limited. The cars themselves are designed to give the maximum comfort to the passenger, and no expense has been spared to get this result.

The outcome of this installation will be watched with interest all over the country, as the company is in competition with the New York Central Railroad and a large number of motor buses. The officials of the Southwestern believe that thirty-minute service in new, comfortable, easy riding cars will bring back to their road a large portion of the business now handled by private automobiles, motor buses and steam railroads. It certainly looks logical; no one knows how much patronage the buses can stand to lose, but unless all signs fail, the Southwestern is going to find out.

Other Properties—All of the other properties mentioned in the accompanying table are well satisfied with the change from heavy to light cars, and the writer does not believe there is a single instance where a return to the heavy car would be considered.

LIGHT CARS PERMIT ADDED SERVICE

The general possibilities available from the use of light-weight cars are many. Where one-man operation is used, it takes but 8 or 10 cents per car-mile additional to put on an extra car where it will relieve congestion and give real service. Such extra service reduces the number of private automobiles, and also reduces the number of "pick-ups" by such vehicles. These increased receipts gradually climb into a considerable number of dollars, and the railway companies that are in position to do these things by reason of having light-weight rolling stock are the ones that are most likely to make a profit.

A number of the installations of light-weight interurban cars mentioned in the accompanying table have been described in the pages of the *ELECTRIC RAILWAY JOURNAL*. Chief among them are the following:

Cincinnati, Lawrenceburg & Aurora, Dec. 13, 1919, page 915; Cincinnati, Milford & Blanchester, May 28, 1921, page 982; Kentucky Traction & Terminal Company, June 3, 1922, page 983, and Sept. 1, 1923, page 327; Youngstown & Suburban Railway, Jan. 27, 1923, page 181; Western Ohio Railway, Sept. 30, 1922, page 517; Chicago, North Shore & Milwaukee Railroad, Sept. 23, 1922, page 470, and June 9, 1923, page 959; Texas Interurban Railway, April 7, 1923, page 595; Bangor Railway & Electric Company, April 15, 1922, page 643.

Gaining Public Good Will in a City of 100,000*

Friendly Relations with Newspapers, Co-operation with City Authorities, Prompt Settlement of Claims, Courteous Trainmen, Clean and Freshly Painted Cars and Other Means Have Been Used Effectively in El Paso

POPULARIZING the street car service in El Paso, Tex., has largely been the result of gaining the good will of the public, of developing good relations between management and employee, and of conducting a very successful safety program.

The El Paso Electric Railway officials feel that it is difficult to say just how the public came to a realization of the fact that street railway transportation is of vital importance to it, and that it is even more difficult to attempt to set forth in anything like a brief statement the various methods which have been used to accomplish this end.

During the past year the company has used a very large amount of space in the daily papers telling the story to the public. That is one definite thing that has doubtless been of great help.

The company is a firm believer in the principle that the public is reasonable, and even generous, when it is fully acquainted with conditions, and has earnestly striven to interest it in the various phases of the company's business. The heads of departments are prominently identified with the local civic clubs, and several of them have been honored with the office of president. Through these clubs a very kindly feeling toward the company is built up, and newspaper articles on the business of the company frequently refer to the railway department as "Dixon's Railroad" (Alves Dixon is superintendent), or to "Warren's Company" (Alba H. Warren is manager). It is interesting to observe how quickly the public generally takes to this personal equation of the situation, and how quick patrons and customers are to speak to the individuals regarding the good points of the service. Whereas a few years ago complaints were numerous, both in the daily press and in the form of written and telephonic communications, the company is at the present time receiving at least twenty complimentary communications to one of an adverse nature.

GOOD SERVICE BUILDS GOOD WILL

This kind of public good will makes it possible to give better and better service, and the company states that its relations could hardly be improved upon. This is evidenced in so many ways that all of them could not be mentioned in an article of this kind. Several illustrations will prove of interest and are typical of the situation.

The citizens from a certain section of the city succeeded in eliminating jitney competition, despite the fact that the car fare is 6 cents, whereas the jitney fare was 5 cents. When a protest was made and the jitney men employed attorneys to fight the repealing ordinance

these citizens again went before the Council and their spokesman, a minister, made such a splendid plea for the company and against the jitneys that the ordinance eliminating the jitneys was permitted to stand.

There are three daily papers in El Paso, and two of them are not only friendly to the company, but seem even eager to assist it in every way possible, both from the standpoint of news items and by editorial comment, on the way the business is being run. The other paper, which is owned by the Scripps McRae syndicate, has not attacked the company.

On the contrary, its news columns have been unusually fair, and an editorial complimenting the company on the courtesy of its trainmen appeared in one of its recent issues.

There has been no newspaper opposition to anything the company has done during more than a year. This has been due largely to the fact that before inaugurating a change the management has gone to the newspaper men, has discussed the proposed change with them, has given the reasons and has asked their advice. In every instance this plan has been entirely successful.

The result has been that the company has not only been able to avoid criticism, but has, on the contrary, had the active co-operation and editorial backing of the newspapers.

GETTING BACKING OF MUNICIPAL AUTHORITIES

That the municipal authorities appreciate that the company is trying to render the best possible service, and that its efforts are directed solely in the interest of the upbuilding of the city of El Paso, has been accomplished by thoroughly acquainting the municipal authorities with the difficulties of operating a street railway system in these days of high costs. This has been done through a comprehensive education in the details and problems of operating, maintaining and financing, which has cost no little time and effort, but according to the company the results have been well worth while.

Among other things, for example, when streets outside of the business district are paved, it is a practically settled policy that the tracks of the company are to be left unpaved, even though it is stipulated in the franchise that the company must pave when the streets are paved. This has saved approximately \$200,000 during the past few years.

Appreciating the fact that some companies make the mistake of advertising and taking their story to the public only when in distress, the El Paso Electric Railway has, for the past year, been using regularly each week space in the local papers to convey information concerning some particular phase of the business. Sometimes these notices have described the workings of various departments, at other times they treat of some

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

particular problem of the company as a whole. Frequently causes of certain types of accidents are mentioned and these are what are called "timely," such as warnings against tangling kites in electric wires during kite season, etc.

ADVISING THE PUBLIC OF SCHEDULE CHANGES

Whenever it is found necessary or advisable to change car schedules, the public is first notified through the newspapers and then cards are placed in all of the cars on the line affected. It is made a point to emphasize that the change is being made for the improvement of service, and the public has been found very appreciative of this advice. A serious handicap in the operation of the cars is the fact that two transcontinental railway lines run through the heart of the city within half a block of each other, and long and heavy trains frequently occasion considerable delay to the street cars. These trains, on account of the heavy grade, frequently stall or pull out a drawhead, and the service is then delayed longer than usual. On several occasions when the railroad made no effort to remove the trains promptly, the street cars have been delayed almost half an hour. On these occasions the company has advertised the cause of the delay in the local papers. This has not only enlightened the public as to the cause of the delay, but has been decidedly helpful in stirring up the railroads to act more promptly under similar circumstances.

Sometimes the claim department is unable to locate witnesses at the addresses given to conductors, and occasionally an out-of-town address is given. In such circumstances a questionnaire is sent them, and upon its return the company's acknowledgment thanking them for their kindness in mailing it. This acknowledgment is signed by the manager.

GOOD PUBLIC RELATIONS ASSIST IN INCREASING CAR FARE

In 1916 a strike of the company's trainmen took place, which was won by the company. Owing to the fact that El Paso is, to a considerable extent, a union town, this left much hard feeling. That this feeling has been overcome was very definitely illustrated when, two years ago, the company went before the City Council with its request for an increase in car fare. Not a single protest was raised. On the contrary, heads of several of the local unions and the managing editor of the local union paper were present and stated to the Council that they were of the opinion that the company was entitled to this increase. There has not been one single request for a decrease in fare in El Paso since that time.

CUSTOMER OWNERSHIP

The company believes that customer ownership is one of the biggest factors in the building up of the utility's public relations. It makes each patron, who is a security holder, a booster, provided that the company is properly managed and that the security holder receives a compensatory return on his investment. El Paso is one of the cities of the West where growth has been rapid during the past ten years. This has resulted in a scarcity of local investment capital and high interest rates. For example, the mortgage interest rate on commercial property with a 50 to 60 per cent equity is 8 per cent, and the interest rate on residential property is, in a large number of cases, higher. The common stock of this company is paying

a 10 per cent annual dividend. With a par value of \$100, its present market price is \$126, making the annual return on this basis 7.9 per cent. The preferred stock is paying a 6 per cent annual dividend. With a par of \$100 and an existing market price of \$88, the annual return is 6.8 per cent. The 5 per cent first mortgage gold bonds of the company, due in 1942, are at present selling for \$93, or at the rate of 5.4 per cent per annum.

Under these conditions it is most difficult to sell the bonds, common and preferred stock of the company yielding less than 8 per cent return to the investor in competition with an 8 per cent local interest rate. Again, the city is frequently floating a community enterprise of one nature or another, which affords greater dividends than the company can pay on its stock. For instance, money is now being raised for a 5,000-spindle cotton mill, on the theory that it will pay a 15 to 50 per cent annual return on the capital stock.

Despite the conditions above set forth, and at a time when new money was more costly than it is at present, in 1920 and 1921, the company sold locally to 512 customers a total of \$268,800. The security issued was a 7 per cent five-year gold convertible note, and was sold at \$96 and accrued interest to yield 8 per cent.

CO-OPERATION WITH POLICE DEPARTMENT

When a new chief of police was appointed several months ago, he was found exceedingly progressive and earnestly desirous of operating his department at the maximum of efficiency. The company has been helpful in traffic matters, and has assisted him in installing an up-to-date system for keeping record of traffic accidents. These records include maps where accidents, fights, burglaries, etc., are shown by location, and by the use of colored-headed pins indicating the type of occurrence. The company also supplied him with a clock chart, whereon the time of day when various types of accidents occur is indicated.

The company operates a telephone dispatch system, and the police department has been given keys to all of the telephone boxes. In return, the police department has furnished the company with keys to its telephone boxes, so that the co-operation between the two departments has been very helpful to both.

COURTEOUS TRAINMEN IMPORTANT

While it has long been realized that courteous trainmen are a valuable asset, this fact has not been fully appreciated until recently in El Paso, when the company has benefited in most unexpected ways and from unexpected quarters on account of some courtesy extended some one by its men. Not long ago an elderly lady who had stopped in El Paso a few days en route to Seattle wrote a friend in New York that one of the outstanding impressions of her trip across the country was the exceptional and remarkable courtesy of El Paso trainmen.

Trainmen are taught that they must be far better than merely good operators, and that each man in the organization must do his part toward selling the company to the public. It is astonishing how the men have taken this up themselves, and how they have gone even further in matters of courtesy than the company could expect or require. In addition to the instructions which new men are given in this respect, each man receives a special lecture twice a month by his divisional inspector.

Good-looking and attractive equipment is a very large factor in securing public good will, and though in El Paso it would be possible easily to run the cars eighteen months without repainting, the schedule calls for a new paint job every year. The principal difference is that by yearly painting the cars are kept bright and attractive, whereas when they are permitted to go for a longer period they become dingy and unattractive.

The cars are kept scrupulously clean, and never are permitted to go out in service with dirty windows.

PUBLIC SERVICE DEPARTMENT

The company has recently established a Public Service Department which performs a number of functions and has proved one of the largest factors in securing the excellent relations which the company now enjoys with the public. This department handles the various odds and ends which other departments have had to handle incidental to their regular business. Its activities comprise, among other things, the following: Advertising, handling of complaints, analyzing and filing all complaints, safety talks in schools, talks within the organization, talks among contact employees, talks among civic clubs, cultivating friendship of newspaper men, promoting the use of "Better Service" slips, entertainment of employees, such as dances, picnics, etc., educational work among the employees, which promotes a greater use of correspondence school courses, use of motion picture and stereopticon machines in getting the company's story over to the public and employees, establishing and charge of a company library, promoting greater use of the Boston Office Library, files and permanent forms of old newspapers and collections of clippings of all news items pertaining to the company. In addition this department is also in charge of the company's publication, *Cactus Points*. A closer contact with the various departments may be kept by every member of the organization through reading *Cactus Points*, and it is establishing a feeling of good fellowship which was never enjoyed prior to its publication.

In the handling of complaints this department is particularly valuable. A written complaint is immediately acknowledged, and if of any importance, by special delivery. The acknowledgment states that while the company regrets the necessity of the complaint, it is grateful to the writer for having taken the trouble to make it, and assures him that it will receive prompt and thorough attention. After the circumstances surrounding the complaint have been ascertained, the head of this department calls in person on the complainant and is almost invariably able to straighten it out to the entire satisfaction of all concerned. By the company's process of elimination, most of the causes of complaint can be disposed of, with the result that complaints become fewer and fewer in number. As an illustration of this, two years ago through the inspector of public utilities an average of twenty complaints a month was received. During the past year these complaints fell off to less than two a month, and quite recently the office of the inspector of public utilities was abolished, largely for the reason that complaints of street car service, which had formed a large part of its business, had been practically eliminated.

OTHER MEANS OF IMPROVING PUBLIC RELATIONS

An ordinance exists in El Paso prohibiting vehicles from passing street cars which are receiving or discharging passengers. Many automobilists are either

unacquainted with or willfully violate this ordinance, and in order to help remedy the situation the word "Stop" has been painted on one of the folding doors. Some of these signs are painted on the wooden part of the door, and others on the glass. The ones on the glass are, perhaps, more easily seen at night, but both of them have aided very much in having automobilists bring their cars to a stop while the street cars are loading or unloading passengers.

Upon the company's initiative, without any suggestions from outside sources, its poles have been removed from the business districts, and, instead, span wires are fastened to adjacent buildings, greatly improving the looks of the streets.

In its advertisements and other ways the company, to a far-reaching extent, has sold to the public the idea that it is a local concern. All the company's trucks and automobiles carry the company name, and it is now planned to erect an office building to help maintain the "Home Company" idea. The company's name is displayed on the power plant, office building, etc. Following out this idea, the company has originated a letterhead which has been adopted by all Stone & Webster properties in the Texas district. This letterhead carries the names of the executives and departmental heads and their positions. This idea has lately been carried into the company's general advertising, the names of departmental heads being carried in advertisements affecting their department.

A further effort to localize the company is the practice of training the men for promotion. When a vacancy occurs anywhere in the organization, every effort is made to fill it from within the company's own ranks, and to go outside the organization only as a last resort.

It is planned to issue to the company's patrons on the first of the coming year a book giving the details of the activities of the company during the year just closed. This book will contain such information as it is felt the customer would like to know, and what the company would like to have him know about itself. Of late, the company has emphasized the three partners, i.e., customer, company and employee. Their wants must be fully satisfied before the company is willing to admit that its operation is, in every sense, successful.

Every year a report is issued to the stockholders, detailing such information therein as is believed will be of pertinent value. Through the medium of the company publication and various other means, employees are constantly advised of the company's activities. In other words, the company's activities are got over to the employees and the stockholders in a pretty definite and concrete way. The thought is that this should be done also for the patrons of the service.

This booklet will start out with a statement about the utility's aims and ambitions in the matter of serving its patrons; it will attempt to show the difference between operating a public utility and other businesses from a financial standpoint, with particular emphasis on the fact that the company turns its capital over only once every three or four years at best, and stressing the large amount of annual capital requirements.

Following this will be detailed the amount of money expended for construction during the year, stating precisely what the money was used for, why it was needed and the improvement that resulted because of the expenditure. What has been done to improve all personal contact relations with the patrons will be

shown. Definite things that have been done to assist in the further growth of the prosperity of El Paso will be mentioned. Figures and statistics will also be presented showing the growth of the company, special consideration being given to kilowatt-hour output, car-miles run, analysis of accident situation, and other pertinent statistics of similar nature. Figures will be given as to the capacity and nature of equipment in the power plant, number of street cars owned, miles of track, etc. The company's income and detailed expenses will be shown. A copy of the balance sheet will be included.

Photographs of the officials and executives of the company will be shown, possibly with group photographs of the various departments, with a little story as to the part each plays in rendering service. It will also contain a statement showing the small proportion of a man's annual income that is spent for utility service, and other things tending to illustrate and prove the cheapness of electric service.

The company's final thought is that this booklet will portray to the patrons, a splendid idea of the company's activities and is calculated to improve and build up public confidence in and an appreciation of the problems of a street railway company.

Railway Finds New Source of Revenue

Steel Dump Cars Increase the Income of the Wheeling Traction Company by Hauling Mine and Power Waste on Contract Basis

THE Wheeling Traction Company does not rely for revenue only on its passenger transportation business or interurban express service. The railway has availed itself of an opportunity that was presented to solve the problems of two brother utilities—a power plant and a coal mine—and at the same time improve its own finances. After the completion of the 150,000-kw. power plant of the Beech Bottom Power Company at Windsor, W. Va., some means of disposing of the ashes from the boilers had to be found. A hopper car stationed on a siding into which the daily refuse would go was out of the question because the plant was not situated adjacent to a steam railroad. The traction company's right-of-way, however, passes close by the power plant and a spur siding made it possible to bring its cars very conveniently to a loading hopper.

For the railway the proposition meant a considerable expenditure for equipment to handle the work. Steel dump cars were recommended as the best for this purpose, and arrangements were made for the disposition of 490 tons of cinders daily.

Three Differential dump cars constituted the initial equipment. It was planned to use two motor cars and a trailer in train operation. Each one of the three cars equipped with additional side boards has a capacity of 18 tons. The motor cars are propelled by quadruple equipments of Westinghouse 532-A motors, each motor having a 50 hp. capacity. Electro-pneumatic HL control is provided for double-end control and arranged for multiple-unit operation, as is required when the three dump cars are used together. The dumping mechanism is operated by a Westinghouse type "HK" 5-hp. motor and a type 810 switch and control panel.



Three-Car Train of the Wheeling Traction Company, Consisting of Two Motor Dump Cars and One Trailer

Another matter of importance was a suitable and convenient location where the ashes could be disposed of. The owner of a ravine at Glenn's Run, Warwood, consented to have the ashes used for filling the ravine, the depth of which averaged 35 ft. The fill extends over an area of about 15 acres. From the cinder pit at the power plant to the dump the distance is about 5½ miles.

Another opportunity for additional revenue was



Loading Ashes at the Power House Hoppers

grasped by the railway management a short time after it had begun serving the power company. At a mine belonging to the Richland Coal Company the point had been reached where some disposition of the "gob" must take place immediately. The traction company again offered a proposition similar to that accepted by the power company. Tracks were laid, another dump car purchased and today the daily refuse of from 150 to 200 tons is being handled with mutual satisfaction. The mine "gob" is hauled about 2.2 miles to the dump.



Filling in a Deep Ravine with the Ashes

Automatic Feeder Control Prevents Service Interruptions

A Combination of Automatic Substation and Special Automatic Feeder Operation with Supervisory Control Insures Continuity of Service on Cleveland Railway Lines—Short Circuit Is Burned Off, Without Shutting Down the Section, by Connecting Several Feeders to the Shorted Line Through Resistance

By Maurice E. Reagan

Switchboard Engineer Westinghouse Electric & Manufacturing Company

A PLAN has been devised and applied on the system of the Cleveland Railway whereby the individual feeders are automatically controlled, but the load dispatcher is given a chance to transfer the circuits in case of a short circuit in such a manner that the short may be burned off without taking an entire feeder section out of circuit. This has been accomplished by the use of a number of new devices worked out to meet the peculiar conditions prevailing on the metropolitan city system and applied first on the Cleveland Railway system.

In order to understand fully what has been accomplished in this installation, the distinctions between automatic substation control of the ordinary type and this Cleveland installation will be sketched briefly.

EARLY AUTOMATIC CONTROL UNSUITABLE

In the earliest form of automatic feeder control, both for light and heavy traction service, large-capacity iron resistance units were inserted in a feeder circuit upon occasion of overload on that section. The overloaded feeder would thus operate on reduced voltage overheat the resistance at any station, the feeder is

from at least one of its ends during the period, while remaining sections feeding from the same station would be undisturbed. Satisfactory results were obtained by the foregoing method when the effective resistance of the circuit consisting of feeder cable, trolley, and rail return to the nearest adjacent "feed-in" point was comparatively high, as is the case in light traffic centers.

In heavily loaded districts encountered in city service the relative resistance of feed-lines is low. Also, the majority of urban feeders are connected to more than one station. The insertion of a resistance in the feeder circuit lowers the voltage, and shunts a portion of the load to other adjacent stations feeding the same section. Of course, the right value of resistance must be used, or too great a share of the load may be transferred to the other station, resulting in the automatic insertion of resistance at that point. If enough load is dropped from the near-by station, the breaker at the near end recloses, and surging back and forth is inevitable. Furthermore, if the overload persists long enough to

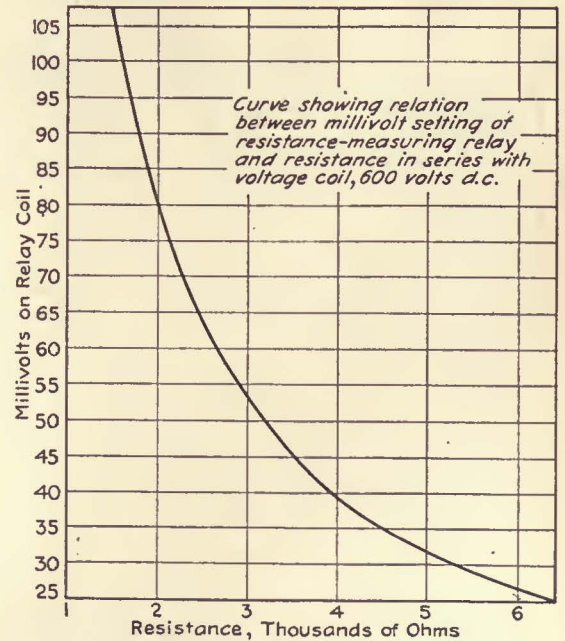
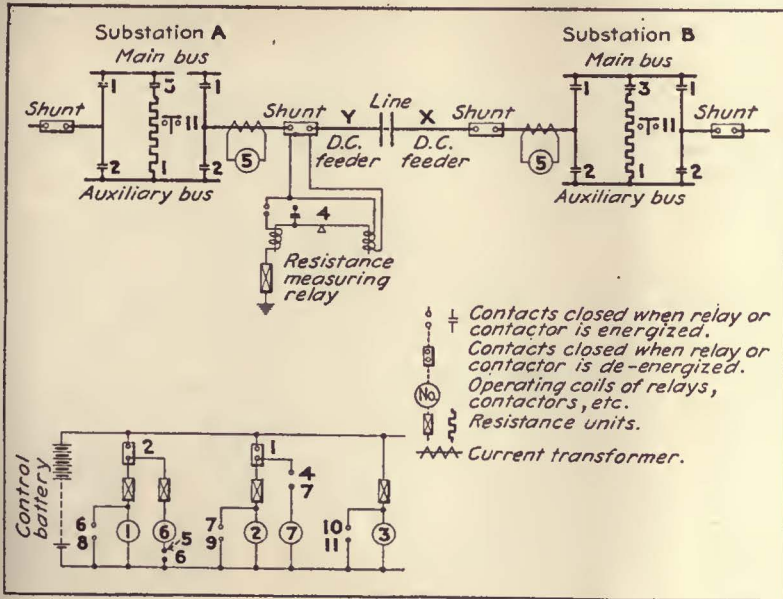


Fig. 1 (At Left)—Typical Cleveland Feeder Layout with Automatic Control. Fig. 2 (At Right)—Relation Between Setting of Resistance Measuring Relay and Resistance in Series with Voltage Coil at 600 Volts

- KEY TO FIG. 1
- 1. Contactor connecting feeder to main bus.
 - 2. Contactor connecting feeder to auxiliary bus.
 - 3. Bus-tie resistance contactor.
 - 4. Resistance measuring relay.
 - 5. Short-circuit detector relay.
 - 6. Auxiliary short-circuit detector relay.
 - 7. Auxiliary reclosing relay.
 - 8. Supervisory control relay.
 - 9. Supervisory control relay.
 - 10. Supervisory control relay.
 - 11. Bus-tie resistance protective thermostat.
 - X. 80 per cent of distance from station A to station B.
 - Y. 80 per cent of distance from station B to station A.

disconnected from the bus until the resistance cools. In the meantime, the cars supplied by this feeder are without power. Also, during the period of greatest load lower voltage is supplied to the cars, causing lower speeds and greater congestion.

The above principle of operation was, therefore, found entirely unsuited for heavy traffic conditions where two or more substations were automatically operated in parallel. Since the machines in the substations had sufficient capacity for any legitimate load, only trouble on the feeder system should disturb the flow of energy. The machines being protected from overheating, it should be necessary to disconnect a feeder from the bus only in case of a short circuit on it.

AUTOMATIC RELAY DETECTS SHORT CIRCUITS

To take care of this condition, a device known as the "short-circuit detector" was developed, by means of which the feeder breaker would remain closed through all periods of overload. Only a short circuit would cause it to open. This relay consisted of a sensitive moving element whose operating coil was connected across the secondary of a current transformer. The primary of the current transformer was the main outgoing feeder cable. The iron circuit of the current transformer had a small air gap to prevent saturation from the normal direct-current load and give a straight saturation curve. Then a short circuit of a certain resistance would induce a definite current in the secondary of the transformer regardless of the direct-current load being carried at the time the ground occurred.

The time required for the current to reach its maximum value on closing a circuit depends on the inductance of the various portions of that circuit. Thus with the sudden application of an inductive load, such as street car motors, the current will build up so slowly as to induce very little energy in the secondary of the current transformer. Since a short circuit has little inductance, the rise of current presents a very steep wave front, transferring a large amount of induced energy to the transformer secondary and hence to the relay coil. The current induced in the secondary of the transformer is then a direct measure of the value of the short circuit. If the current flowing exceeds a certain amount it is desirable to disconnect the feeder from the main station bus. The relay acts accordingly, and the feeder breaker opens.

Shortly after the feeder breaker opens, a circuit operating on the Wheatstone bridge principle is set up to measure the resistance of the feeder circuit, the object being to indicate when it is safe to reconnect the feeder to the main station bus. As the ground is removed the resistance suddenly rises and the reclosing relay sets up the circuit for reclosing the contactor. This scheme of operation keeps the section dead until some one picks up the broken trolley or in some other way removes the low resistance path.

PRECAUTIONS TO PREVENT SERVICE INTERRUPTIONS

On systems such as the Cleveland Railway every precaution is taken to prevent the slightest interruption. Provision had therefore to be made to keep power on the section of line affected by the short circuit, if possible.

Each substation has two direct-current buses. The main bus normally is connected to the positive terminals of the converters when they are in operation, while the second or auxiliary bus is connected to the main bus

through a high capacity resistance by means of a contactor. Each outgoing feeder has a double contactor arrangement so that it may be connected to either the main or the auxiliary bus. The two contactors are so interlocked, however, that only one of them may be closed at one time.

The feeder contactor connecting to the main bus may be opened in two different ways. The first is automatic, through action of the "short-circuit detector" upon occasion of a ground. The second is by means of the "supervisory control system" at the will of the load dispatcher. This man, located in a downtown office, has before him an operating board displaying two lamps corresponding to each contactor and each main piece of apparatus in the substation. One lamp is red, the other white. The red lamp shows that the particular part of the equipment to which it corresponds is in the closed or energized position. If the position of any portion of the equipment in any substation changes, the dispatcher gets an immediate indication by means of the change in lamp signals. The system of remote control provided enables the dispatcher to transfer any feeder from the main to the auxiliary bus, retransfer it back to the main bus, or lock it out of service entirely by opening both contactors.

AUXILIARY BUS USED TO INSERT RESISTANCE WHEN A GROUND OCCURS

In normal operation all feeders are connected to the main bus, with the bus-tie resistance connected ready for operation. Should a ground occur, the feeder on which it occurs is at once automatically transferred to the auxiliary bus. The feeding is then from the main bus through the bus-tie resistance to the auxiliary bus and thence into the short-circuit. The load dispatcher is at once informed by the corresponding change in lamp signals that the feeder has been transferred. He also gets an approximate indication of the voltage on the auxiliary bus, which gives him some idea of the resistance of the fault. Following out the object of this special arrangement, which is to clear the trouble as quickly as possible, he transfers other feeders in the station from the main to the auxiliary buses in order to raise the voltage. This causes a larger flow of current into the faulty section and the ground is soon burned clear.

When the fault is removed, all feeders must automatically retransfer to the main bus. To ascertain if the line is clear, the resistance of the circuit in trouble is being measured while the feed is taken through the auxiliary bus. The usual resistance-measuring relay which operates on the Wheatstone bridge principle is not applicable in this system, since the voltage of the auxiliary bus may have any value up to 600. A relay is required which will measure a resistance from a variable voltage source. This has been taken care of by a type of resistance-measuring relay which has two operating coils pivoted on a common balance arm. One of the coils is connected with a variable resistance in series between the auxiliary bus and ground; the other coil is connected across a shunt in the outgoing feeder circuit. Hence, one coil measures the voltage of the auxiliary bus, while the other determines the flow of current into the fault. At a point slightly below that set for reclosing, the two coils are calibrated to have the same pulling effect, so that a balance is reached.

When a feeder has been grounded and has been transferred to the auxiliary bus, this relay is placed in the

circuit automatically, with the current coil overbalancing the voltage coil. If the resistance of the short-circuited feeder remains constant while the voltage of the auxiliary bus rises, the pull of the voltage coil increases. However, this is accompanied by a corresponding increase in the pull of the current coil. Thus the relay gives an accurate measure of the resistance, regardless of the value of voltage on the auxiliary bus. As the resistance rises to a value at which it is permissible to reclose the feeder to the main bus without again operating the "short-circuit detector," the relay acts, making a contact to retransfer the feeder.

The coil of the "short-circuit detector" relay which is connected across the secondary of the transformer has several taps brought out so that the relay may be calibrated by changing one screw on the terminal board. Each feeder on the system has an individual setting depending on its resistance to the nearest adjacent feeder station. Having determined the corresponding short-circuit current, 80 per cent of this value is taken as the value at which the "short-circuit detector" should operate.

Referring to the diagram of connections given, this means that a short circuit occurring on the right hand side of point *X* would transfer the station *B* feeder to the auxiliary bus but would not affect station *A*. On the other hand, a short occurring to the left of point *Y* would cause a transfer of the connections at station *A* but would not affect station *B*. However, should trouble take place between *X* and *Y*, both stations would be transferred. The reason for this arrangement is that this same feeder may be used to carry current to burn off a ground on some other feeder leading out of the far station. It would be undesirable to transfer it to the auxiliary bus at the near end if connected to the auxiliary bus at the far end by the load dispatcher. The proper calculation is made on each individual feeder circuit, and a relay setting is made to correspond. In case a radical change is made in the feeder circuits a new relay setting is required.

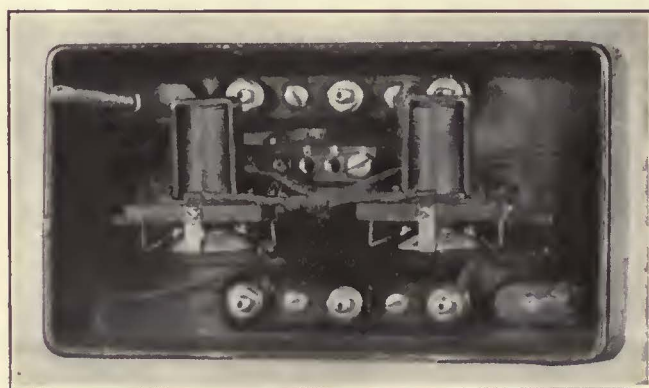
OPERATION OF RECLOSING RELAY

After the tripping value of the feeder has been determined by the foregoing method, the reclosing relay is set at a point approximately 25 per cent below this amount. As stated before, this adjustment is accomplished by the variation of a resistance in series with the voltage coil of the resistance-measuring relay. Suppose, for example, a feeder is set to transfer on a short circuit of approximately 2,000 amp., and it is desired to retransfer the feeder to the main converter bus when the resistance of the feeder is such that 1,500 amp. will flow when connected to a 600-volt circuit. Since the current coil is connected to a 2,000 amp. shunt, there will be approximately 37.5 millivolts on the current coil at the point of retransferring. Approximately 40 millivolts are required on the voltage coil to overbalance and make contact. By referring to the curve, the necessary amount of resistance to have in series with the voltage coil is determined to correspond with 40 millivolts and set the rheostat accordingly.

The feeder usually transfers from the main to the auxiliary bus only upon occasion of a short circuit. At such a time precautions must be taken to keep the converter from dangerous flashing. As the heavy load is thrown onto the converter, the armature is pulled back from the synchronous position an amount depending on the resistance of the ground. If the load is suddenly

removed by opening the feeder breaker, the armature jumps quickly ahead to a position as determined by the remaining legitimate load. All of the armature energy corresponding to the difference in phase position is given up. If this amount of energy is great enough, the converter will flash.

Developments at the present time to prevent flashing include high-speed breakers, having enough feeder resistance between the machine and the first connection to the trolley or by the insertion of sufficient resistance in the machine circuit to limit the current to a value within the commutating capacity of the converter before opening the circuit. The use of the high-speed breaker, which opens the circuit before the armature can be pulled a dangerous amount away from the synchronous position, entails features such as opening under a slight reduction of voltage, etc., which renders it undesirable for such application. Having a permanent resistance of



Short-Circuit Detector Relay and Auxiliary Relay,
Nos. 5 and 6 in Fig. 1

sufficient value in the feeder is also undesirable because of the constant loss, the drop in voltage under heavy loads, and the extra copper required to feed the territory nearest to the station.

The system now in use in Cleveland temporarily inserts resistance in the machine circuit for several cycles before the feeder breaker opens. This allows time for the armature to settle in a position from which all load may be suddenly relieved without causing damage. To accomplish this, an air-gap current transformer with a "short-circuit detector" is placed in each machine circuit as well as each feeder circuit. The impulse from the steep wave-front current curve starts both the machine and feeder "short-circuit detectors" operating at the same instant. The time differential comes from the difference in timing between the two contactors. As soon as the feeder breaker opens, disconnecting the feeder from the main bus, the resistance is removed from the machine circuit.

The majority of contactors used in railway feeder application have been of the magnetic type. The natural limitation of this type of contactor is that it will not close on less than 60 per cent of normal voltage. However, since a feeder should be operative when the station is out of service so that other stations may feed through to sections out of their normal zone, the energy for closing the feeders must come from some separate and reliable source. Pneumatic contactors similar to those in use for years in railway car and locomotive service have been adopted in Cleveland. The energy to operate the air valves is supplied by a storage battery.

Some Depreciation!
 What can you get for the new car after driving it a few days?
 Your loss, on the average car, will take you to and from town daily on the street car for more than ten years.

Figure it yourself
 DALLAS RAILWAY CO.

Why not Resolve?
 Ride the Street Car - Save the Difference
 6c takes you there - it brings you back

SAVE YOUR AUTO
 Are you grinding the life out of your car by driving it to work? Use your car for pleasure trips and the saving will surprise you.
 RIDE THE STREET CAR
 Save the Difference
 DALLAS RAILWAY CO.

SAVE YOUR AUTO
 No blow-outs, no punctures, no parking worries, no danger of accidents, no thieves to guard against when you ride the street car.
 6c Pays The Whole Bill
 DALLAS RAILWAY CO.

EDUCATING A THOUSAND
 School Tax paid by this Company annually pays for one year's education for over 1000 pupils. Each street car pays for the schooling of five Dallas children.
 SAVE THE DIFFERENCE
 HELP DALLAS SCHOOLS
 DALLAS RAILWAY CO.

**RIDE THE STREET CAR
 SAVE TIME & EXPENSE**

SMILE!
 Our service is always given with a smile. It requires 66 muscles to frown and 17 to smile!
 Save the difference
 DALLAS RAILWAY CO.

How many street car rides in a Gallon of Gasoline?
 Save The Difference
 Dallas Railway Co.

Accidents cost dollars and cents while safety costs only common sense!
 Why not invest in Safety?
 DALLAS RAILWAY CO.

Women appreciate the thoughtfulness of men who keep their shoes off street car seats
 It pays to be thoughtful!
 DALLAS RAILWAY CO.

ALWAYS SAFE
 Again this year, as in former years, thousands of children were given free street car rides on CHILDREN'S DAY without a single accident on a car.
 DALLAS RAILWAY CO.

6 CENTS
 I'LL TAKE YOU THERE
 I'LL BRING YOU BACK
 THE PRICE OF A RIDE
 TAKES YOU THERE
 IT BRINGS YOU BACK
 DALLAS RAILWAY CO.

GOOD FOR ONE CITY FARE

I AM A MAGIC COIN
 DROPPED INTO THE TROLLEY BOX
 I'LL TAKE YOU WHERE YOU'RE GOIN'
 DALLAS RAILWAY CO.

**DEPENDABLE SERVICE
 RIDE THE**

NO PUNCTURES NO WORRIES
 IT TAKES YOU THERE IT BRINGS YOU BACK
 DALLAS RAILWAY CO.

Selling Transportation
 A few examples of the effective car-card advertising used by the Dallas Railway Company

Selling Transportation
 A few examples of the effective car-card advertising used by the Dallas Railway Company

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 A few examples of the effective car-card advertising used by the Dallas Railway Company

Census Figures for Nine More States

These Reports Follow the Trend Indicated in the Census Statements Previously Published—The Track Mileage Has Decreased Slightly Since 1917—Incomes of Electric Railways in These States Have Increased on Account of Higher Fares

Washington—A decrease of 6.5 per cent occurred in track mileage and a decrease of 6.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$13,852,442 in 1922, an increase of 52.1 per cent as compared with 1917, but on account of a more rapid increase in expenses net income decreased by 57.8 per cent.

	1922	1917	Per Cent of Increase, 1917-1922†
Number of operating companies...	**19	20	
Miles of single track operated††...	1,001.69	1,071.33	* 6.5
Number of cars, all types...	1,988	1,969	1.0
Number of electric locomotives...	31	30	
Number of persons employed...	4,578	5,857	*21.8
Salaries and wages...	\$7,125,954	\$6,291,027	13.3
Primary horsepower, total...	27,985	274,224	*89.8
Kilowatt capacity of generators...	17,700	173,160	*89.8
Current generated, kilowatt-hours...	75,510,512	626,948,720	*88.0
Current purchased, kilowatt-hours...	191,120,960	116,797,063	63.6
Passengers carried...	\$173,728,486	186,361,737	* 6.8
Revenue car mileage...	36,299,115	36,128,262	0.5
Railway operations, revenues...	\$13,852,442	\$9,109,642	52.1
Railway operations, expenses...	\$10,903,804	\$6,624,286	64.6
Net revenues, railway operations...	\$2,948,638	\$2,485,356	18.6
Auxiliary operations, revenues...	\$1,315,885	\$6,305,468	*79.1
Auxiliary operations, expenses...	\$786,606	\$2,694,495	*70.8
Net revenues, auxiliary operations ‡	\$529,279	\$3,610,973	*85.3
Net operating revenues...	\$3,477,917	\$6,096,329	*43.0
Taxes assignable to railway operations...	\$599,788	\$1,296,612	*53.7
Operating income...	\$2,878,129	\$4,799,717	*40.0
Non-operating income...	\$376,290	\$653,940	*11.9
Gross income...	\$3,454,419	\$5,453,657	*36.7
Interest and other deductions from gross income...	\$2,898,121	\$4,136,448	*29.9
Net income...	\$556,298	\$1,317,209	*57.8

** Reduction in companies due to mergers.
 †† Includes 48.62 miles in 1922, and 49.73 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 0.5 mile in 1922 and 0.9 mile in 1917 operated in the state, but owned by companies outside the state.
 ‡ In addition there were 713,798 passengers carried by twenty-six motor buses operated by electric railway companies.
 § Chiefly revenues from electric light and power departments of electric railways.

Indiana—In spite of a decrease of 2.4 per cent in track mileage, there was an increase of 13.4 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$24,700,557 in 1922 as compared with \$17,127,101 in 1917, a gain of 44.2 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies...	†27	32	
Miles of single track operated†...	2,297.80	2,353.18	*2.4
Number of cars, all types...	2,908	2,692	8.0
Number of electric locomotives...	12	9	
Number of persons employed...	8,855	8,184	8.2
Salaries and wages...	\$10,509,432	\$6,586,842	59.6
Primary horsepower, total...	149,115	168,883	*11.7
Kilowatt capacity of generators...	114,625	125,262	*8.5
Current generated, kilowatt-hours...	297,116,367	288,205,284	3.1
Current purchased, kilowatt-hours...	96,633,780	71,298,793	35.5
Passengers carried...	262,320,348	231,290,386	13.4
Revenue car mileage...	58,551,813	52,213,871	12.1
Railway operations, revenues...	\$24,700,557	\$17,127,101	44.2
Railway operations, expenses...	\$17,874,164	\$11,429,824	56.4
Net revenues, railway operations...	\$6,826,393	\$5,697,277	19.8
Auxiliary operations, revenues**...	\$3,743,959	\$2,401,910	55.9
Auxiliary operations, expenses...	\$2,215,513	\$1,287,248	72.1
Net revenues, auxiliary operations...	\$1,528,446	\$1,114,662	37.1
Net operating revenues...	\$8,354,839	\$6,811,939	22.7
Taxes assignable to railway operations...	\$1,766,198	\$867,049	103.7
Operating income...	\$6,588,641	\$5,944,890	10.8
Non-operating income...	\$424,183	\$400,342	6.0
Gross income...	\$7,012,824	\$6,345,232	10.5
Interest and other deductions from gross income...	\$5,215,951	\$5,341,878	*2.4
Net income...	\$1,796,873	\$1,003,354	79.1

† Reduction in companies due to consolidations and to the fact that four companies with 28.22 miles of track discontinued operations prior to 1922.
 ‡ Includes 31.20 miles in 1922 and 33.03 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 44.47 miles in 1922 and 35.43 miles in 1917 operated in the state, but owned by companies outside the state.
 ** Chiefly revenues from electric light and power departments of electric railways.

New Jersey—The figures show a slight decrease in track mileage and a reduction of 12.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$31,716,476 in 1922, an increase of 42.8 per

cent as compared with 1917, but owing to a more rapid increase in operating expenses and taxes, the net income from all sources decreased by 95.1 per cent during the five-year period.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies...	†19	22	
Miles of single track operated†...	1,329.22	1,354.35	*1.9
Number of cars, all types...	3,359	3,364	*0.1
Electric locomotives...	2	2	
Number of persons employed...	9,638	7,461	29.2
Salaries and wages...	\$13,419,003	\$7,888,127	70.1
Primary horsepower, total...	30,116	18,966	58.8
Kilowatt capacity of generators...	18,200	14,550	25.1
Current generated, kilowatt-hours...	23,021,695	22,895,276	0.6
Current purchased, kilowatt-hours...	234,541,378	245,049,086	*4.3
Passengers carried††...	484,084,796	555,286,203	*12.8
Revenue car mileage...	69,214,150	68,966,244	0.4
Railway operations, revenues...	\$31,716,476	\$22,304,776	42.8
Railway operations, expenses...	\$22,523,541	\$13,387,865	68.2
Net revenues, railway operations...	\$9,192,935	\$8,816,911	4.3
Auxiliary operations, revenues**...	\$375,655	\$59,305	533.4
Auxiliary operations, expenses...	\$183,823	\$48,183	281.5
Net revenues, auxiliary operations...	\$191,832	\$11,122	1,624.8
Net operating revenues...	\$9,384,767	\$8,828,033	6.3
Taxes assignable to railway operations...	\$3,054,252	\$1,831,691	66.7
Operating income...	\$6,330,515	\$6,996,342	*9.5
Non-operating income...	\$266,554	\$269,212	*1.0
Gross income...	\$6,597,069	\$7,265,554	*9.2
Interest and other deductions from gross income...	\$6,551,768	\$6,342,569	3.3
Net income...	\$45,301	\$922,985	*95.1

† Three companies with 27.86 miles of track discontinued operations prior to 1922.
 ‡ Includes 0.66 miles of track in 1922 and 1917 lying outside the state, but owned by companies within the state, and excludes 14.37 miles in both years operated in the state, but owned by companies outside the state.
 †† In addition there were 10,279 passengers carried by six motor buses operated by electric railway companies in 1922.
 ** Chiefly revenues from electric light and power departments of electric railways.

Texas—A slight increase occurred in track mileage, and there was a gain of 23.9 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$16,038,086 in 1922, an increase of 47.2 per cent as compared with 1917.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies...	†24	32	
Miles of single track operated†...	966.01	940.41	2.7
Number of cars, all types...	1,606	1,493	7.6
Number of electric locomotives...	1	1	
Number of persons employed...	5,736	4,914	16.7
Salaries and wages...	\$7,286,684	\$4,189,408	73.9
Primary horsepower, total...	68,511	63,200	8.4
Kilowatt capacity of generators...	49,732	46,871	6.1
Current generated, kilowatt-hours...	171,734,012	119,510,988	43.7
Current purchased, kilowatt-hours...	62,411,775	53,737,334	16.1
Passengers carried...	229,165,045	184,912,268	22.9
Revenue car mileage...	44,570,642	39,682,183	12.3
Railway operations, revenues...	\$16,038,086	\$10,894,860	47.2
Railway operations, expenses...	\$11,241,975	\$6,742,007	66.7
Net revenues, railway operations...	\$4,796,111	\$4,152,853	15.5
Auxiliary operations, revenues**...	\$2,853,341	\$1,876,360	52.1
Auxiliary operations, expenses...	\$1,489,218	\$928,689	60.4
Net revenues, auxiliary operations...	\$1,364,123	\$947,671	43.9
Net operating revenues...	\$6,160,234	\$5,100,524	20.8
Taxes assignable to railway operations...	\$1,299,174	\$748,239	73.6
Operating income...	\$4,861,060	\$4,352,285	11.7
Non-operating income...	\$267,675	\$234,476	14.2
Gross income...	\$5,128,735	\$4,586,661	11.8
Interest and other deductions from gross income...	\$2,558,162	\$2,182,321	17.2
Net income...	\$2,570,573	\$2,404,340	6.9

† Six companies with 20.83 miles of track which reported in 1917 discontinued operations prior to 1922, and in addition 4 companies were merged with other companies.
 ‡ Excludes 8.62 miles in 1922, and 9.53 miles in 1917 operated in the state, but owned by companies outside the state.
 ** Chiefly revenues from electric light and power departments of electric railways.

Virginia—The figures show a decrease of 4.5 per cent in track mileage and a gain of 2.7 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$8,016,948, an increase of 24.4 per cent, but

*Indicates decrease.

owing to a more rapid increase in expenses, net income from all sources decreased by 31.2 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies.....	114	16	.....
Miles of single track operated†.....	555.02	581.35	*4.5
Number of cars, all types.....	1,141	1,015	12.4
Electric locomotives.....	4	4	.....
Number of persons employed.....	4,462	3,406	31.0
Salaries and wages.....	\$5,243,754	\$2,547,194	105.9
Primary horsepower, total.....	179,616	121,536	47.8
Kilowatt capacity of generators.....	126,812	85,289	48.7
Current generated, kilowatt-hours.....	314,336,019	210,427,025	49.4
Current purchased, kilowatt-hours.....	33,195,804	21,063,702	57.6
Passengers carried.....	139,049,282	135,411,909	2.7
Revenue car mileage.....	24,312,340	21,968,083	10.7
Railway operations, revenues.....	\$8,016,948	\$6,444,415	24.4
Railway operations, expenses.....	\$6,792,444	\$3,959,244	71.6
Net revenues, railway operations.....	\$1,224,504	\$2,485,171	*50.7
Auxiliary operations, revenues**.....	\$7,402,022	\$3,648,872	102.9
Auxiliary operations, expenses.....	\$3,867,384	\$1,455,805	165.7
Net revenues, auxiliary operations.....	\$3,534,638	\$2,193,067	61.2
Net operating revenues.....	\$4,759,142	\$4,678,238	1.7
Taxes assignable to railway operations.....	\$986,298	\$482,452	104.4
Operating income.....	\$3,772,844	\$4,195,786	*10.1
Non-operating income.....	\$404,526	\$257,743	56.9
Gross income.....	\$4,177,370	\$4,453,529	*6.2
Interest and other deductions from gross income.....	\$2,899,097	\$2,594,523	11.7
Net income.....	\$1,278,273	\$1,859,006	*31.2

† Reduction in companies due to consolidations and to the fact that one company discontinued operations prior to 1922.
 ‡ Includes 3.88 miles in 1922 and 4.69 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 2.50 miles in 1922 and 4.02 miles in 1917 operated in the state, but owned by companies outside the state.
 ** Chiefly revenues from electric light and power departments of electric railways.

Oregon.—There was a slight increase in track mileage, and an increase of 5.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$7,400,750 in 1922 as compared with \$4,999,601 in 1917, a gain of 48 per cent, and operating expenses increased 74.1 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies.....	9	8	.....
Miles of single track operated†.....	605.16	596.23	1.5
Number of cars, all types.....	1,422	1,431	*0.6
Electric locomotives.....	19	22	.....
Number of persons employed.....	3,585	3,057	17.3
Salaries and wages.....	\$5,610,433	\$2,976,798	88.5
Primary horsepower, total.....	115,000	113,950	0.9
Kilowatt capacity of generators.....	85,630	64,880	32.0
Current generated, kilowatt-hours.....	323,645,100	218,086,315	48.4
Current purchased, kilowatt-hours.....	15,991,264	15,066,427	6.1
Passengers carried.....	97,246,645	91,926,694	5.8
Revenue car mileage.....	21,341,238	22,528,731	*5.3
Railway operations, revenues.....	\$7,400,750	\$4,999,601	48.0
Railway operations, expenses.....	\$6,062,257	\$3,481,723	74.1
Net revenues, railway operations.....	\$1,338,493	\$1,517,878	*11.8
Auxiliary operations, revenues**.....	\$3,883,726	\$2,102,832	84.7
Auxiliary operations, expenses.....	\$1,490,986	\$759,168	96.4
Net revenues, auxiliary operations.....	\$2,392,740	\$1,343,664	78.1
Net operating revenues.....	\$3,731,233	\$2,861,542	30.4
Taxes assignable to railway operations.....	\$1,043,736	\$693,211	50.6
Operating income.....	\$2,687,497	\$2,168,331	23.9
Non-operating income.....	\$317,600	\$184,711	71.9
Gross income.....	\$3,005,097	\$2,353,042	27.7
Interest and other deductions from gross income.....	\$3,248,744	\$2,981,620	9.0
Deficit.....	\$243,647	\$628,578	*61.2

* Includes 0.50 miles in 1922 and 0.09 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 7.35 miles in 1922 and 6.99 miles in 1917 operated in the state, but owned by companies outside the state.
 ** Chiefly revenues from electric light and power departments of electric railways.

Maine.—The figures show a slight decrease in track mileage and a reduction of 10.1 per cent in the number of passengers carried. On the other hand railway operating revenues increased, owing chiefly to advances in fare rates, from \$3,510,034 in 1917 to \$4,836,396 in 1922, or 37.8 per cent, and net income showed a gain of 112.1 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies.....	15	16	.....
Miles of single track†.....	571.56	577.00	*0.9
Number of cars, all types.....	672	820	*18.0
Electric locomotives.....	8	7	.....
Number of persons employed.....	1,789	1,903	*6.0
Salaries and wages.....	\$2,615,625	\$1,665,721	57.0
Primary horsepower, total.....	56,556	45,548	24.2
Kilowatt capacity of generators.....	30,660	22,814	34.4
Current generated, kilowatt-hours.....	75,180,990	61,596,706	22.1
Current purchased, kilowatt-hours.....	47,887,491	40,673,687	17.7
Passengers carried.....	55,575,075	61,789,846	*10.1
Revenue car mileage.....	11,026,566	12,255,066	*10.0
Railway operations, revenues.....	\$4,836,396	\$3,510,034	37.8
Railway operations, expenses.....	\$3,724,767	\$2,618,746	42.2
Net revenue, railway operations.....	\$1,111,629	\$891,288	24.7
Auxiliary operations, revenues.....	\$1,815,178	\$1,271,187	42.8
Auxiliary operations, expenses.....	\$776,900	\$501,475	54.9
Net revenue, auxiliary operations.....	\$1,038,278	\$769,712	34.9

	1922	1917	Per Cent of Increase, 1917-1922
Net operating revenue.....	\$2,149,907	\$1,661,000	29.4
Taxes assignable to railway operations.....	\$417,362	\$198,524	110.2
Operating income.....	\$1,732,545	\$1,462,476	18.5
Nonoperating income.....	\$215,496	\$143,450	50.2
Gross income.....	\$1,948,041	\$1,605,926	21.3
Deductions from gross income.....	\$1,140,658	\$1,225,209	*6.9
Net income.....	\$807,383	\$380,717	112.1

† Includes in both years 5.48 miles of track lying outside of the state, but owned by companies within the state.

Vermont.—The figures show not only a decrease of 8.1 per cent in track mileage, but also a loss of 20.5 per cent in the number of passengers carried. Gross railway operating revenues amounted to \$602,196 in 1922, an increase of less than 1 per cent, as compared with 1917, while railway operating expenses increased 7.3 per cent, and net income 1.3 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies.....	18	9	.....
Miles of single track operated†.....	99.20	107.95	*8.1
Number of cars, all types.....	87	156	*44.2
Electric locomotives.....	5	.....	.....
Number of employees.....	268	311	*13.8
Salaries and wages.....	\$294,712	\$259,205	13.7
Primary horsepower, total.....	2,600	8,394	*66.6
Kilowatt capacity of generators.....	2,150	7,277	*72.2
Current generated, kilowatt-hours.....	3,449,600	11,601,930	*70.3
Current purchased, kilowatt-hours.....	11,879,978	10,152,558	17.0
Passengers carried.....	7,372,195	9,268,385	*20.5
Revenue mileage.....	1,405,742	1,865,039	*24.6
Railway operations, revenues.....	\$602,196	\$596,983	0.9
Railway operations, expenses.....	\$525,166	\$489,663	7.3
Net revenues, railway operations.....	\$77,030	\$107,320	*28.2
Auxiliary operations, revenues**.....	\$286,387	\$229,586	24.7
Auxiliary operations, expenses.....	\$189,896	\$109,783	73.0
Net revenues, auxiliary operations.....	\$96,491	\$119,803	*19.5
Net operating revenues.....	\$173,521	\$227,123	*23.6
Taxes assignable to railway operations.....	\$30,680	\$34,684	*11.5
Operating income.....	\$142,841	\$192,439	*25.8
Non-operating income.....	\$53,633	\$48,489	10.6
Gross income.....	\$196,474	\$240,928	*18.5
Interest and other deductions from gross income.....	\$160,116	\$205,040	*21.9
Net income.....	\$36,358	\$35,888	1.3

† One company with 13.22 miles of track suspended operations prior to 1922.
 ‡ Includes 2.25 miles in 1922, and 2.86 miles in 1917 operated outside the state but owned by companies within the state, and excludes 20.45 miles in 1922 and 20.46 miles in 1917 operated in the state but owned by companies outside the state.
 ** Chiefly revenues from electric light and power departments of electric railways.

Massachusetts.—Track mileage decreased 12 per cent. This decrease is due to track reported as abandoned or idle in 1922. A decrease of 13.2 per cent is also shown in the number of passengers carried. Gross railway operating revenues amounted to \$60,942,009 in 1922, an increase of 34.7 per cent as compared with 1917; operating expenses increased 30.3 per cent while net income made a gain of 222.8 per cent.

	1922	1917	Per Cent of Increase, 1917-1922†
Number of operating companies.....	**31	39	.....
Miles of single track operated††.....	2,688.37	3,055.88	*12.0
Number of cars, all types.....	6,273	9,515	*34.1
Number of electric locomotives.....	5	6	.....
Number of persons employed.....	17,530	21,330	*17.8
Salaries and wages.....	\$27,938,108	\$21,236,219	31.6
Primary horsepower, total.....	303,863	333,390	*8.9
Kilowatt capacity of generators.....	224,539	233,619	*3.9
Current generated, kilowatt-hours.....	396,515,810	537,040,967	*26.2
Current purchased, kilowatt-hours.....	111,050,581	97,326,716	14.1
Passengers carried.....	\$1,058,708,495	\$1,219,706,121	*13.2
Revenue car mileage.....	105,161,956	137,559,415	*23.6
Railway operations, revenues.....	\$60,942,009	\$45,239,116	34.7
Railway operations, expenses.....	\$44,431,004	\$34,097,107	30.3
Net operating revenues.....	\$16,511,005	\$11,142,009	48.2
Taxes assignable to railway operations.....	\$2,636,552	\$2,210,133	19.3
Operating income.....	\$13,874,453	\$8,931,876	55.3
Non-operating income.....	\$770,176	\$211,547	264.1
Gross income.....	\$14,644,629	\$9,143,423	60.2
Interest and other deductions from gross income.....	\$9,845,285	\$7,656,659	28.6
Net income.....	\$4,799,344	\$1,486,764	222.8

** Reduction due to companies which have discontinued operations.
 †† Excludes 70.29 miles in 1922 and 110.93 miles in 1917 lying outside the state, but owned by companies within the state.
 ‡ In addition there were 639,217 passengers carried by twelve motor buses operated by electric railway companies.
 § Includes revenues from sale of electric current to the amount of \$533,016 in 1922 and \$578,283 in 1917.
 * Indicates decrease.

Association News & Discussions

Committee Appointments for 1923-1924, American and Affiliated Associations

THE committee appointments of the American Electric Railway Association and affiliated associations have been completed by President Britton I. Budd and the other presidents. The list printed herewith includes only the men who have accepted, and there will be a few additions to some of the committees as final acceptances are received.

American Association

FINANCE

J. H. Pardee, president The J. G. White Management Corporation, New York, N. Y., chairman.

R. P. Stevens, New York, N. Y.
J. G. Barry, Schenectady, N. Y.

POLICY

J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.

J. P. Barnes, Louisville, Ky.

H. G. Bradlee, Boston, Mass.

C. D. Emmons, Baltimore, Md.

J. H. Hanna, Washington, D. C.

W. H. Sawyer, East St. Louis, Ill.

Paul Shoup, San Francisco, Cal.

H. D. Shute, East Pittsburgh, Pa.

L. S. Storrs, New Haven, Conn.

Robert I. Todd, Indianapolis, Ind.

SUBJECTS AND MEETINGS

F. R. Coates, Henry L. Doherty & Company, New York, N. Y., chairman.

Harry L. Brown, New York, N. Y.

Joseph K. Choate, New York, N. Y.

Harlow C. Clark, Newark, N. J.

F. W. Doolittle, New York, N. Y.

E. C. Faber, New York, N. Y.

George H. Harries, Chicago, Ill.

Cornell S. Hawley, Albany, N. Y.

W. H. Hyland, Gloversville, N. Y.

H. A. Johnson, Chicago, Ill.

C. W. Kellogg, Boston, Mass.

J. K. Punderford, New Haven, Conn.

A. S. Richey, Worcester, Mass.

PUBLICITY

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

P. S. Arkwright, Atlanta, Ga.

Frank L. Blanchard, New York.

John S. Bleecker, Springfield, Ohio.

Frank R. Coates, New York, N. Y.

P. H. Gadsden, Philadelphia, Pa.

L. E. Gould, Chicago, Ill.

Luke Grant, Chicago, Ill.

J. P. Griffin, Dallas, Tex.

H. M. Lytle, Chicago, Ill.

J. C. McQuiston, East Pittsburgh.

Martin P. Rice, Schenectady, N. Y.

L. S. Storrs, New Haven, Conn.
E. M. Walker, Schenectady, N. Y.

PUBLICATIONS

L. S. Storrs, president The Connecticut Company, New Haven, Conn., chairman.

J. P. Barnes, Louisville, Ky.

F. G. Buffe, Kansas City, Mo.

Harlow C. Clark, Newark, N. J.

E. C. Faber, New York, N. Y.

M. B. Lambert, East Pittsburgh, Pa.

J. N. McDonald, New York, N. Y.

M. McCants, San Francisco, Cal.

E. M. Walker, Schenectady, N. Y.

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R. P. Stevens, president Republic Railway & Light Company, New York, N. Y., chairman.

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John A. Dewhurst, Philadelphia, Pa.

Albert Flor, New York, N. Y.

H. B. Flowers, New Orleans, La.

L. E. Gould, Chicago, Ill.

C. W. Kellogg, Boston, Mass.

T. A. Kenney, New York, N. Y.

George R. Lyman, New York, N. Y.

C. E. Morgan, Brooklyn, N. Y.

R. Shaddelee, Grand Rapids, Mich.

K. A. Simmon, East Pittsburgh, Pa.

E. M. Walker, Schenectady, N. Y.

E. P. Waller, Schenectady, N. Y.

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C. P. Billings, Pittsburgh, Pa.

L. C. Datz, Memphis, Tenn.

C. R. Ellicott, New York, N. Y.

W. H. Hyland, Gloversville, N. Y.

H. A. Johnson, Chicago, Ill.

J. K. Punderford, New Haven, Conn.

Martin Schreiber, Camden, N. J.

J. E. Wayne, York, Pa.

E. M. White, Binghamton, N. Y.

CO-OPERATION WITH STATE AND SECTIONAL ASSOCIATIONS

J. P. Barnes, president, Louisville Railway, Louisville, Ky., chairman.

John S. Bleecker, Springfield, Ohio.

F. G. Buffe, Kansas City, Mo.

F. C. Chambers, Des Moines, Iowa.

J. C. Chestnut, McAlester, Okla.

J. F. Collins, Jackson, Mich.

F. B. Culley, Augusta, Ga.

P. H. Gadsden, Philadelphia, Pa.

L. H. Palmer, Baltimore, Md.

C. E. Morgan, Brooklyn, N. Y.

A. B. Paterson, New Orleans, La.

A. M. Patten, Topeka, Kan.

T. H. Tutwiler, Memphis, Tenn.
C. V. Wood, Springfield, Mass.

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E. F. Wickwire, secretary the Ohio Brass Company, Mansfield, Ohio, chairman.

George O. A. Barnes, New York, N. Y.

W. C. Bell, Richmond, Va.

W. D. Blatz, Bridgeport, Conn.

W. H. Boyce, New Brighton, Pa.

F. R. Coates, New York, N. Y.

C. R. Ellicott, New York, N. Y.

C. D. Emmons, Baltimore, Md.

Edwin C. Faber, New York, N. Y.

H. H. Lloyd, Indianapolis, Ind.

J. C. McQuiston, East Pittsburgh.

E. B. Meissner, St. Louis, Mo.

George R. Rowland, New York, N. Y.

W. S. Stackpole, Newark, N. J.

E. M. Walker, Schenectady, N. Y.

E. P. Waller, Schenectady, N. Y.

James Ashton Greig, Chicago, Ill.

EDUCATION

Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.

Edward J. Blair, Chicago, Ill.

C. F. Crane, Harrisburg, Pa.

C. B. Fairchild, Philadelphia, Pa.

R. M. Howard, Winona, Minn.

Myles B. Lambert, East Pittsburgh.

M. McCants, San Francisco, Cal.

James McFall, Pittsburgh, Pa.

C. E. Morgan, Brook'yn, N. Y.

H. H. Norris, New York, N. Y.

J. V. Sullivan, Chicago, Ill.

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L. H. Palmer, general manager United Railways & Electric Company, Baltimore, Md., chairman.

Gordon Campbell, York, Pa.

G. K. Jeffries, Indianapolis, Ind.

R. A. Leussler, Omaha, Neb.

Samuel Riddle, Louisville, Ky.

W. S. Rodger, Highland Park, Mich.

H. B. Weatherwax, Albany, N. Y.

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H. O. Allison, New Brighton, Pa.

Charles W. Chase, Gary, Ind.

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A. W. Brady, president, Union Traction Company of Indiana, Anderson, Ind., chairman.

Wm. Chamberlain, Cedar Rapids, Iowa.

E. J. Dickson, Providence, R. I.

George E. Hamilton, Washington, D. C.

R. D. Hood, Haverhill, Mass.

T. W. Passailaigue, Charleston, S. C.
Alfred Sweeney, Lewiston, Me.

C. L. S. Tingley, Philadelphia, Pa.
H. B. Weatherwax, Albany, N. Y.

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E. B. Meissner, St. Louis, Mo., vice-chairman.

James P. Barnes, Louisville, Ky.
F. G. Buffe, Kansas City, Mo.
Edward Dana, Boston, Mass.
C. R. Ellicott, New York, N. Y.
H. B. Flowers, New Orleans, La.
L. E. Gould, Chicago, Ill.

J. H. Hanna, Washington, D. C.
H. J. Kenfield, Chicago, Ill.
M. B. Lambert, East Pittsburgh, Pa.
R. V. Prather, Springfield, Ill.
Harry Reid, Indianapolis, Ind.
E. P. Waller, Schenectady, N. Y.

NATIONAL RELATIONS

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.

W. A. Baehr, Chicago, Ill.
H. G. Bradlee, Boston, Mass.
Ralph R. Bradley, Chicago, Ill.
Arthur W. Brady, Anderson, Ind.
C. D. Cass, Waterloo, Iowa.
C. R. Ellicott, New York, N. Y.
P. H. Gadsden, Philadelphia, Pa.
C. E. Groesbeck, New York, N. Y.
J. H. Hanna, Washington, D. C.
W. H. Sawyer, East St. Louis, Ill.

INDETERMINATE FRANCHISE

Edwin Gruhl, vice-president and general manager, North American Company, New York, N. Y., chairman.

Walter A. Draper, Cincinnati, Ohio.
Edwin Duffey, Cortland, N. Y.
H. L. Geisse, Wausau, Wis.
F. C. Hamilton, New York, N. Y.
R. B. Stearns, Boston, Mass.

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N. H. Daniels, Boston, Mass.
B. J. Denman, Davenport, Iowa.
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F. M. Hamilton, Chicago, Ill.
A. D. Knox, New Haven, Conn.
John H. Moran, Boston, Mass.
C. E. Morgan, Brooklyn, N. Y.
Charles B. Scott, Chicago, Ill.
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RELATIONSHIP WITH THE MOTOR VEHICLE INDUSTRY

L. S. Storrs, president, The Connecticut Company, New Haven, Conn., chairman.

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A. W. Brady, Anderson, Ind.
F. R. Coates, Toledo, Ohio.
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RAPID TRANSIT

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R. F. Kelker, Jr., Chicago, Ill.
L. H. Palmer, Baltimore, Md.
F. R. Phillips, Pittsburgh, Pa.

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W. H. Maltbie, special counsel United Railways & Electric Company, Baltimore, Md., chairman.

F. C. Chambers, Des Moines, Iowa.
A. T. Davison, New York, N. Y.
Edwin Gruhl, New York, N. Y.
A. G. Neal, Washington, D. C.
H. B. Sawyer, Boston, Mass.

VALUATION

F. W. Doolittle, vice-president The North American Company, New York, N. Y., chairman.

F. C. Hamilton, New York, N. Y., vice-chairman.

J. P. Barnes, Louisville, Ky.
E. J. Bechtel, New York, N. Y.
H. M. Brinckerhoff, New York, N. Y.
H. A. Clark, New York, N. Y.
Thomas Conway, Jr., Philadelphia.
W. Findlay Downs, Philadelphia, Pa.
J. A. Emery, New York, N. Y.
C. W. Gillespie, New York, N. Y.
J. B. Klumpp, Philadelphia, Pa.
W. H. Maltbie, Baltimore, Md.
L. R. Nash, Boston, Mass.
A. S. Richey, Worcester, Mass.
W. H. Sawyer, East St. Louis, Ill.
Frank Silliman, Jr., New York, N. Y.
W. B. Tuttle, San Antonio, Tex.
E. D. Uhlendorf, Chicago, Ill.

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Britton I. Budd, president Chicago Elevated Railroads, Chicago, Ill., and president American Electric Railway Association, chairman.

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C. P. Billings, Pittsburgh, Pa.
F. R. Coates, New York, N. Y.
C. D. Emmons, Baltimore, Md.
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A. D. Mackie, Springfield, Ill.
A. T. Perkins, St. Louis, Mo.
L. S. Storrs, New Haven, Conn.

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National Transportation Institute:
J. H. Hanna, vice-president The Capital Traction Company, Washington, D. C.

Committee on Customer Ownership of the National Electric Light Association:

R. P. Stevens, president Republic Railway & Light Company, New York, N. Y.

National Councillor of the United States Chamber of Commerce:

J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Substitute National Councillor:
J. H. Hanna, vice-president Capital Traction Company, Washington, D. C.

National Industrial Conference Board:

L. S. Storrs, president The Connecticut Company, New Haven, Conn.

J. H. Pardee, president The J. G. White Management Corporation, New York, N. Y.

American Committee on Electrolysis:

W. J. Harvie, vice-president Auburn & Syracuse Electric Railway, Auburn, N. Y.

National Committee for National Defense:

Edward J. Blair, assistant to the president, Chicago Elevated Railroads, Chicago, Ill.

National Joint Committee of Public Utility Associations:

Randall Morgan, vice-president United Gas Improvement Company, Philadelphia, Pa., chairman.

Britton I. Budd, Chicago, Ill.

J. K. Choate, New York, N. Y.

F. R. Coates, New York, N. Y.

E. C. Faber, New York, N. Y.

P. H. Gadsden, Philadelphia, Pa.

L. S. Storrs, New Haven, Conn.

Robert I. Todd, Indianapolis, Ind.

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STANDARD CLASSIFICATION OF ACCOUNTS

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M. W. Glover, Pittsburgh, Pa.

W. F. Ham, Washington, D. C.

H. L. Wilson, Boston, Mass.

Percy S. Young, Newark, N. J.

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Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.

B. W. Fernald, Oakland, Cal.

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M. W. Glover, general auditor West Penn Railways, Pittsburgh, Pa., chairman.

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H. O. Allison, safety engineer Beaver Valley Traction Company, New Brighton, Pa., chairman.

E. L. Lindemuth, Wilkes-Barre, Pa.

F. W. Melford, Richmond, Va.

Allison J. Van Brunt, Newark, N. J.

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W. B. Getchell, claim agent Central Maine Power Company, Augusta, Me. chairman.

Bert C. Wood, Youngstown, O.

CLAIMS DEPARTMENT ASPECTS OF
MOTOR BUS OPERATION

G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
D. M. Finch, Des Moines, Ia.
Carl L. Young, Milwaukee, Wis.

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W. M. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.

W. H. Renaud, Jr., New Orleans, La.

SUBJECTS

L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta, Ga., chairman.

John J. Reynolds, Boston, Mass.

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Dr. Hart E. Fisher, chief surgeon Chicago Elevated Railroads, Chicago, Ill., chairman.

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Charles R. Harte, construction engineer the Connecticut Company, New Haven, Conn., chairman.

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C. C. Beck, Mansfield, Ohio.

J. A. Brooks, Philadelphia, Pa.

L. C. Datz, Memphis, Tenn.

W. G. Gove, Brooklyn, N. Y.

C. G. Keen, Philadelphia, Pa.

C. S. Kimball, Washington, D. C.
John Lindall, Boston, Mass.

F. R. Phillips, Pittsburgh, Pa.

N. W. Storer, East Pittsburgh, Pa.

N. B. Trist, Pittsburgh, Pa.

C. H. Clark, Cleveland, Ohio.

BUILDINGS AND STRUCTURES

N. E. Drexler, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.

B. R. Brown, Dallas, Tex.

E. D. Eckroad, Akron, Ohio.

John R. McKay, Fort Wayne, Ind.
Judson Zimmer, Gloversville, N. Y.

C. H. Clark, Cleveland, Ohio, sponsor.

REVISION OF CAR AND CARHOUSE
WIRING RULES

H. H. Adams, superintendent shops and equipment, Chicago Surface Lines, Chicago, Ill., chairman.

A. T. Clark, Baltimore, Md.

C. G. Keen, Philadelphia, Pa.

John Lindall, Boston, Mass.

P. V. C. See, Akron, Ohio.

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(JOINT COMMITTEE)

L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y., co-chairman for Engineering Association.

Clifford A. Elliott, Los Angeles, Cal.

Herbert Jackson, Washington, D. C.

Charles R. Harte, New Haven, Conn., sponsor.

EQUIPMENT

F. H. Miller, vice-president Louisville Railway, Louisville, Ky., chairman.

Walter S. Adams, Philadelphia, Pa.

W. W. Brown, Brooklyn, N. Y.

R. S. Bull, Pittsburgh, Pa.

A. T. Clark, Baltimore, Md.

J. M. Hipple, East Pittsburgh, Pa.

J. H. Lucas, Milwaukee, Wis.

A. D. McWhorter, Memphis, Tenn.

J. F. Miller, Pittsburgh, Pa.

M. O'Brien, St. Louis, Mo.

E. D. Priest, Schenectady, N. Y.

E. S. Sawtelle, Cincinnati, Ohio.

P. V. C. See, Akron, Ohio.

Ralston B. Smyth, Boston, Mass.

C. W. Squier, New York, N. Y.

W. G. Stuck, Lexington, Ky.

J. M. Yount, San Francisco, Cal.

Joseph C. McCune, New York, N. Y.

J. L. Gould, New York, N. Y.

Daniel Durie, Connellsville, Pa., sponsor.

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John C. Davidson, engineer electric traction, Norfolk & Western Railway, Bluefield, W. Va., chairman.

A. H. Armstrong, Schenectady, N. Y.

J. M. Bosenbury, Peoria, Ill.

H. F. Brown, New Haven, Conn.

Morris Buck, New York, N. Y.

H. W. Cope, East Pittsburgh, Pa.

A. H. Daus, Chicago, Ill.

J. H. Davis, Baltimore, Md.

J. V. B. Duer, Altoona, Pa.

Norman Litchfield, New York, N. Y.

John J. Sinclair, Brooklyn, N. Y.

L. S. Wells, New York, N. Y.

Charles R. Harte, New Haven, Conn., sponsor.

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W. E. Bryan, St. Louis, Mo., vice-chairman.

H. E. Davis, Utica, N. Y.

F. C. Hanker, East Pittsburgh, Pa.

G. H. Kelsay, Cleveland, Ohio.

H. A. Kidder, New York, N. Y.

F. W. Peters, Schenectady, N. Y.

G. W. Saathoff, New York, N. Y.

L. J. Turley, Los Angeles, Cal.

R. L. Weber, Kansas City, Mo.

E. H. Scofield, Minneapolis, Minn., sponsor.

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DISTRIBUTION

Charles H. Jones, electrical engineer Chicago Elevated Railroads, Chicago, Ill., chairman.

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S. H. Anderson, Los Angeles, Cal.

Leslie E. Delf, Fort Worth, Tex.

Ralph W. Eaton, Providence, R. I.

D. D. Ewing, Lafayette, Ind.

Charles Gilman, New York, N. Y.

C. L. Hancock, New York, N. Y.

H. D. Hawks, Chicago, Ill.

C. J. Hixson, Schenectady, N. Y.

Adrian Hughes, Jr., Baltimore, Md.

John Leisenring, Springfield, Ill.

F. M. McVittie, Rochester, N. Y.

J. F. Neild, Toronto, Ont.

H. A. Pharo, Pittsburgh, Pa.

Walter J. Quinn, New York, N. Y.

W. Schaaake, East Pittsburgh, Pa.

A. Schlesinger, Indianapolis, Ind.

J. M. Waldron, New York, N. Y.

F. J. White, New York, N. Y.

M. B. Rosevear, Newark, N. J., sponsor.

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Jackson P. Dick, purchasing agent, Georgia Railway & Power Company, Atlanta, Ga., chairman.

W. N. Ford, Memphis, Tenn., vice-chairman.

William C. Bell, Richmond, Va.

J. F. Fleming, Washington, D. C.

C. A. Harris, Pittsburgh, Pa.

A. A. Ordway, Boston, Mass.

W. S. Stackpole, Newark, N. J.

W. H. Staub, Baltimore, Md.

C. Thorburn, Los Angeles, Cal.

R. H. Dalgleish, Washington, D. C., sponsor.

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H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.

J. A. Brooks, Philadelphia, Pa.

Charles Gordon, Chicago, Ill.

W. F. Graves, Charleston, W. Va.

J. W. Hulme, New York, N. Y.

G. L. Kippenberger, St. Louis, Mo.

John Lindall, Boston, Mass.

Victor Willoughby, New York, N. Y.

R. H. Dalgleish, Washington, D. C.

WAY MATTERS

H. H. George, engineer maintenance of way Public Service Railway, Newark, N. J., chairman.

E. M. T. Ryder, New York, N. Y., vice-chairman.

C. A. Alden, Steelton, Pa.

V. Angerer, Easton, Pa.

S. Clay Baker, East St. Louis, Ill.

W. R. Dunham, Detroit, Mich.

E. B. Entwisle, Johnstown, Pa.

G. C. Estill, New Orleans, La.

R. B. Fisher, Harvey, Ill.

Chester F. Gailor, New York, N. Y.

A. E. Harvey, Kansas City, Mo.

J. H. Haylow, Memphis, Tenn.

J. S. Hyatt, Highwood, Ill.

B. P. Legare, San Francisco, Cal.

A. T. Spencer, Toronto, Ont.

Francis Tingley, Upper Darby, Pa.

J. B. Tinnon, Joliet, Ill.

Claude L. Van Auken, Chicago, Ill.

W. W. Wysor, Baltimore, Md.

R. C. Cram, Brooklyn, N. Y., sponsor.

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A. P. Way, electrical engineer American Electric Power Company, Philadelphia, Pa., chairman.

C. A. Smith, Atlanta, Ga., vice-chairman.

M. J. Curtin, Boston, Mass.

J. L. Fritsch, Pittsburgh, Pa.

W. H. Fulweiler, Philadelphia, Pa.

Ernest F. Hartman, New York, N. Y.

W. L. Harwood, Springfield, Mass.
E. L. Morier, New York, N. Y.
M. B. Rosevear, Newark, N. J., sponsor.

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R. H. Dalgleish, chief engineer the Capital Traction Company, Washington, D. C., chairman.

C. A. Ives, Erie, Pa.
J. A. Leeper, Pittsburgh, Pa.
J. S. McWhirter, New York, N. Y.

AUTOMATIC SUBSTATIONS

W. E. Bryan, superintendent of power the United Railways of St. Louis, St. Louis, Mo., chairman.

C. H. Jones, Chicago, Ill., vice-chairman.

L. D. Bale, Cleveland, Ohio.
C. A. Butcher, East Pittsburgh, Pa.
Adrian Hughes, Jr., Baltimore, Md.
F. W. Peters, Schenectady, N. Y.
Ralph H. Rice, Chicago, Ill.
E. H. Scofield, Minneapolis, Minn., sponsor.

UNIT METHOD OF VOTING ON STANDARDS

C. S. Kimball, engineer way and structures, Washington Railway & Electric Company, Washington, D. C., chairman.

H. H. Adams, Chicago, Ill.
C. H. Clark, Cleveland, Ohio.
W. J. Harvie, Auburn, N. Y.

Transportation and Traffic Association

ACCIDENT PREVENTION

Charles W. Chase, president Gary Street Railway, Gary, Ind., chairman.
M. B. Bridges, Chicago, Ill.
C. H. Evenson, Chicago, Ill.
James Harmon, Indianapolis, Ind.
S. B. Ireland, St. Joseph, Mo.
A. W. Koehler, Rochester, N. Y.
D. E. Parsons, East St. Louis, Ill.
W. R. Phipps, Meridian, Miss.
R. M. Reade, Quebec, Que.
E. M. Walker, Schenectady, N. Y., sponsor.

DEVELOPMENT OF NEW BUSINESS

F. W. Shappert, traffic manager Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
Frank L. Butler, Atlanta, Ga.
John A. Dewhurst, Philadelphia, Pa.
S. W. Greenland, Fort Wayne, Ind.
James P. Griffin, Dallas, Tex.
H. G. Monger, Milwaukee, Wis.
F. D. Norveil, Anderson, Ind.
C. D. Smith, New Brighton, Pa.
Bert Weedon, Indianapolis, Ind.
W. H. Harton, Covington, Ky.
Robert P. Woods, Kansas City, Mo.
Samuel Riddle, Louisville, Ky., sponsor.

RELIEF OF TRAFFIC CONGESTION

Paul E. Wilson, secretary Cleveland Railway, Cleveland, Ohio, chairman.
G. B. Anderson, Los Angeles, Cal.

H. O. Butler, St. Louis, Mo.
D. L. Fennell, Kansas City, Mo.
M. McCants, San Francisco, Cal.
W. H. Maltbie, Baltimore, Md.
James Smith, Boston, Mass.
W. E. Thompson, New York, N. Y.
J. V. Sullivan, Chicago, Ill., sponsor.

TRACKLESS VEHICLE OPERATION

W. J. Flickinger, assistant to the president The Connecticut Company, New Haven, Conn., chairman.

B. W. Arnold, Oshkosh, Wis.
V. E. Keenan, Providence, R. I.
J. B. Stewart, Jr., Youngstown, Ohio.

Edward Dana, Boston, Mass., sponsor.

Mail Pay Hearing

TESTIMONY was taken last week in the railway mail pay case before Examiner Mullen of the Interstate Commerce Commission, I. C. C. Docket No. 10227, consuming four full days, Nov. 19 to 22. Joseph Stewart, special assistant to the Attorney General was in charge of the commission for the Post Office Department, and W. H. Maltbie, counsel for the committee on mail pay, American Electric Railway Association was in charge of the case for the railways.

C. W. Cornell of counsel for the Pacific Electric Railway Company, and F. E. Loucks, a special accountant for that company were in attendance and presented some evidence for their road. The witnesses put on by the mail pay committee were Prof. A. S. Richey, Worcester, Mass., Dr. Thomas Conway, Jr., Philadelphia, and Joseph A. Stoll, superintendent traffic, A. T. Clark, superintendent rolling stock and shops, and John B. Duvall, assistant superintendent of transportation of the United Railways and Electric Company of Baltimore.

After finishing the four-day session during which some fifty exhibits had been filed, the examiner set March 1 as the final date for filing of briefs. After the briefs have been filed, the commission, it is expected, will set a date for oral argument and will thereafter take the case under advisement for a decision.

Companies Which Made Presentations for Coffin Prize

LETTERS of acknowledgment and commendation are being sent by the Executive Committee to the railway companies which made presentations to the Charles A. Coffin prize committee of the American Electric Railway Association, in accord with the resolution passed at the meeting of the executive committee on Nov. 16. The companies which submitted briefs follow in alphabetical order:

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

Colorado Springs & Interurban Railway, Colorado Springs, Col.

East St. Louis & Suburban Railway and East St. Louis Railway, East St. Louis, Ill.

El Paso Electric Railway, El Paso, Tex.

Holyoke Street Railway, Holyoke, Mass.

Interstate Public Service Company, Indianapolis, Ind.

Kansas City Railways, Kansas City, Mo.

Kentucky Traction & Terminal Company, Lexington, Ky.

Los Angeles Railway, Los Angeles, Cal.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Monongahela-West Penn Public Service Company, Fairmont, W. Va.

Northern Texas Traction Company, Fort Worth, Tex.

San Diego Electric Railway, San Diego, Cal.

San Francisco-Oakland Terminal Railways, Oakland, Cal.

Spokane United Railways, Spokane, Wash.

Union Street Railway, New Bedford, Mass.

Washington Railway & Electric Company, Washington, D. C.

News of Other Associations

Program Announced for New England Club Meeting

THE December meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on Thursday, Dec. 6. The afternoon meeting, called to order at 3 o'clock, will be devoted to a series of fifteen-minute papers on the following subjects: "Snow Handling Equipment" (with moving pictures), by Charles F. Reuter, engineer Eastern Tractors Company; "Results Obtained in Track Work by the Use of Mechanical Devices," by F. B. Walker, engineer Eastern Massachusetts Street Railway; "Electric Freight Haulage," by P. H. Stoffel, Westinghouse Electric & Manufacturing Company.

The evening meeting will be devoted to a talk, illustrated by slide and moving pictures on "Maine, the Sportsman's Paradise," by Eugene S. Jones, photographer of the Boston & Maine Railroad. A dinner will be served at 6.15.

C.E.R.A. Annual Meeting in Indianapolis Jan. 24 and 25

THE Annual Meeting of the Central Electric Railway Association will be held at Hotel Lincoln, Indianapolis, Ind., Thursday and Friday, Jan. 24 and 25, 1924. There will be a dinner on the evening of Jan. 24.

Relief from Paving Burden Urged

THERE is no longer any good reason why a railway should pay for installation of original pavements or for complete repavements, declared R. C. Cram in a paper read before the

National Municipal Research Council held at the City Club, Washington, D. C., on Nov. 16. This is so because the presence of tracks has nothing to do with the question of the need for street pavements. The only requirement as to railway pavements may be one relating to the extent the railways, through operation of cars, may cause deterioration in the pavement, and this should be limited strictly to repairs needed in consequence of the existence and use of the tracks.

Some interesting data were presented by Mr. Cram tending to show that paving maintenance costs are substantially the same as on any part of a railway street. These data seem to support the view that railway streets, being main arteries of travel, receive greater traffic. It should logically be expected that main traveled streets will require more extensive paving repairs than streets of lesser importance.

Dean Cooley Honored

UNIVERSITY presidents, judges, engineers and men prominent in political life, gathered at a dinner in Detroit on November 23, paid tribute to Mortimer E. Cooley, dean of the engineering schools of the University of Michigan and retiring president of the Federated American Engineering Societies. Dean Cooley, at the end of nearly half a century of effort, was extolled as an engineer and educator of distinguished public service.

The dinner was given under the auspices of the Detroit Engineering Society and the local section of the national engineering societies.

Those at the speakers' table included Supreme Court Justice Robert F. Thompson, Canandaigua, N. Y.; Ira N. Hollis, president of Worcester Polytechnic Institute and classmate of Dean Cooley at the United States Naval Academy; Admiral John K. Robinson, representing Secretary of the Navy Edwin Denby; Dr. Marion L. Burton, president of the University of Michigan; Philip N. Moore, St. Louis, vice-president of the Federated American Engineering Societies; F. Paul Anderson, dean of engineering of the University of Kentucky; Chase S. Osborn, L. W. Wallace, executive secretary of the Federated American Engineering Societies, Washington; Truman H. Newberry, Walter S. Russel, Charles F. Loweth, president of the American Society of Civil Engineers; N. S. Shaw, president of Michigan Agricultural College; and John L. Herrington, president of the American Society of Mechanical Engineers.

Several speakers brought out reminiscences of Dean Cooley's days at Annapolis and later as a naval officer. Others dwelt upon his services to education and to engineering, praising "his high character, his big-heartedness and geniality, his noble aspirations and his love for his fellowmen." President Burton paid a tribute to the work of Dean Cooley in his long connection with the University of Michigan.

Dean Cooley has been granted leave of absence for the second semester of the present academic year by the University of Michigan. He will spend this period on a farm recently purchased by him near Canandaigua, N. Y. His successor as president of the F. A. E. S. will be elected at the annual meeting of the American Engineering Council early in January.

Kentucky Utilities Association to Meet at Louisville

THE annual meeting of the Kentucky Association of Public Utilities will be held at Louisville on Dec. 13 and 14. The session will open with a dinner for the delegates on Thursday evening, with the technical sessions on Friday.

Aims and Plan of the National Transportation Institute

THE National Transportation Institute is a comparatively new national organization, whose object is to change the attitude of the public at large toward transportation in general. It comprises all industry and is governed by a board of directors made up by groups, such as agricultural, railway, public utility, etc., consisting of fifty-two directors of whom twenty-six have been elected at this time. It is a continuing board with certain expirations each year, so that the chance for control by any group is thought to be remote. Membership in the institute may be had by practically any company or organization at \$100 per membership, and any organization may take out as many memberships as it desires, having one vote for each membership.

The institute consists of a research council and a publicity bureau. The research council will comprise a group of men particularly fitted by experience to develop the facts about the various transportation agencies—steam railroads, electric railroads, motor buses, water transportation, etc. The members of the council are to be selected by the process of the president nominating three men, from among whom the directors will elect one. This again is designed to avoid any possible control of the organization by one group.

The representatives of the institute have conceived the need for this organization because there is at present no comprehensive study of transportation going on by a disinterested impartial body. The absence of this has afforded opportunity for radical elements to attack the railroads and make extensive use of false information. The key to the institute plan is the research council, which is to be composed of men of accepted reputation who will be given a certain amount of money and set aside where they will be free from responsibility to any organization or group. They will get the facts and then these facts will be put out to the public through the publicity bureau.

It is expected that the most effective work of the institute will come later when it has sufficiently progressed in its organization and finances to permit of the employment of men to give their entire time to speaking on transportation problems. The idea is that there may ultimately be the equivalent of one speaker for every state. It is

thought also that addresses of this kind will produce much publicity in the newspapers. Further, the newspapers, knowing that they can apply to the Institute for information upon which they can depend as accurate and impartial, will have no reason to publish misinformation.

Another phase of the work is educational in nature. It is claimed that the proportion of children who never go so far in their schooling as high school is so great that as they grow up they numerically control the popular vote. This great body of children at present receives practically nothing in the way of information as to the influence of transportation, coal, or any of the other essentials on their lives. The Institute plans to bring to the school children the effect of various businesses on the child's life.

The institute is now publishing a twelve-page leaflet monthly, but plans ultimately to have a magazine of considerable importance as a medium for putting out the results of its efforts. It is planned also to use motion picture lectures, in which it can bring out what transportation, or the lack of it, means to a country.

The Institute has no relation with the United States Chamber of Commerce or any other body. It is an independent body in which it is considered essential that all business interests participate. On the question of municipal or government ownership, the policy of the institute is not stated, as the idea of creating the institute as an entirely impartial body precluded any predetermination of policy on any matter. If the reports of the research council were not unanimously concurred in by the council, there is nothing in the present organization of the body to prevent both the majority and minority reports being made public, although it would obviously be the endeavor to reach unanimous agreement.

This is the first time that all business interests have joined together in a movement of this kind. The institute earnestly desires that the electric railways support and take part in its activities. The American Electric Railway Association has not as yet determined what its action shall be with respect to endorsement of the Institute, but has the matter under advisement at the present time.

Maintenance of Equipment

Signal System Shows Steam Pressure

THE Wilmington, N. C., power plant of the Tidewater Power Company has a signal system in the generator and boiler rooms which shows the steam pressure carried in the main header. The scheme was developed by George Avant, combustion engineer for the company, and has been in successful operation for over two years. The Tidewater Power Company operates an inter-urban line between Wilmington and Wrightsville Beach.

Four different colored lights are arranged on a small board suspended half way between the floor and ceiling, so that they may be seen from any point in the generator room. The circuits for the lights are opened and closed by three steam gages, which were fitted with contacts so as to make electrical connections whenever the steam pressure reaches specific values. If the steam pressure falls below 140 lb., a white light will burn and continue to burn until the pressure rises above this value.

All lights are out between pressures of 140 lb. and 150 lb. At the latter pressure a red lamp is lighted, and at 155 lb. a blue lamp comes on in addition to the red lamp, and if the pressure rises to 158 lb. a green lamp also lights and a Klaxon horn is sounded. As the safety valves are set for 163 lb., this arrangement gives ample warning and helps to provide even boiler operation. A similar set of signals is installed in the boiler room.

Blueprints of Repair Parts Save Mistakes

BY O. A. NORENE

Assistant Master Mechanic Omaha & Council Bluffs Street Railway

A BOOK of blueprints of standard repair parts is furnished to the store department and the shop and carhouse foremen of the Omaha & Council Bluffs Street Railway. These prints show standard elliptic and coil springs, brake levers and pins, brake slack adjusters and brake riggings, sizes and types of motor bolts,

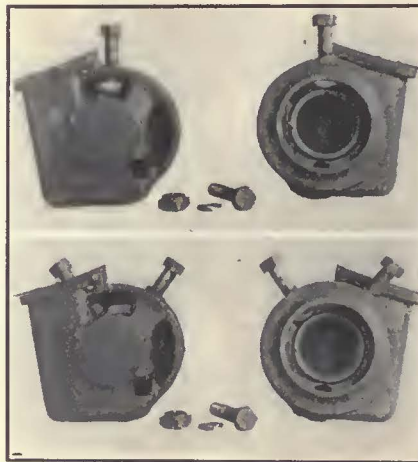
etc., for different types of equipments; also spring tension on different types of brush-holders and sizes and types of carbons used on different types of motors. By referring to these prints no excuse can be given if wrong material is used.

Through-Bolt Housings Save Motor Trouble

BY JAMES A. DUFFY

Superintendent of Equipment Monongahela-West Penn. Public Service Company

WE HAVE had on our property for a number of years several Westinghouse No. 306 motors. These are of the split-frame type, with housings or heads that originally



Application of Through Bolts to Motor Housings. Above, With One Vertical Bolt; Below, With Two Radial Bolts

were held to the upper half of the motor frame casting by two radial tap bolts. This arrangement holds the armature to the upper half of the shell when the lower half is swung down or removed for making repairs to the motor under the car. In addition these bolts help to keep the housing in place.

It was our experience that these housings would work loose in service and tend to wear at the seats, and at the same time the threaded holes in the housings would become badly worn. In many instances the threads in the housings were entirely worn out and the bolts would not hold, thus making it necessary to replace these worn housings by new ones.

In making replacements on some of these housings, a new through-bolt type of housing has been adopted. This was developed for these motors by the Westinghouse company. The results have been very satisfactory. The new housing has two bolts, each of which screws into a nut and clamps the housing to the motor shell through a draft on the nut. This type of housing is shown in the illustrations.

They are made for us from either malleable iron or cast steel, so that they are strong and durable.

The through bolts holding them in place are heat treated, which makes them strong and fatigue resisting. If the bolts wear at the threads they can be replaced readily by new ones at a small expense. If the threads rust, the nut can be cut off and the bolt is easily removed.

There are no threads in the housings to become worn out, so that a better fit is obtained throughout the life of the motor.

These housings can be obtained in oversize on the diameter. This is of particular advantage for fitting in frames that have worn. These housings have three bolt holes so that they can be used not only on the No. 306 motor, which has two radial bolts, but on the old No. 101 motor using a single vertical bolt.

Since using these through-bolt type housings, we have eliminated all housing trouble. We have never had a through bolt get loose. In fact, it was one of the improvements that almost eliminated all motor troubles on the No. 306 motor on this property.

Brass Foundry Aids Repairs

THE Illinois Traction System has a brass foundry in connection with its Decatur shops and four men turn out from twelve to fourteen tons of brass castings per month. This is found of great assistance in producing such parts as brush-holders, grab-handle sockets, sash locks, window lifts and other car fixtures which are needed immediately and which would be given six months delivery or longer if bought in the open market.

Safety in the Wood Shop

THE ACCOMPANYING group of pictures shows the woodworking mill of the Nashville Railway & Light Company. This shop is particularly interesting for the precautions taken to safeguard employees from accidental contact with moving parts of machines, and to provide for their comfort. The equipment of the shops consists of the following machines: A 16-in. four-side molder, 9-in. four-side molder, blind slat molder, two-drum sander, band re-saw, band saw, plunger mortiser, column mortiser, 24-in. planer, 9-in. surfacer, double head shaper, and crossarm boxer.

Referring to the illustrations, No. 3 is a general view of the woodworking equipment. The band saw shown in No. 1 has the moving wheel well incased with a slat protection made of iron strips, which are riveted together. This gives an open construction, and at the same time fully protects the moving parts. An effective method of mounting guards and gages for a shaper is shown in No. 2. The exhaust piping for removing various cuttings is also to be seen in the background.

A surfacer with safety head and a grated protection that swings around to protect the cutting parts is shown in No. 4. The cutting tool is in a sort of pocket, so as to pre-

vent accidents. The 24-in. planer shown in No. 5 has the belt well shrouded, and the protection of moving parts, together with the piping for cuttings shown in No. 6, which is a molding machine, is particularly interesting. The small pulley shown in the center of this machine has a right and left-hand thread so as to keep the belt from dropping. A crossarm borer is shown in No. 7, with all moving parts protected.

Light Track Construction in Texas*

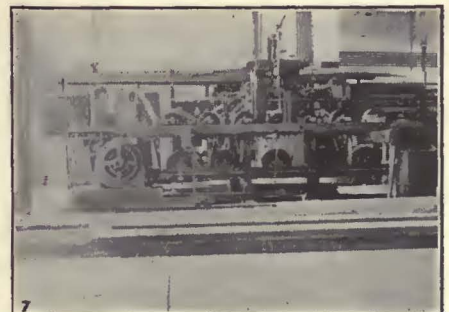
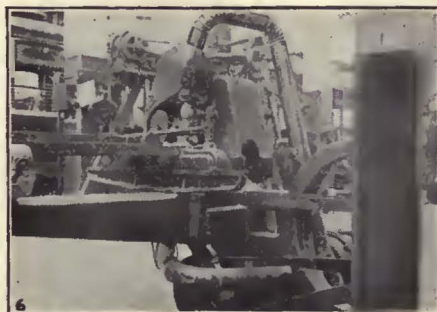
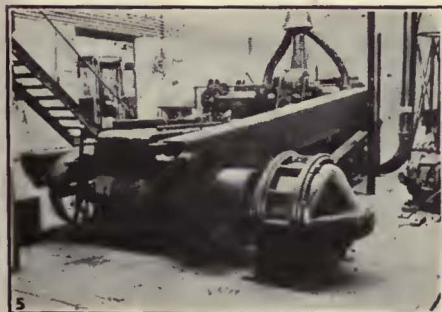
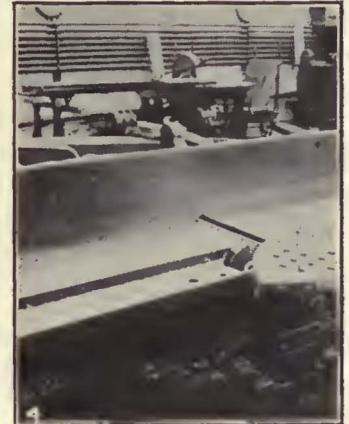
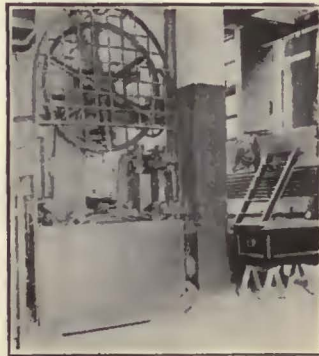
THE standard type of paved track-work adopted by the El Paso Electric Railway consists of 90-lb. A.R.A. rail, oak ties, spaced 24 in. on centers, 12 in. of crushed stone or gravel ballast, with a two-course concrete pavement of 7½ in. total thickness. This has proved to be both the

best and cheapest construction so far developed in Texas, according to the statement and is original with this company. Full advantage has been taken of the soil and climatic conditions peculiar to this section, in adopting an even lighter standard construction for paved tracks where Birney cars only are used. A.S.C.E. rail of 75-lb. section is laid on 6-in. x 8-in. x 7-ft. ties, with 6 in. of ballast under the ties, and a 6-in. concrete pavement. This has proved entirely satisfactory, both as a track structure and a durable street surface.

Track of this character has been built in 1923 for \$7.20 per foot, according to the company, while the 90-lb. construction cost about \$9. The latter is stated to be at least \$2 per foot cheaper than monolithic concrete with grooved rail and brick or asphalt pavement.

A further development in the track construction has been the use of steel ties laid on ballast, in conjunction with concrete pavement. Track of this type has been built that will undoubtedly compare favorably in ability to stand up under heavy traffic with any other in the country. It is somewhat more costly than wood tie construction, but should be even more durable.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association.



Safety Protection for Woodworking Tools in the Shops of the Nashville Railway & Light Company

No. 1. Slot work protection made of iron strips for wheel of band saw.
No. 2. Shaper with guards and gages in position.
No. 3. General view of woodworking equipment.

No. 4. Safety head attached to surfacer.
No. 5. Method of shrouding planer belt.
No. 6. Molding machine with moving parts protected.
No. 7. Method of protecting moving parts on a crossarm borer.

New Equipment Available

Portable Vise and Pipe Bending Stand

A PORTABLE vise stand and pipe bender has just been developed by H. P. Martin & Sons, Owensboro, Ky. This stand is made of No. 16 sheet iron riveted and braced at the corners with angle irons, which also serve as pockets for four supporting legs. The legs are made of steel tubing and extend outward sufficiently to brace the stand against upsetting, tilting or skidding. The stand is supplied with either a hinge or chain vise, as desired. The vise is fixed rigidly to the top of the frame at one end in such a position that short nipples can be threaded without injury to the workman's

roller on the rear support to keep correct alignment and to enable one man to move the full length of pipe forward or backward without unnecessary labor. The weight of the $4\frac{1}{2}$ -in. size machine is 172 lb., with a hinge vise and 156 lb. with a chain vise.

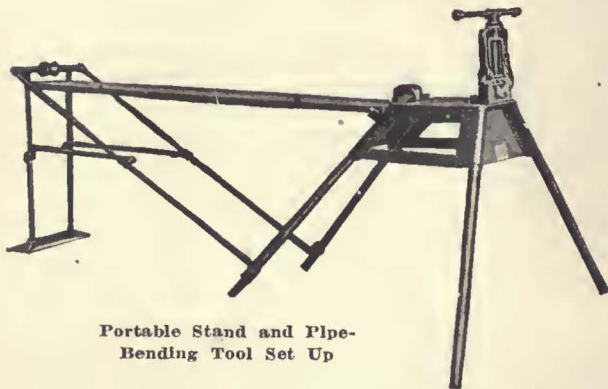
Headlight with Special Metal Reflector

A HEADLIGHT with special case and sealed silver-plated reflectors has been developed by the Pyle National Company, Chicago, Ill., for use on electric locomotives or inter-urban cars. The parabolic reflector is 18 in. x 9 in. and is spun from heavy-gauge sheet copper. The inside surface

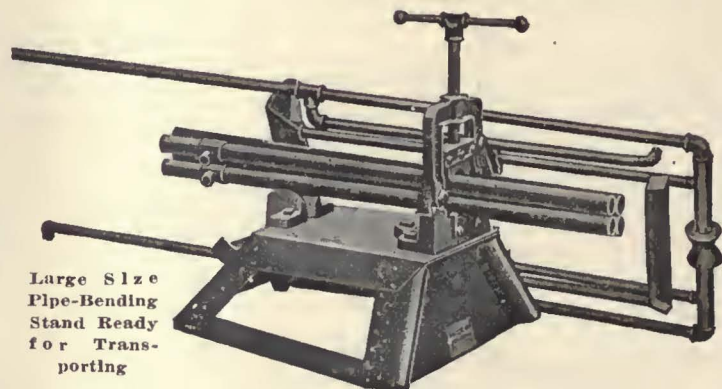
Convenient Size Electric Drill

A N ELECTRIC drill for holes up to $\frac{3}{8}$ in. in diameter has just been placed on the market by the Argyle Railway Supply Company, Chicago, Ill. The drill weighs about 5 lb. and is operated by a special Westinghouse motor with a full load speed of 850 r.p.m. The motor can be operated on either direct or alternating current. The handle grip of the drill is kept cool by a ventilation system which brings cool air into the back of the handle. Incoming air is distributed to all parts of the motor.

A special switch for operating the electric drill has been developed by



Portable Stand and Pipe-Bending Tool Set Up



Large Size Pipe-Bending Stand Ready for Transporting

hand. A guide and rest for the pipe while it is being cut or threaded is provided at the end of the frame opposite to that on which the vise is installed. This assists in keeping bends free from kinks and also in locating the bends accurately.

The stand can be dismantled by pulling the legs out of their sockets and fastening them in the vise. Convenient handles are provided for carrying. As the sides of the frame are open with a brace across the bottom, the frame provides a convenient rest for pipe tools where oil from the stocks will drain off without running down the handle. The equipment weighs 60 lb. and can be assembled or dismantled in half a minute. It occupies a space of 6 ft. x 8 ft.

The outfits are built in two sizes, one for pipe ranging from $\frac{1}{8}$ in. to $2\frac{1}{2}$ in. in diameter and another for heavier pipes up to $4\frac{1}{2}$ in. diameter. The larger size is provided with a

is prepared for the quadruple silver plating by grinding and polishing operations.

The case is of No. 16 gage copper-bearing steel and is protected on the outside by two coats of flexible black baking enamel, and on the inside by the application of an aluminizing preparation. A machine finished, cast aluminum-alloy door frame forms the front of the case and a slot hinged door ring, which is also machine-finished aluminum alloy casting, is sealed against a heavy gasket by the tightening of five wing nuts on hinged bolts. The front glass is made of clear convex heat-resisting glass and is held and sealed against the door-ring gasket by means of bronze fasteners.

Lamp replacements are made by loosening the bronze ring nuts and swinging the door open. This construction makes the fitting of front glasses convenient and avoids the necessity of breaking electrical con-

nections, or disturbing the focal adjustments for renewing lamps. The headlight cases are made in four different styles.

the Cutler-Hammer Manufacturing Company, so that the drill runs only when the operator is actually gripping it. The position and operation of the switch is natural, and can be released readily without shifting the hand. The drill chuck bearings and two armature bearings have bronze bushings and spring oilers which retain a considerable amount of lubricant. The thrust in drilling is taken up on a ball bearing which works between two hardened ground steel surfaces. The gears are packed in grease. The pinion is of steel with helical teeth, cut directly on the armature shaft. The chuck is of the Goodell-Pratt keyless type, requiring no tools for opening or closing. To prevent the armature from turning, when opening or closing the chuck it is only necessary to press the spring stop into the slot in the end of the armature shaft. This locks the shaft and the chuck may then be turned without difficulty.

The News of the Industry

Subway Financing Sought

Detroit Commission Prepared to Present Plans at Special Session of Michigan Legislature

The Detroit Rapid Transit Commission will seek the aid of the state Legislature at a special session to be convened in December, to secure the passage of an amendment to the rapid transit act adopted last spring by the Legislature to pave the way for financing the construction of a system consisting of subways or elevated railways.

The commission's plans for financing rapid transit construction in Detroit are embodied in a tentative amendment drafted by P. J. M. Hally, special counsel for the Rapid Transit Commission. It is pointed out that funds for rapid transit construction could be secured:

1. By levying a special ad valorem tax on the total wealth of the city.
2. By assessing benefits of rapid transit on the local area benefited in such manner and in such proportion of the cost of rapid transit construction as the legislative body of the city may determine.
3. By issuing bonds against the rapid transit property.
4. By combining the foregoing.

It is the desire of the commission to lay the rapid transit plan before the electors at the election next April. If the amended bill is passed by the Legislature it is the intention of the commission to seek its submission to the voters, together with a "definition of a general plan of assessment" at a special election to be called, probably in February. Then the comprehensive plan for rapid transit which is being worked out by the engineers for the commission would be presented to the voters in the spring.

ENGINEER OUTLINES WORK

The work to date as outlined by Major John P. Hollihan, engineer engaged in studies and surveys for the rapid transit system, includes the determination of a satisfactory plan of financing a rapid transit system, without using the faith and credit of the city. In this work it was necessary to go thoroughly into assessed values of property throughout the city; and to estimate the probable increase in values that would accrue to property directly benefited.

The engineers of the commission have conferred with the City Plan Commission on the thoroughfare plan covering the proposed metropolitan area, with a view to enabling the commission to present a final plan for the joint consideration of the department of public works, department of parks and boulevards, the street railway department and the rapid transit commission. These bodies should, in the opinion of Mayor Dore-

mus, determine the thoroughfares required to relieve the present motor vehicle traffic inside the city limits and indicate for the consideration of the adjoining municipalities and counties, the probable future requirements of Detroit as the city expands. The commission is also conferring with the Detroit Bureau of Governmental Research on the proposed metropolitan area. The work of the commission is being carried on with the aid of an appropriation of \$70,000 by the City Council.

Municipal Ownership Recommended for Phoenix

A special citizens' committee has recommended to the City Commission of Phoenix, Ariz., that the system of the Phoenix Railway be municipally owned. It is proposed to purchase the system from General M. H. Sherman, Los Angeles, Cal., its owner, in thirty annual payments of \$12,000, without interest, the gross sum being about equal to the valuation placed on the railway by the State. If the plan for the purchase is carried out as proposed the road would be leased to the Central Arizona Light & Power Company for operation by it for twenty years. Meanwhile the city would be called upon to spend \$400,000 to rehabilitate the system and to provide \$190,000 for paving between the tracks. Most of the money so required would be raised by the sale of bonds. It is said that the railway in Phoenix is operated at a loss of about \$15,000 annually, due principally to the operation of an inter-urban line between Phoenix and Glendale district.

The report of the committee grew out of the controversy between the company and the city over franchise matters and the alleged inability of the company to meet the terms with regard to paving included in the original grant to the railway.

One Day Off Compulsory.—One day off in eight without pay except in emergency cases will be mandatory upon employees of the Seattle Municipal Railway beginning Jan. 1, 1924. A resolution to this effect has been unanimously passed by the City Council, but Mayor Brown intimated that he would veto the measure, declaring that it would be impossible for the railway to put the regulation in effect by the date named. The ordinance means the hiring of between seventy and eighty men, and D. W. Henderson, superintendent of railways, states that it will be impossible to train that number in the time given.

Non-Union Pledge Void

Circuit Court Rules Against Law Forbidding Employers to Exact Non-Union Pledges

The California state law forbidding employers to exact pledges from employees not to join labor unions has been held void. Decision to this effect was handed down by the United States Circuit Court of Appeals on Nov. 13 in a case affecting the Pacific Electric Railway. The opinion of the Circuit Court affirms the decision handed down by the United States District Court of Los Angeles, which enjoined labor unions from organizing the non-union men of the Pacific Electric Railway.

The injunction is made permanent. It is directed against the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Engineers. It said:

Activities without lawful excuse, engaged in by the unions, were: Unionizing the employees of the railway and the drawing of them into a controversy in which they had no substantial cause for complaint; calling strikes after organizing 1,200 of the 1,500 employees; striking when the country was at war in the face of the Presidential proclamation that there should be no strikes or lockouts during the war, and striking while the complaints of the employees were being submitted by the railway to a representative of the United States Department of Labor.

The court held these activities interrupted the railway company's business in intrastate and interstate commerce to its irreparable damage.

On Aug. 16, 1919, certain employees of the Pacific Electric Railway elected to strike. It was alleged that the men had been influenced in this decision by certain officials of the Brotherhood of Railway Trainmen and Brotherhood of Locomotive Engineers.

The results of the strike, engaged in by a portion of the company's employees, were reviewed in this paper for Sept. 6, 1919.

In July, 1918, a similar strike was attempted, but this strike, undertaken during the war, was quickly ended by the railway securing in the Federal courts an injunction against certain officials of the trainmen's unions restricting interference between the Pacific Electric Railway and its employees.

Since obtaining this injunction during the first strike in July, 1918, it was possible to obtain an order from the courts in August, 1919, during the second strike making the restraining order effective during the second strike.

In March, 1922, the Pacific Electric Railway sought to have the Federal court make this injunction against strikers permanent. This move was reviewed in the *ELECTRIC RAILWAY JOURNAL* of March 18, 1922, page 489. Another reference to the matter was published on page 721, Oct. 28, 1922.

More Passengers But Less Revenue with Five-Cent Fare

Definite Conclusions Impossible from Results of First Month's Operation of New Fare System on Public Service Railway—Bus Competition Continues to Be the Crux of the Problem

ALTHOUGH the total number of passengers carried by the Public Service Railway of New Jersey during the month of October, 1923, was approximately 400,000 more than the number carried during October, 1922, the total revenue was smaller and a deficit of \$382,753 resulted. Except for a changed rate of fare the operation of the railway was about the same as in the corresponding month of the previous year, with only a nominal increase in the number of car-miles and car-hours.

The compilation of the figures for the first month's operation under the

than last; the expenditures for equipment were slightly higher; power expenses were markedly less and other items showed very little change except that for conducting transportation, which was more than \$100,000 higher.

NUMBER OF REVENUE FARES INCREASE

The number of revenue fares for the first month of the new system was much greater than in previous months, being 33,508,564 as against 27,187,790 in October, 1922. This large increase,

existing system of compiling the figures. While this was true also of the figures for October, 1922, there were then few two-zone riders compared with the number of such riders under the present system.

It would appear that the railway traffic is still suffering somewhat from the effects of the seven-weeks shutdown this summer. At least the bus traffic in some places is heavier than before the strike. In the Newark area, for example, the number of passengers carried by buses in October of this year was 8,066,263 as against 7,062,333 a year ago. An influential factor in the situation has been the exceptionally fine weather which has prevailed all during the summer and fall, and this has undoubtedly had a tendency to favor the bus business.

Under the circumstances it would be

FIRST MONTH OF 5-CENT FARE ON PUBLIC SERVICE RAILWAY COMPARED WITH CORRESPONDING MONTH OF PREVIOUS YEAR

	October, 1923	October, 1922
Total operating revenue....	\$1,836,185	\$2,190,098
Total operating expenses....	1,577,784	1,482,321
Operating ratio, per cent....	85.93	67.68
Gross income.....	\$55,737	\$505,777
Total income deductions..	438,490	446,541
Net income or deficit....	\$382,753	\$59,235
Revenue passengers carried	33,508,564	27,187,790
Transfer passengers carried	139,740	6,060,930
Total passengers carried....	33,648,304	33,248,720

new fare system was made public on Nov. 26. Passenger revenue for October, 1923, was 36.59 cents per car-mile as against 45.24 cents per car-mile a year ago, and \$3.43 per car-hour this year as against \$4.27 in October, 1922. The total operating revenue was \$1,836,185, from which operating expenses of \$1,577,748 were deducted, giving an operating ratio of 85.93 per cent instead of 67.68 per cent. The gross income for the month of October, 1923, was \$55,737 as against \$505,777 in 1922.

Operating expenses increased greatly due almost entirely to higher wages which were granted the company's employees as a result of the settlement of last summer's strike. The expenses for way and structures were less this year



Bus Blocks Entrance to Trolley—A Familiar Scene

however, is offset by the loss in transfer passengers which decreased from more than 6,000,000 to only about 140,000. Thus, the total number of passengers carried was 33,648,304, a slight increase over the number carried during October a year ago which was 33,248,720.

It is impossible to tell exactly what this means in the way of increased riding because a single individual who rides in two zones and pays two fares is listed as two passengers under the

premature to draw any definite conclusions from the figures of the first month's operation. It is said that the railway income is steadily increasing and this tendency may be expected to become more pronounced as winter approaches and bad weather sets in. However, the average fare per revenue passenger has been reduced from 7.83 cents to only 5.31 cents which means that there must be a very large increase in riding before the railway revenue will equal what it used to be under the old fare. This outcome appears to be doubtful as long as the destructive bus competition continues on the same streets with the railway.

CAMDEN BUSES BOUGHT BY RAILWAY

In the Camden district the company has already taken steps to get control of the situation by buying up a large number of buses. With these vehicles in the hands of the railway it is planned to co-ordinate the bus and street car services.

Elsewhere the railway has undertaken plans to reduce the cost of operation. It has been announced that one-man cars will replace the present two-man cars on several lines in Newark and it is expected that the same plan will be tried by the company on other lines.



Bus and Trolley Give Similar Service at Same Time on Same Street

Legislation Needed to Further Electrification in New York

A plan for the solution of the west side traffic problem by the construction of an elevated freight railroad was presented on Nov. 26 by the New York Central Railroad at a joint hearing of the Transit Commission and the Public Service Commission.

The hearing was upon the company's application to the Public Service Commission for an order specifying the method of the electrification of its west side line in conformity with the Kaufmann law, passed by the last Legislature, and an application to the Transit Commission for a change of grade on all streets crossing the west side tracks, under the general law placing one-half of the expense upon the railroad, one-fourth on the state and one-fourth on the city.

The plan presented by the railroad provides for the construction of an elevated railroad most of the way from Spring Street to the Harlem River, eliminating all grade crossings. The total cost is estimated at between \$60,000,000 and \$70,000,000, which the railroad would pay except the cost of eliminating the grade crossings, estimated at from \$15,000,000 to \$25,000,000, which would be divided by the company, state and city.

Ira A. Place, vice-president of the New York Central, in charge of its law department, said that while the two questions of elimination of grade crossings and electrification were legally separated, they should be considered together.

George McAneny, chairman of the Transit Commission, expressed belief that legislation would be needed to accomplish any result. Mr. McAneny explained that a law was passed in 1911 permitted the city to reach an agreement with the railroad on a plan and that a law of 1917 permitted the commission to prepare a plan for submission to the railroad with the railroad paying the cost. Mr. McAneny said that, in any event, appeal would have to be made to the Legislature to get an appropriation under the general change of grade law for the relocation of the tracks. An adjournment was taken to Dec. 6.

Pacific Electric Railway Employees to Be Provided with Insurance

Employees of the Pacific Electric Railway, Los Angeles, are to participate in the group insurance plan recently announced by the Southern Pacific Company for all its employees. More than 7,000 employees of the Pacific Electric System will enjoy the benefits by the ruling of the Southern Pacific Company that subsidiary company employees are entitled to the insurance provisions made.

Employees in the service six months receive \$250 insurance free of cost.

The plan becomes effective when 75 per cent of eligible employees of the

company subscribes for the insurance, but not before Jan. 1, 1924.

The policy taken out by the Southern Pacific Company is estimated to exceed \$100,000,000. The insurance plan affects 90,000 employees of the Southern Pacific interests. The policy is to be written by the Metropolitan Insurance Company.

Target of Opinions in Massachusetts—One-Man Cars

The one-man car is still being assailed in Massachusetts. William Walsh of the Massachusetts branch of the American Federation of Labor and a former business agent of the Boston Street Carmen's union has asserted that he has asked for and received promise of support of the Boston Central Labor Union in the initiative and referendum movement to eliminate the one-man cars in the State. Petitions asking for the initiative and referendum are being circulated. An attack on the one-man car is planned in Boston where a group of men headed by an attorney has announced intention to petition the Legislature to prohibit the use of the one-man cars. The Attorney General has approved the form of the petition, which provides that if the proposed law is defeated by the Legislature it shall go to the people for referendum vote.

Chairman Jackson of the Boston Elevated Railway trustees has notified Mayor Curley of that city that one-man cars have come to stay. They are used only on routes, Mr. Jackson said, where cars run by two men would be unprofitable. The one-man controversy in Massachusetts has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

Arbitration Next Step in Springfield

Arbitration will be necessary before the new contract between the employees of the Worcester Consolidated Street Railway, the Springfield Street Railway and the officials of the trolley lines are drawn. The present contract expires Dec. 31. In accordance with the terms of the present contract the employees and employers have exchanged proposals for the new contract, but both sides have made demands which have put them far from agreement. Bentley W. Warren, Boston, representing the company, and James H. Vahey, representing the men, have had several conferences since the union committee and trolley officials met in an effort to reach some basis that would permit resumption of negotiations for an agreement, but without making progress. In the arbitration proceedings Mr. Warren will be the companies' representative and Mr. Vahey will act for the carmen. They will select the third man.

The major demands of the trolley men are for an eight-hour day, an increase in the maximum pay for uniformed men from 58 cents to 80 cents

an hour and for operators of one-man cars an increase from 66 to 95 cents an hour with a 30 per cent increase for all miscellaneous employees.

The company has proposed maintaining the present schedule of wages if certain bonuses are eliminated, but suggests that if the bonuses are retained the pay of uniformed men should be reduced 5 cents an hour. President Clark V. Wood has also told the men that the increase they ask with the eight-hour day would add \$750,000 to the annual payroll and that the company cannot do this on the present revenue with a 10-cent fare, and could not do it with an increased fare because the decrease in riding would keep the income down.

Peter Witt for Municipal Ownership.—Councilman-elect Peter Witt, former street railway commissioner at Cleveland, urges that the city take over the property of the Cleveland Railway at its estimated value of \$35,000,000. Mr. Witt says it can be done "without costing the taxpayers a penny." As he sees it the money now paid by car riders in the shape of taxes totals \$1,378,933 a year and is constantly increasing. Mr. Witt says the money thus saved, which now goes to Washington, Columbus and townships in the county outside of the city, will more than pay for the present outstanding obligations of the Cleveland Railway in less than twenty-five years.

Must Remove Snow.—The Boston & Worcester, Milford & Uxbridge and Springfield Street Railways will be obliged to remove all snow piled by their plows onto walks previously cleared by householders, according to a recent decision of the Massachusetts Department of Public Utilities. They must also remove snow which the plows throw in the highways cleared by the various towns and cities of Massachusetts through which they operate lines.

Pay Increases for More Detroit Men.—The October payroll of the Department of Street Railways at Detroit was increased approximately \$10,000 due to advances in pay granted by the Street Railway Commission to employees of the system other than platform men.

Houston Company States Its Case.—"That Houston May Fulfill Her Destiny" is the title of an instructive pamphlet issued for the patrons of the Houston Electric Company. The company, in publishing the pamphlet, states that it wants its patrons to know what it is doing and has done during the past three years to furnish transportation in its city. It gives, in detail, the various construction and improvement undertakings and the money that was involved in each improvement. But the company urges upon people the need for greater improvement as the expansion is pressing down heavily on them; that millions of dollars more will be necessary during the next few years, and asks for the support and confidence of the people to insure the success of the transportation system.

Financial and Corporate

Committee Reports at Montreal

Favorable Findings Presented by Shareholders Who Inquired Into Affairs of Holding Company

The committee that was appointed by shareholders of the Montreal Tramways & Power Company, Montreal, Que., to look into the affairs of that corporation has made a report. The *Canadian Financial Post* says that the report is on the whole favorable to the present directors and management, but that there may be a renewal of the fight for control that was waged during the summer.

DATA FURNISHED STOCKHOLDERS

The report provides shareholders with data concerning the profits and losses of the company since formation eleven years ago. This is the first time shareholders had any information concerning the company's operations between 1912 and 1920.

The committee's statement indicates that the total income for the years from 1912 to 1922 was \$5,978,062, and the total expenditures during the period were \$7,752,699. This made a deficit of \$1,774,636 for the company as of the period ended Nov. 30, 1922.

The company had losses in six years and profits in five of the eleven years under review and the record for each year was as follows:

Year	Income	Expenditure
1912	\$282,500	\$690,184
1913	503,047	457,913
1914	513,544	442,953
1915	543,082	846,046
1916	558,669	493,762
1917	560,898	863,190
1918	475,471	534,360
1919	463,760	1,409,514
1920	814,224	719,513
1921	587,054	717,724
1922	675,811	577,536

This succession of losses is blamed upon the fact that it was a very serious task to finance the company owing to opposition encountered at the start, and later to conditions created by the war. This was responsible for high cost of short date financing and high premiums on United States funds. Under more favorable conditions, says the report, this expense would have been curtailed, and sources of revenue increased considerably by a fuller development of the assets of the company.

OPTION AGREEMENT TO BE EXERCISED

The report also deals with the point that has been criticized by shareholders, namely, the transfer of 59,500 common shares of the Canadian Light & Power Company to the Montreal Public Service Corporation. These shares were handed over as collateral, when Montreal Public Service made a bond issue

of \$2,550,000 in 1919. There was an agreement to be made that Tramways & Power Company was to have the right to repurchase these securities together with \$1,700,000 of Canadian Light & Power Company 5 per cent bonds, due 1949, for the sum of \$2,050,000. The committee was informed by officers of the company that the transaction was treated as a temporary sale to meet the suggestions of the solicitors, but the intent between the parties was that the securities were pledged with right of redemption. The report recommends that the agreement of option be executed without further delay.

The Montreal Tramways & Power Company owns a majority of the ordinary stock of the Montreal Tramway and the stock of the Canadian Light & Power Company.

Order Entered to Dismantle Famous Colorado Line

The famous Colorado Springs & Cripple Creek District Railway, once referred to by Theodore Roosevelt as offering "the one-day trip that bankrupts the English language," has finally been declared dead *de jure*, it having died *de facto* a considerable time ago.

In May, 1919, the United States District Court appointed a receiver for the property on application of trustees for the bondholders. In May, 1920, the same court authorized the receiver to discontinue operation of the line except as to a small portion thereof. The Public Utilities Commission of Colorado thereupon filed petition for modification or vacating of the last mentioned order contending that since the property was located wholly within the State of Colorado the question of its operation or discontinuance was with the state commission. In October, 1922, the receiver sold the property at foreclosure and the purchaser proceeded to begin to dismantle and junk the line. Interested citizens petitioned the state commission to take jurisdiction on its own motion and protect their rights.

After a hearing the commission ruled that a foreclosure sale transferred property subject to all duties and responsibilities under which the original owner held the property; that the purchaser at foreclosure was without right to abandon public service except by permission of the lawful authority having fully jurisdiction thereof.

At the close of the hearing an agreement entered into by all parties sanctioned an order to permit the dismantling except as to certain portions, which order was entered.

The road consisted of 75 miles of track.

\$8,100,000 Value Fixed at Norfolk

Sum Decided Upon by State Commission \$2,000,000 Less Than Company's Claim

The valuation of the Norfolk railway properties of the Virginia Railway & Power Company was fixed on Nov. 24 by the State Corporation Commission as \$8,100,000. This is less by more than \$2,000,000 than the sum claimed by the company and more by about the same amount than the valuation asserted by the city of Norfolk. The company's 7-cent fare, granted some time ago by the commission, will be continued in force, for the commission has pointed out that even at the valuation claimed by the city, the earnings of the company at 7 cents are not more than 4 per cent on the valuation.

The company claimed a valuation of \$10,639,084 and the city contended for \$6,152,532.

The commission states in its decision that in the five months from June until October during which the 7-cent fare, with four tokens for a quarter, was existent, the company's net earnings applicable to return after payment of taxes, depreciation and renewal reserve, were \$181,070, as compared with \$165,660 for the corresponding period of last year. The commission gives it as its opinion that the 7-cent fare should stand.

Major Alexander Forward, commissioner in charge of transportation problems, rendered the opinion.

The commission decided to include in the company's valuation the summer resort owned by it at Norfolk and rented for a sum which is less than enough to pay the carrying charges. The decision holds that if it were not for the summer resort there would be insufficient permanent travel from the limited number of residents on the Ocean View line to warrant its continuance, but that the city undoubtedly would not want the line discontinued and that in view of these considerations the property should be allowed as a part of the valuation.

From the company's valuation the commission has deducted \$1,091,000 for accrued depreciation. The claim of the city on account of this item was \$1,960,735. Minor deductions were made for other items.

Receiver Appointed for Washington-Virginia Line

On petition of five Philadelphia trust companies acting in behalf of bondholders, the Washington-Virginia Railway was declared insolvent by the Circuit Court of Fairfax County, Va., on Nov. 23. At the request of the petitioners, Arthur L. Reynolds, manager of the company, was appointed receiver. The company operates several interurban lines between Washington and near-by points in Virginia, among them the line to Mount Vernon. Insolvency

was admitted by the company in its answer to the petition. An intervening petition, filed by Mattie M. Newcomer, a stockholder, was rejected by Judge Samuel G. Brent.

New Plan Submitted for Service Between Kewanee and Galva

Kewanee, Ill., has not given up its effort to get back its city line and the interurban line from Kewanee to Galva. Despite the fact that the first plan to sell \$100,000 in stock to refinance the Galesburg & Kewanee Electric Railway failed, merchants, manufacturers and city officials have devised another plan, the adoption of which will make possible the resumption of service at an early date.

Opinion is unanimous that the loss of the lines would be a severe handicap to the community. At an enthusiastic meeting of the business interests B. F. Parker, vice-president of the Kewanee Boiler Company, and general chairman of the Pittsburgh-plus commission, presented a plan which was adopted.

This plan included an offering to the public of a \$75,000 issue, secured by first mortgage on all the property of the company including the \$60,000 in new equipment; \$45,000 of capital stock unsecured; provision for the sale of certain pieces of real estate owned by the company and some of the old equipment such as cars to the amount of about \$20,000. This would leave a total of \$12,000, according to the arrangements, necessary to refinance the proposition, including the purchase of new cars and other equipment. The original figure estimated as necessary to cover everything was \$140,000. The new figure, \$120,000, would be covered by the bond issue of \$75,000 and the stock issue of \$45,000. The new arrangement also calls for the selling of a block of tickets, good within a year, to the largest possible number. It is said that many persons who could not take a \$50 bond might be willing to expend \$15 or \$25 for tickets. This would bring money in for immediate use and would help the company in many ways. The difficulties in Kewanee have been referred to previously in these pages.

Minority Report by Pittsburgh Receiver

Charles A. Fagan, one of the receivers of the Pittsburgh Railways, acting independently of his colleagues, W. D. George and S. L. Tone, has filed an exception to the plans for the reorganization of the company to follow the lifting of the receivership. In a petition filed by his attorneys in the United States Court Mr. Fagan declares that the company is still "manifestly insolvent."

In his attitude on this matter Mr. Fagan takes direct issue with former Judge Henry G. Wasson, who as special master, delegated by the court to take testimony and advise it as to whether the reorganization was possible, recommended the reorganization.

Mr. Fagan says that he disagrees with the master's conclusions in view of the present insolvency of the company, the absence of any offer to cure the insolvency, the failure to provide for the refunding or extension of bonded indebtedness now in default, and the failure to adduce sufficient evidence to prove that the corporation can operate at a profit and make ends meet in the next several years.

According to Mr. Fagan the general tenor of the master's report is to the effect that if the receivership should be terminated at the present time there would be ample cash and other assets on hand to meet all the current obligations as they mature and leave a substantial amount for working capital. In Mr. Fagan's opinion this is a conclusion unwarranted by the evidence.

Further Progress Reported in Kansas City Reorganization

The committee representing the bondholders of the Kansas City Railways reached a new agreement on Nov. 24 with the lawyers who represent the holders of personal injury judgments by which these claimants will receive 50 cents on a dollar in cash and the remainder of their claims in first mortgage bonds of the new company to be organized after the receivership has been lifted. The total of the outstanding accident claims is more than \$2,000,000.

To protect the worth of the bonds which the judgment holders will receive it has been agreed that the total initial bond issue against the reorganized property shall not exceed \$20,000,000. Provision is also made to reimburse the bondholders' protective committee for \$500,000 advanced to pay state taxes prior to the receivership.

The agreement stipulates that the parties shall collaborate to obtain an equitable adjustment of all the matters involved in the reorganization.

Judge Stone of the Federal court expressed himself as pleased at the progress made and said that on the determination of the priority of claims against the railways will depend the progress of negotiations for the reorganization of the property. The hearing set for Nov. 26 was postponed until Dec. 27. If further progress toward arranging the reorganization is reported on Dec. 27 Judge Stone said that he will continue the hearing until Jan. 7.

An order issued by the court to pay a group of claims against the old receivership was rescinded by Judge Stone, pending publication of a notice to claimants.

Should a foreclosure be necessary the bonds would be issued by the reorganized company, but if the present company were to continue, then the old bonds must be retired and new ones issued by it.

Holders of the second mortgage bonds and the notes are so widely scattered with respect to their residence that fully a month will be required to consult all creditors. If these holds can

be induced to accept the plan as now proposed, then a hearing on the priority of claims will be avoided.

Receivership of Brooklyn Line Expected to Be Lifted Soon

The Brooklyn, Queens County & Suburban Railroad, Brooklyn, N. Y., is expected soon to emerge from the hands of the receiver as the result of an agreement reached between the Brooklyn City Railroad and the reorganization committee of the Brooklyn-Manhattan Transit Corporation.

Until the present, the Brooklyn, Queens County & Suburban Company has not been considered in the reorganization plan of the Brooklyn-Manhattan on account of the claims against this road by the Brooklyn City Railroad. At the time of the major reorganization it was impossible to make an adjustment with the Brooklyn City Railroad so that the Queens County line remained in the hands of the receiver. Lindley M. Garrison was appointed July 14, 1919.

The plan for the reorganization of the property does not contemplate any foreclosure sale.

The agreement that has just been reached between the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation has to do only with the bonds of the Queens County & Suburban Company. It does not apply in any way to the construction suit involving \$10,000,000 between the two railway companies, which is still pending.

The Brooklyn, Queens County & Suburban Railroad has 64 miles of track. Its assets according to the 1922 report were \$14,094,904.

McKinley-Studebaker Group Buys Into Kansas City Light

The Illinois Power & Light Corporation, which was formed a few months ago to consolidate the McKinley and Studebaker public utility properties, has acquired through purchase J. Ogden Armour's interest in the Kansas City Power Securities Company. E. H. Rollins & Sons, bankers, Chicago and New York, acted for the purchaser. The exact number of shares transferred has not been made public, but it can be stated that the transaction involves approximately 33 per cent of the Kansas City Power Securities Company's outstanding capitalization, which consists of 40,000 shares of common stock and 40,000 shares of preferred stock.

The Kansas City Power Securities Company, in which Mr. Armour was the most important individual stockholder, is a holding company owning the entire capital stock of the Kansas City Power & Light Company, which in turn has numerous subsidiaries. This transaction does not involve Mr. Armour's holdings in the Kansas City Railways. Since the reorganization of the utilities in Kansas City in 1916 the Kansas City Power Securities Company

has had no control over the Kansas City Railways.

The purchase of the stock by the Illinois Power & Light Corporation has been approved by the Illinois Commerce Commission.

Auction Sales in New York

At the auction rooms of A. H. Muller & Sons there were sold on Nov. 28 the following securities:

4,201 shares Interborough Consolidated Corporation, preferred, \$100 lot.
3,322 shares Interborough Consolidated Corporation, common, \$160 lot.
100 shares of Interborough Consolidated Corporation, common, \$2 lot.
200 shares Interborough Consolidated Corporation, preferred, \$14 lot.
\$6,250 Central New York Southern Railroad Corporation deposit receipt under subscription agreement, dated Oct. 2, 1913, \$100 lot.

Net Income Shows Increase.—For the four months ended Oct. 31, 1923, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was \$3,907,962, against \$3,897,784 for the same four months a year ago. The net corporate income increased from \$615,248 for the four months ended Oct. 31, 1922, to \$644,544 for the same four months of the current year.

Valuations Fixed in Michigan.—The Michigan Public Utilities Commission has fixed the following valuations based on reproduction costs, less depreciation, on Michigan electric lines: Michigan Railroad, \$9,418,140; Michigan United Railways, \$10,139,542; Grand Rapids, Holland & Chicago, \$2,462,396; Grand Rapids, Grand Haven & Muskegon, \$2,562,489; Southern Michigan Railway, \$1,618,645; Benton Harbor-St. Joe Railway & Light, \$2,140,613. The total valuation aggregates \$28,341,326.

"Be a Partner."—The Wisconsin Public Service Corporation has recently issued a handsomely colored booklet of fifteen pages entitled "Be a Partner." The booklet was issued in order that the widespread movement among public utility companies to provide home investors with sound investments and to perpetuate co-operative relations of the company with its customers and employees may gain greater headway.

Additional Bonds Sold.—The National City Company recently sold at 92½ and interest an additional block of \$380,000 general mortgage and refunding mortgage gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio. The bonds are known as series A, 6 per cent. They are dated March 1, 1922, and are due March 1, 1947.

Issue Covers Completed Improvements.—The \$107,000 issue of bonds by the Fort Smith Light & Traction Company, Fort Smith, Ark., authorized by the State Commission, is not intended for new improvements to the system, but for work already completed. This issue was referred to in the Nov. 24 issue of the ELECTRIC RAILWAY JOURNAL.

Gold Notes Offered.—A syndicate is offering at 98½ and interest to yield more than 6.70 per cent \$10,000,000 of convertible 6½ per cent gold notes of the Northern States Power Company,

Fargo, N. D. The notes are dated Nov. 1, 1923, and are due Nov. 1, 1933. The proceeds from the sale of these notes will be used to redeem the entire issue of the company's ten-year notes due April 1, 1926, now outstanding in the amount of \$7,805,000 and to reimburse the company in part for expenditures heretofore incurred for additions extensions and betterments to the properties of the system.

Dividends Resumed on Common Stock.—The Duluth-Superior Traction Company, Duluth, Minn., has resumed dividends on its common stock by the declaration of a quarterly dividend of \$1 a share. This dividend and the regular quarterly dividend of \$1 a share on the preferred stock are payable on Jan. 2 to stock of record of Dec. 15. The company paid the last quarterly dividend of \$1 a share on Oct. 1, 1918, on the common stock. The gross revenues of the Duluth-Superior Traction Company for the nine months ended Sept. 30, 1923, amounted to \$1,413,990 against \$1,314,036. The net income after the consideration of fixed charges and taxes was \$75,496 for the nine months of this year, against \$52,963 for the nine months' period ended Sept. 30, 1922.

Booklet Describes Property.—The Byllesby Engineering & Management Corporation has prepared a twenty-page booklet entitled "Back of the Investment," illustrating the properties comprising the Northern States Power System, Minneapolis, Minn. Photographic views made from an airplane of the system is an added feature included in the booklet.

Figures Show Tax Distribution.—According to figures presented to the National Tax Association recently by John E. Walker, former tax adviser to the United States Treasury Department, more than 8 per cent of the total tax burden of the country in 1921 was collected from three agencies of transportation, the motor car, steam railroad and electric railways.

Surplus Falls Off.—The gross earnings of the Lake Shore Electric Railway, Cleveland, Ohio, from Jan. 1, 1923, to Sept. 31 were \$2,084,953, against \$1,866,401 for the same period a year ago. The surplus shows a falling off from \$158,894 for the period from Jan. 1 to Sept. 31, 1922, to \$138,807 for the same months of the current year.

Net Receipts.—\$3,855.—The municipally owned Norton, Taunton & Attleboro Street Railway, Norton, Mass., shows for the nine months ending Sept. 30 gross earnings of \$57,241 and operating expenses for the same period of \$53,385, leaving net receipts of \$3,855. Four \$1,000 notes due the municipalities from the railway have been paid in this period, together with the interest accrued.

Additional Refunding Bonds Offered.—Tucker Anthony & Company, New York, N. Y., is heading a syndicate which is offering for subscription at 99½ and interest, to yield more than 6½ per cent, an additional issue of \$1,039,500 of

first mortgage and refunding lien sinking fund 6½ per cent gold bonds, Series A, of the Consolidated Power & Light Company, Huntington, W. Va. The bonds are dated March 1, 1923, and are due on March 1, 1943. The company owns and operates the entire electric power and light and electric railway business in Huntington, W. Va., Roanoke and Lynchburg, Va., and surrounding communities, as well as the gas business in Lynchburg, Va. The system also does the entire electric light and power and electric railway business in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the intermediate territory.

Bonds Offered.—Halsey, Stuart & Co., New York, N. Y., are offering \$1,500,000 of first lien and refunding convertible 6 per cent bonds, series A, of the Monongahela-West Penn Public Service Company. The bonds are offered at \$96.25 and accrued interest to yield about 7 per cent.

Atlanta Lines Report Increase.—Cars of the Georgia Railway & Power Company, Atlanta, carried 228,110 more passengers during October, 1923, than during October, 1922. The increase in revenue amounted to \$14,502. The total number of passengers transported in October this year was 6,724,071, with gross revenue of \$456,744. Substantial increases have been shown nearly every month this year over the corresponding month of last year.

Assessments Completed.—A total valuation of \$104,410,000, on which a tax of \$2,171,140 will be paid, has been placed on the properties of the Wisconsin light, heat, power and electric railway companies by the Wisconsin Tax Commission, which has just completed its report. The assessment on the Milwaukee Electric Railway & Light Company is based on a value of \$59,000,000.

Partial Abandonment Approved.—The Public Service Commission has approved a declaration of abandonment by the Southern New York Power & Railway Corporation of that part of its electric railway system in Oneonta, starting in Main Street and running through Broad to the east end, and from Chestnut and Main Streets east in Main Street and Broadway to Market Street. There was no opposition to the proposed abandonment.

Improvement in Net Earnings.—The gross earnings of the East Penn Electric Company for the year ended Aug. 31, 1923, were \$2,798,350, against \$2,262,135 for the same period a year ago. The net earnings were \$1,006,129 and for the year ended August a year ago were \$859,737.

Net Income Increases.—The gross earnings of the Twin City Rapid Transit Company, Minneapolis, Minn., were \$10,210,795 for the nine months ended Sept. 30, 1923, against \$10,251,795 for the same period a year ago. The net income after the consideration of fixed charges, etc., amounted to \$1,151,755 against \$1,044,509 for the nine months ended Sept. 30, 1922.

Traffic and Transportation

Ten-Cent Fare Asked in Kingston

The Kingston Consolidated Railroad, Kingston, N. Y., has applied to the Public Service Commission for permission to charge a 10-cent cash fare in Kingston with a ticket fare of 8 cents. The present fare rate is 7 cents.

The railroad operated on a 5-cent fare until April 15, 1919, when a 6-cent fare was authorized. The company later sought to abandon certain parts of its lines in Kingston, but this step was put off and an agreement reached whereby a 7-cent fare was placed in operation on Dec. 23, 1920.

The company in its petition to the Public Service Commission states that in 1921 certain economies were put into effect which produced a saving over 1920 of \$10,000. Since 1921 these savings have gradually diminished because of wage increases and other expenses, so that by 1924 the savings will be wiped out entirely.

The revenues received from its railroad at the present passenger rate are gradually diminishing, accounted for by the increased use of automobile and bus operations and other causes, so much so that the return upon the capital invested is not sufficient and will not allow the petitioner to add to and improve its railroad property or to keep pace with the growth and development necessary and meet the requirements of the territory served.

The company in a supporting petition shows that for the first nine months of 1923 its total revenue from street railroad transportation was \$169,213. The total operating expenses were \$129,026 and its taxes \$11,367.

Fare Increase Sought by Texas Electric

The Texas Electric Railway, which owns and operates the lines in Sherman and Denison, Tex., has asked authority of the City Commissions in both cities to increase fares on the grounds that the present fares cannot permit the company to operate at a profit. Authority is sought to increase fares from 5 cents to 7 cents for regular cash fares and to sell four tickets for 25 cents, or a fare of 6½ cents where tickets are purchased. The fare for children and students in schools would be 3½ cents. Jack Beall, president of the Texas Electric Railway, and James P. Griffin, vice-president and general passenger agent, both of Dallas, visited the two cities and placed the matter before the City Commissions.

Messrs. Beall and Griffin told the City Commissions that the gradual increase in the number and use of automobiles had brought about a gradual reduction in passenger revenues of the

companies operating in Texas, and that the situation had reached a point where relief must be given if the traction companies are to maintain the high standard they have maintained in the past.

Applications for similar increases are pending in Waco and Corsicana.

Action Taken Against Jitneys

All jitneys are off Federal Street in Youngstown as a result of the Council's latest anti-jitney ordinance. The ordinance moving the jitneys west of the postoffice also was put into effect. The west-bound jitneys that formerly parked in West Federal Street now are stationed in Chestnut Street. City Solicitor Leighninger, at the order of the Council, is now drawing up an ordinance to be presented shortly that will prohibit the jitneys from entering the congested district.

Prior to this order the jitney controversy in Youngstown had been renewed when Safety Director Hamilton ordered the police to enforce sections of the jitney ordinance restricting the discharging of passengers in downtown streets. As a result J. H. Hogan, representing South Side jitney men, countered with a demand that the city cease discrimination in traffic enforcement, pointing out to Hamilton that the Pennsylvania-Ohio buses were violating traffic laws in parking in East Boardman Street. The jitney ordinance passed by the City Council on Oct. 8 provided among other restrictions that jitneys entering or leaving the city by Market Street should load and unload on Front Street between Market and Phelps. Mr. Hamilton said that he had ordered the police to enforce every traffic ordinance to the limit and that if the Pennsylvania-Ohio buses were still violating the law the drivers of them would be treated the same as others.

Six-Cent Fare in Cleveland

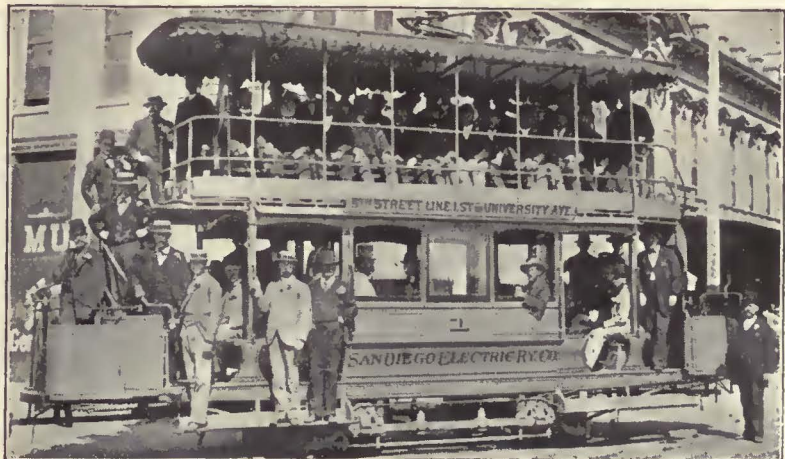
Car riders of the Cleveland Railway on Dec. 1 started to pay a 6-cent fare with a penny charge for transfer. Nine tickets were sold for 50 cents. This is the second street car fare raise in Cleveland within two months. The last raise went into effect on Sept. 1, when the sale of eleven tickets for 50 cents was discontinued.

The increased rate of fare is due to the fact that the company's interest fund now shows a deficit of \$83,801.54. Originally placed at \$500,000, the company's franchise provides that the fare goes up when this fund drops below \$300,000 and the fare goes down when the fund goes above \$700,000. The 6-cent fare is the highest permitted by the franchise.

The increased rate of fare is due to the big deficits that were accumulated during the period when Clevelanders were riding for a nickel, officials of the Cleveland Railway say.

Fare Increase Denied.—The Oklahoma Corporation Commission has denied the application of the Tulsa Street Railway to increase its fare from 7 cents to 8 cents. The Tulsa property has been struggling against jitney operation for several years and in order to meet this competition extended its service some months ago by putting on buses to be operated in connection with the city lines. In its application the company says that the operation of these buses contributed to a heavy loss sustained during the past year. The commission held that losses due to operation of motor buses in connection with a city street railway system would not be considered in determining the proper railway fare.

Will Seek Fare Adjustment.—University of Washington students, represented by a committee appointed by President Sam Mullins of the Associated Students, will appear before the City Council of Seattle shortly to ask for a 2½-cent carfare, with transfer privilege, the same as is accorded to high school students. The matter has already been taken up privately with several members of the City Council.



Reproduced in San Diego Electric Railway "Pass One" to Show the Contrast with Commodious Equipment of Present Day

Abide by Ordinance.—Jitney operators of Shreveport, La., at first threatened to cease operating altogether as a result of a regulatory ordinance passed by the city. The ordinance requires the jitneys to operate continuously from 7 a.m. to 7 p.m. along certain specified routes and on a regular schedule. There are probably fifty jitneys operating in Shreveport and they haul an average of 5,000 passengers daily. After stopping their cars for a short time, the operators resumed service and are obeying the ordinance.

Bus Plan Approved.—The City Council of Toledo has approved the Community Traction Company's plan for motor bus operation. The ordinance which was recently sanctioned provides for the purchase of two modern buses on the Oak Street extension to replace the two machines now being operated in conjunction with the traction system, but on a rental basis. Another bus is being rented and operated on South Erie Street, and this, it is expected, will be replaced by a company-owned motor bus. Arrangements include financing by an addition to the preferred stock.

Accommodates School Children.—Unusual service is being given by the recently started Melrose addition feeder bus line of the Springfield Railway, Springfield, Ohio, in that the bus is diverted twice each day from its regular route in order to carry school children directly to and from the Highland School, about a mile distant. The plan was adopted after being suggested to residents by P. E. O'Brien, general manager of the railway. Twenty-six children are carried daily in the bus at a round trip fare of 3 cents each.

Opera Service on North Shore Line.—With the opening of the opera season recently by the Chicago Civic Opera Association, the Chicago, North Shore & Milwaukee Railroad started a special train service to accommodate opera patrons living in the near North Shore towns. This special train service consists of a dining car and coach. It leaves Great Lakes at 6:32 p.m. and arrives at Congress and Wabash, at the door of the Auditorium, Chicago, at 7:50 p.m. The "Civic Opera Special," as it is called, makes express stops in the intervening towns between Great Lakes, 34 miles north of Chicago, and Chicago.

Better Transportation This Winter.—H. G. Tulley, president of the International Railway, Buffalo, in referring to the new snow equipment for the coming winter said that in the winter of 1922-23 the cars were operated by new men who, while trained operators, were unfamiliar with the severe weather encountered in that part of the country. The organization was now a year old and, benefiting by the experience of last season, was expected to provide better winter transportation this year. It was pointed out by President Tulley that most of the cold weather delays are caused by stalled automobiles, trucks and other vehicles blocking the tracks, often interfering so greatly with the

operation of plows and sweepers, as to permit the storm to gain headway and become unmanageable. City co-operation in keeping the tracks free from obstruction, and in strictly enforcing traffic regulations, would do much, Mr. Tulley said, to insure regularity of service and elimination of delays.

Safety Meetings Held.—The Los Angeles Railway has started a series of safety meetings in which officials of the company meet trainmen at the five car-house divisions. One general topic is discussed at each division in five consecutive weeks. Attendance is voluntary on the part of trainmen, but attendance records are kept and are of use in selecting trainmen for the special Christmas bonus under the merit and bonus system of the company. In the first series of meetings C. M. McRoberts, general claim agent, and John C. Collins, supervisor of safety, have paved the way for future safety meetings by arousing the interest of trainmen in the cause.

Large Sum for Transporting Mail.—During the last fiscal year \$604,915 was expended by the Post Office Department for the transportation of mail by electric railways. At the close of the fiscal year authorizations were in effect over 8,521 miles of electric railway. This included service on 317 routes. During the full twelve months 10,883,970 unit miles were traveled. The average cost per mile was 5.24. Compared with the previous fiscal year, the decrease in the number of routes was eleven. The length of routes increased 162 miles. The decrease in the annual travel was 48,799 unit miles. The increase in the expenditure was \$12,142, and the increase in cost per unit mile traveled was 0.14 cents.

Working for More Pass Riders.—Sales of weekly passes by the Tacoma Railway & Power Company, Tacoma, Wash., for the week beginning Nov. 12, totaled 12,550, a new high record since the pass system was adopted in July, 1922. A recent innovation in its campaign to make the pass more popular was made by the company with appointment of C. J. Quill to the position of transportation salesman. He has been working among operators of the cars, and the system has already shown results. C. V. Allen, advertising manager, states that unless the pass sales can be brought up to 15,000 weekly the company will have to sell the passes for more than \$1 each. The company has for its objective the 15,000 mark. At the present number, the passes are not paying, although 43 per cent more passengers are being carried than before the pass was adopted.

Complaint Sustained.—On the complaint of George Bullock, receiver of the Buffalo & Lake Erie Traction Company, the Public Service Commission has ordered R. H. Henneous to desist from operating a motor vehicle freight line between Erie and North East, Pa., until he receives a certificate of approval.

Legal Notes

ILLINOIS—Policy of Public Utilities Act Stated.

The policy of the Public Utilities Act is not to promote competition between common carriers as a means of providing service to the public, but that through regulation of an established carrier occupying a given field, and protecting it from competition, it may be able to serve the public more efficiently and at a more reasonable rate than would be the case if other competing lines were authorized to serve the public in the same territory. To warrant the Commerce Commission in granting a bus company authority to operate its lines and to serve the same public already served by an existing street railway system it must appear that the railway was not rendering adequate and convenient service, and that the operation of the bus lines would eliminate such inadequacy and inconvenience, the convenience and necessity of the public being a primary consideration. The fact that a bus company is limited to a 5-cent fare, and the street railway company serving the same district is charging a larger fare, does not of itself warrant an order by the Commerce Commission allowing the bus company to operate in such district; nor is the convenience or inconvenience of even a considerable number of individuals the test for an order of convenience and necessity. [West Suburban Transp. Co. vs. Chicago & W. T. Ry. Co., 140 Northeast Rep., 56.]

FEDERAL COURTS—Eviction of Colored Interstate Passenger Justified Only By Proof of Existence of Reasonable Segregation Regulation.

To justify the eviction of a colored interstate passenger for his refusal to occupy a seat in that part of an interurban electric car set apart for colored passengers, it is incumbent on the carrier to show that it had in force a regulation requiring the segregation on its trains of white and colored passengers and that such regulation was reasonable. Oral instructions by a carrier to its conductors to segregate interstate passengers by races is not a valid regulation binding on the passengers, since knowledge of such regulation should be brought home to the passenger at least constructively before he enters the car. [Washington, B. & A. Electric R. Co. vs. Waller, 289 Federal Rep., 598.]

NEW YORK—Duties and Rights During a Strike Defined.

An attempt of city officials to prevent a street railway company from taking out of its barns or operating any of its street cars during a strike of its employees, on the ground that it is to preserve law and order, will be enjoined. It is the duty of the police and department of public safety to preserve order and protect the property of citizens, individual and corporate, and it is their duty to protect a street railway

company in running its cars during a strike of its employees. The right of any man to work, if he wants to, is as inalienable a right as the right of another to quit work, and no person has a right to prevent another from working when he wants to. [Scheneectady Ry. Co. vs. Whitmayer, Mayor, et al., 199 New York Suppl., 827.]

FEDERAL COURTS: Rights of Lessor, Lessee and Creditor.

Where a receiver for a lessee defaults in rental under the lease, further operation of the railway property by the receiver is considered to be with the acquiescence of the lessor, and is for its account and at its risk. The relations between the two will not be affected by the fact that the officers are the same or the same person is the receiver, and a street railway company, which furnished power, maintenance and repairs to the lessee of another system, necessary to keep it in operation, has an equitable lien on the earnings of such system until it is paid, and a receiver for the lessee is justified in paying from earnings bills for power, etc., furnished prior to the receivership. While a materials creditor furnishing supplies necessary to the operation of the railway has an equitable lien therefore, on the current earnings, the receiver is obliged to pay for the same only to the extent of his ability. [Westinghouse E. & M. Co. vs. Brooklyn Rapid Transit Co., et al., 291 Federal Rep., 836.]

MICHIGAN—Duty of Motorman to Slow Down When Signaled.

Where a truck became stalled on the crossing of an interurban line at night and an attempt was made to stop an approaching interurban car by waving a lantern, because a curve hid a view of the obstruction from the motorman, it was his duty to slow down sufficiently that he could stop if exigencies required, though the light was white, and such as was sometimes used by intending passengers in attempting to stop the car at a place where it did not stop. Hence evidence of motorman's failure to slow down was a question for the jury as to negligence. [Vernick vs. Detroit, M. & T. S. L. Ry., 194 Northwest. Rep., 992.]

FEDERAL COURTS—Proceeds of Tax Refund Not a Trust Under an Adjustment Mortgage.

Where a street railway company had issued adjustment mortgage bonds entitled to receive stipulated interest payments only from the net income of the company, with express provision it should be non-cumulative, a refund to the receiver of the company of excess taxes collected during three previous years, in none of which the full amount of interest on the bonds had been paid, was not a trust fund in the hands of the receiver for payment of additional interest for those years. [American Brake Shoe & Foundry Co. vs. New York Rys. Co., et al., 291 Federal Rep. 112.]

Personal Items

M. R. Boylan Acting General Manager

Public Service Railway Announces Changes in Personnel Affecting Department Heads

A number of changes have been announced in the personnel of the Public Service Railway, Newark, N. J., effective on Dec. 1. They follow:

M. R. Boylan, who has been general auditor, becomes acting general manager during the absence of R. E. Danforth, who starts Dec. 1 on a vacation of four months.

A. T. Warner, traffic engineer, becomes assistant to the acting general manager.

P. W. Pierson, executive assistant, becomes assistant to the acting general manager.



M. R. Boylan

L. P. Baurhenn, formerly assistant general superintendent, becomes general superintendent.

W. H. Shepard, for a long time assistant superintendent of time-tables, becomes assistant general superintendent.

Newton W. Bolen, general superintendent, becomes special representative of the company in Hudson County.

H. C. Donecker, assistant general manager, becomes assistant to Vice-President Edmund W. Wakelee.

Mr. Boylan is a native of New Jersey. His service with the Public Service Railway and its subsidiaries dates back to 1892. That is a long while. Matt Boylan just before that had qualified at school as a stenographer and secretary and it was in these capacities that he served in the office of C. B. Thurston, president of the Jersey City & Bergen Railroad, then a horse car line. During the next few years the Jersey City system was electrified and Mr. Boylan went from his clerical position through the transpor-

tation department, the shops and the power generating stations.

All this sounds natural enough in the line of progress, but not everybody grows, not everybody progresses. The advance of years has ripened his judgment and steeled his determination. Matt Boylan can decide things for himself. And having decided them he can see them through.

But to get back to Mr. Boylan's career with the railway. Things had been happening outside of the company while he was learning and earning, and the upshot of them was that the Jersey City & Bergen Railroad was absorbed by the Consolidated Traction Company and the latter leased to the North Jersey Street Railway. Some there are who would have seen their chances fade with a change of this kind, but to Mr. Boylan it meant greater opportunity with a greater corporation. It meant, too, that he had found himself. He had tried nearly all branches of railway work, and had come to the conclusion that his natural forte was figures. So in 1899 he became voucher clerk in the auditors office. After serving successively as bookkeeper, chief clerk and assistant auditor, he was in 1904 made general auditor of the Public Service Railway, which had acquired the North Jersey Street Railway the previous year. In 1910 he was elected first vice-president of the American Electric Railway Accountants' Association and in 1912 was made secretary-treasurer of the association. In 1916 he became president of the Accountants, serving through 1919.

Mr. Boylan's accession to the managerial staff is a natural one. He knows the company, he knows the men in the service, he knows the public, with which the company deals, he is popular personally all over the territory served by the company, his training in accounting has taught him care and he will bring to the problems now before the railway a new and detached point of view.

Mr. Baurhenn, who becomes general superintendent, was formerly assistant general superintendent. Before that he was superintendent of the Bergen division. He joined the Public Service Railway when the company took over the New Jersey & Hudson River Railway & Ferry Company from Ford, Bacon & Davis.

The other men included in the changes have all been connected with the company for considerable periods. Mr. Bolen's term of service dates back to 1903. Before that he had been a division superintendent with the Brooklyn Rapid Transit Company. Mr. Donecker went to the Public Service Railway in 1913 from the post of secretary of the American Electric Rail-

way Association. He has been engaged in street railway work since 1890, both in the operating and manufacturing ends.

Mr. Gaboury Appointed to Safety League

Arthur Gaboury, formerly superintendent of the Montreal Tramways, has been appointed general manager and secretary of the Province of Quebec Safety League. The appointment was announced following the meeting of the executive committee of that organization, held recently under the chairmanship of Zephirin Hebert, president. In appointing him, Mr. Hebert said that Mr. Gaboury had had considerable experience in connection with the safety movement in Montreal and that he considered Mr. Gaboury's selection a very fortunate one.

Mr. Gaboury has been identified with the Montreal Street Railway since 1894, and has been a prominent figure in the railway field ever since. Early in the current year he resigned as superintendent to become vice-president and managing director of the American Druggists Syndicate, Ltd., of Canada. Besides his railway affiliations Mr. Gaboury has given his services for the advancement of French activities, which in 1918 received public recognition from the French government in the form of a title of Officer of the Academy.

Bert C. Wood, for the past five years chief claim agent of the Youngstown Municipal Railway, has recently been appointed general claim agent of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, Youngstown, Ohio. Mr. Wood has been connected with the above companies for the past fifteen years and previous to that time with the Youngstown Sheet & Tube Company.

F. A. Clark is back again as superintendent of power of the City Light & Traction Company, Sedalia, Mo. As was announced recently in the *ELECTRIC RAILWAY JOURNAL* he was transferred to Washington, Pa., to become a member of the organization which is constructing the new gas plant there. He chose, however, to return to Sedalia.

Matthew C. Carswell, with a record of almost fifty years service, recently resigned from the Interborough Rapid Transit Company, New York, N. Y. He held the position of master carpenter. Since he joined the elevated railway system on June 1, 1878, up to September of this year he served under four general managers, four chief engineers, two engineers maintenance of way and three master carpenters. In 1882 he became foreman carpenter, assistant master carpenter in 1904 and master carpenter in 1908. At a dinner in his honor on the evening of Oct. 17 Mr. Carswell was presented with a traveling bag which it was said "was too small to hold even a part of the affection and esteem his associates had for him."

W. F. Graves Leaves Montreal

He Was Chief Engineer of the Montreal Tramways for More than Nine Years

Willard F. Graves, whose resignation after nine years service as chief engineer of the Montreal Tramways was previously noted in the *ELECTRIC RAILWAY JOURNAL*, began his electric railway career as assistant engineer of construction on the South Side Elevated Railway in Chicago, now a part of the Chicago Elevated Railways System. With that company he had charge of the very extensive reconstruction work involved in building a third or express track from Twelfth Street to Forty-third Street, which included grade, line and station, revision of the old structure, as well as the new track. During the progress of this work the very heavy regular train service was



W. F. Graves

handled by means of temporary tracks and structures.

After that work had been finished Mr. Graves was engaged as superintendent of track, in the reconstruction and maintenance of the tracks of the Chicago City Railway under the 1907 ordinances. During the three years of rehabilitation, as specified in the ordinances, practically the entire track system of 300 miles was rebuilt. This work necessitated at times the employment and organization of between 3,000 and 4,000 men.

From this position he was appointed chief engineer of the Montreal Tramways and engaged in the extensive reconstruction of this property, involving the addition and extension of power houses, substations, tracks, etc., including an extensive system of underground high tension conduits.

While acting as chief engineer of the Montreal property Mr. Graves was engaged to make a track valuation of the Detroit United Railway, and subsequently of the Halifax Tramways & Power Company, Halifax, N. S., and the Quebec Railway, Light, Heat & Power Company, Quebec.

He has been interested for many years in the activities of the American Electric Railway Engineering Association, as a member of the committee on way matters, acting as its chairman during the years 1921-1922 and 1922-1923, and representing the association on several sectional committees of the American Engineering Standards Committee. He is an associate member of the American Society of Civil Engineers, member of the American Railway Engineering Association, Engineering Institute of Canada and the executive committee of the committee on welded rail joints.

Hector Poli has been appointed master carpenter of the elevated lines of the Interborough Rapid Transit Company, New York, N. Y. In this capacity he succeeds Matthew C. Carswell, who resigned recently with a record of approximately fifty years. Mr. Poli entered the employ of the company in 1910 and was promoted to shop foreman in 1913. In 1922 he was made general foreman and became master carpenter on Oct. 1, 1923. In thirteen years he has risen from carpenter to master carpenter.

Obituary

Richard Hapgood

Richard Hapgood, one of the oldest street railway men in the United States in point of service, died recently at his home in Belmont, Mass. He retired in September, 1912, as roadmaster of the Boston Elevated Railway after sixty-four years service. He went to work in 1858 as stableman for the old Union Railway, the original horse car line between Cambridge and Boston. By 1872 he had risen to the position of superintendent of the road, which he held until 1855, when he resigned. A short time later Mr. Hapgood became roadmaster for the Consolidated Street Railway in Boston and later superintendent of the South Boston Railroad. When the latter merged with the West End Street Railway, he remained as superintendent of the South Boston division and was later made superintendent of the Cambridge division. In 1892 Mr. Hapgood became roadmaster of the West End Street Railway and remained in that position when the road was merged with the Boston Elevated Railway.

Henry Pearson, vice-president of the Wason Manufacturing Company, car builders, of Springfield, Mass., died suddenly of heart disease in the car shops Nov. 27 at the age of seventy-one years. Mr. Pearson went to the Wason Manufacturing Company from the Harris-Corliss Engine Works in Providence, R. I., in 1881 to take charge of the machine department. He rose to vice-president and general manager and then to president, holding that office four years, up to 1910, when the plant was taken over by the J. G. Brill Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

November Good Month in Copper Market

The copper market came to life during November and more of the metal was sold than for many months. Supplies were adequate to meet the demand, however, though at gradually advancing prices, about 13½ cents being asked at the end of the buying movement. Since then a recession has taken place, and at the end of the month the metal was obtainable at about 13 cents per lb. With the large production now being made in the United States, South America and Africa there seems to be little likelihood of any marked advance in prices, European financial conditions not being such that that continent can buy the copper in the large quantities that it might absorb. On the other hand, prices are now so low that many companies are doing little better than breaking even, so any further important decline may hardly be expected.

Look to the League for Business Hints

Edwin S. Webster, of Stone & Webster, who has just returned from a visit to the League of Nations headquarters, says that he was very much impressed by the amount of information possessed by the league regarding conditions in every country in the world. If one were going into business in any out-of-the-way country he would recommend getting in touch with the league to find out what that body had in the way of information.

Mr. Webster said that one could get accurate information which never before had been made available on almost any country on earth. This is probably a phase of the League of Nations on which many business men generally have not heretofore been well informed.

Winnipeg Property Protects Road at Crossings

The Winnipeg Electric Railway, Winnipeg, Man., has placed orders with the Union Switch & Signal Company for the necessary materials to protect its road against steam trains at four crossings: Notre Dame Avenue, where two of the crossings are involved, one where the Canadian Pacific crosses and the other where both the Midland and Canadian Pacific cross; Academy Road, where two crossings are protected, one crossed by the Midland and Canadian Pacific Railway, and the other by the Canadian National Railway. Light signals, with automatic control, are employed for this protection in all cases except on the Canadian Pacific Railway at Notre

Dame Avenue, where automatics are now in service and style "S" semaphore signals will be used. The field installation will be made by the company's regular forces.

Bituminous Coal Production Increases

The output of bituminous coal in October totaled 49,171,000 tons, as compared with 46,175,000 in September and 45,173,000 for October, 1922. The production of anthracite aggregated 8,724,000 tons, as against 2,917,000 in September and 8,578,000 in October a year ago.

General Electric Buys New Property

The General Electric Company has purchased at Los Angeles, Cal., 5 acres of property on which is now located a two-story reinforced concrete building. This will immediately be modified and converted into a fully equipped service shop in which all kinds of electrical apparatus will be rebuilt and repaired. Later a large warehouse will be built on the property and eventually there will probably be a factory.

Japanese Interests and Westinghouse Combine

An arrangement has been made between the Westinghouse Electric International Company and Japanese electrical interests. The new company is known as the Mitsubishi Denki Kabushiki Kaisha, or, in English, the Mitsubishi Electric Manufacturing Company. It is thought that the capitalization will be 15,000,000 yen, or \$7,500,000, although definite word on this point has not yet been received.

As a result of progress during recent years Japanese electrical development, including railroad electrification, the utilization of water power, the installation of large steam generating plants and the formation of superpower systems, compares favorably today with that in the United States.

As a consequence of this rapid development, electrical apparatus has become one of Japan's largest imports, and since Japan's principal exports, silk, copper and objects of art, can hardly be expanded by a corresponding degree, it was thought that there was some danger of a continuing unfavorable balance of trade. Hence it seemed wise to certain Japanese interests to stimulate the manufacture of electrical machinery and supplies in Japan.

In pursuance of this policy, the Mitsubishi interests, which are engaged in banking, shipbuilding and steel making, approached the Westinghouse company with a proposal for a co-operative agreement whereby the company was to supply technical skill and experience to a Japanese manufacturing company.

ELECTRIC RAILWAY MATERIAL PRICES—NOV. 27, 1923

Metals—New York		Paints, Putty and Glass—New York	
Copper, electrolytic, cents per lb.	13.05	Linseed oil (5 bbl. lots), per gal.	\$0.93
Lead, cents per lb.	6.90	White lead (100 lb. keg), cents per lb.	11.375
Nickel, cents per lb.	29.50	Turpentine (bbl. lots), per gal.	\$0.93
Zinc, cents per lb.	6.75	Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Tin, Straits, cents per lb.	46.75	Car window glass, (single strength), first three brackets, B quality, discount	86.0%
Aluminum, 98 to 99 per cent, cents per lb.	25.50	Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Babbitt metal, warehouse, cents per lb.:		Putty, 100 lb. tins, cents per lb.	4-6
Fair grade	52.00	*These prices are f.o.b. works, boxing charges extra.	
Commercial	25.00	Wire—New York	
Bituminous Coal		Copper wire base, cents per lb.	15.75
Smokeless mins run, f.o.b. vessel, Hampton Roads	\$4.65	Rubber-covered wire, No. 14, per 1,000 ft.	\$6.50
Somerset mine run, Boston	2.375	Weatherproof wire base, cents per lb.	16.50
Pittsburgh mine run, Pittsburgh	2.00	Paving Materials	
Franklin, Ill., screenings, Chicago	1.45	Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq. yd.	\$3.60
Central, Ill., screenings, Chicago	1.05	Common, per sq. yd.	3.20
Kansas screenings, Kansas City	2.00	Wood block paving 3½, 16 treatment, N. Y., per sq. yd.	2.79
Track Materials—Pittsburgh		Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Standard Bessemer atel rails, gross ton	\$43.00	Crushed stone, ½-in., carload lots, N. Y., per cu. yd.	1.75
Standard open hearth rails, gross ton	43.00	Cement, Chicago consumers' net prices, without bags	2.20
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15	Gravel, ½-in., cu. yd., f. o. b. N. Y.	1.75
Tie plates (flat type), cents per lb.	2.575	Sand, cu. yd., N. Y.	1.25
Angle bars, cents per lb.	2.75	Old Metals—New York and Chicago	
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125	Heavy copper, cents per lb.	10.75
Steel bars, cents per lb.	2.40	Light copper, cents per lb.	9.25
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	\$1.30	Heavy brass, cents per lb.	6.00
Hardware—Pittsburgh		Zinc, old scrap, cents per lb.	4.125
Wire nails, base per keg	3.00	Yellow brass, cents per lb. (heavy)	5.75
Sheet iron (28 gage), cents per lb.	3.75	Lead, cents per lb. (heavy)	6.00
Sheet iron, galvanized (28 gage), cents per lb.	4.85	Steel car axles, Chicago, net ton	\$16.75
Galvanized barbed wire, cents per lb.	3.80	Old car wheels, Chicago, gross ton	18.75
Galvanized wire, ordinary, cents per lb.	3.35	Rails (short), Chicago, gross ton	19.75
Waste—New York		Rails, (relaying), Chicago, gross ton	33.50
Waste, wool, cents per lb.	15-18	Machine turnings, Chicago, net ton	6.25
Waste, cotton (100 lb. bale), cents per lb.:			
White	13-15.50		
Colored	10-15		

Rolling Stock

Michigan United Railways, Jackson, Mich., has sent out inquiries for bids on the construction of six new parlor chair cars which are to be arranged as complete units equipped with baggage and smoking compartments.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has recently purchased four Reo buses to be delivered late in December. They will operate in sections formerly served by the jitneys.

Department of Street Railways, Detroit, recently placed an order for 100 cars. The original order for fifty Peter Witt type cars from the McGuire-Cummings Company was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 17. This order was later increased to 100 cars and fifty were to be built by the Osgood-Bradley Car Company. This explains the status of the car situation in Detroit which was mentioned in the Nov. 17 and Nov. 24 issues of the paper. The train of three cars which is being built by the Cincinnati Car Company will be delivered about Jan. 1, 1924. This train may be operated by one motorman and three conductors or may be operated by one motorman and one conductor. The one conductor will stand in the middle car, which will be used as an entrance car, and the two end cars will be used as exit cars, there being a passageway between the cars.

Track and Line

Charleston Consolidated Railway Gas & Electric Company, Charleston, S. C., is replacing the double track on King Street with a single-line track.

Grand River Valley Railway, Grand Junction, Col., will build a 3½-mile beet spur into the irrigated country north and west of Fruita, its present terminus. Ultimately the spur will be extended to approximately 12 miles.

Duluth Street Railway is planning to complete the extension to Kenwood next year. This line will be built to St. Marie Street some time next spring. General Manager Warren said that active work would be started as soon as the weather would permit.

United Traction Company, Albany, N. Y., will consider with city officials the proposition of improving Western Avenue from Manning Boulevard west to the Albany city line. It is planned to have the United Traction Company's track on the south side of Western Avenue west of the Manning Boulevard, removed to the center 33-ft. strip of the thoroughfare. The city will then improve the south side of the avenue, lay a new concrete pavement to correspond with the one on the north side and build new sidewalks. It is believed that the United Traction Company will deed to the city the land which is now unused and which consti-

tutes the middle 33 feet of the avenue. If this happens the city will pay all, or a part of the cost of relaying the track.

Springfield, Mass.—The joint committee of Springfield and West Springfield, Mass., on a new bridge across the Connecticut River to replace the bridge burned last September has agreed upon plans for an open-deck steel bridge to cost \$873,000, the structure to be 1,135 ft. long and 70 ft. wide, with 54-ft. roadway and 8-ft. sidewalk on each side. Estimates call for \$56,000 for electric railway tracks, including metal to carry the wheel base, of which sum \$25,000 is to be assessed on the Springfield Street Railway, this expenditure being in addition to the \$873,000. A verbal agreement has been made between the street railway company and the city, by which the company would pay the city an annual rental estimated to amount to \$1,500 yearly, payments being computed on the same basis as in the case of the Hampden County Memorial Bridge.

Mississippi Valley Electric Company, Iowa City, Iowa, is adding a short stretch of additional track to the Dodge Street line. The work will cost approximately \$3,500.

Cincinnati, Ohio.—Extension of Cincinnati's rapid transit loop 4 miles was decided on at a recent meeting of the Board of Rapid Transit Commissioners, when a resolution was adopted to appropriate the property lying between Mitchell and Section Avenues, Norwood. Under the revised plans, the loop will terminate in Oakley, instead of in Avondale. The extension will follow the bed of the old canal and then proceed to Oakley by way of St. Bernard, Carthage and Norwood. Most of the work will be open construction, Frank Raschig, rapid transit engineer, announced, except where the route of the subway intersects railroads or streets. No additional bond issue is necessary for this phase of the work. The commission definitely stated that the money on hand would enable it to construct the subway as far as Oakley.

Power Houses, Shops and Buildings

Jamestown, N. Y.—Owing to the fact that cars of the Jamestown Street Railway, Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railway are now running entirely on Niagara power the old power house at Jamestown having been dismantled. The equipment to be sold includes nine boilers, four turbines, pumps, condensers, switchboards and other auxiliary machinery.

United Railways, St. Louis has recently added a new bay to the car-building department of the general shops. The addition is constructed along the most modern lines, having steel framing and brick walls, and is made fireproof by the installation of the best fire doors. The new bay has

a capacity for holding twenty-four cars while under construction. Situated between the car-building shop and the truck and blacksmith shops is the transfer table. This device is operated when transferring cars from department to department while they are in various stages of construction.

Puget Sound Power & Light Company, Seattle, Wash., announces that tentative plans are under way for a terminal at the corner of Elk and Magnolia Streets in Bellingham to cost \$200,000. The terminal is to serve the company's traction trains and stage lines terminating in Bellingham. The proposed structure will be three stories high, with full basement, 150x125 ft.

Trade Notes

The Texas Company, New York, N. Y., producers of Texaco Petroleum Products, has just renewed a contract for the supply of lubricants to the Boston Elevated Railway, Boston. This is the third consecutive year that the Texas Company has obtained this business, one of the largest electric railway lubrication contracts of the country.

Conveyors Corporation of America, Chicago, announces that Jay C. Lathrop, its Cincinnati district representative, has removed his office to 503 Neave Building, Cincinnati.

General Electric Company, Schenectady, N. Y., has appointed L. R. Brown manager of the transformer division of the new central station department. He was one of the company's first transformer specialists and has a wide personal acquaintance in the central station industry. In connection with the reorganization following this and other changes in the central station department, G. G. Jeter, H. F. McRell and Clinton Jones are to be sales managers in this division. Mr. Jeter will have charge of transformer accessories, advertising and publicity; Mr. Jones will have supervision of power transformers, and Mr. McRell, distribution transformers.

New Advertising Literature

The Johns-Pratt Company, Hartford, Conn., has issued the second edition booklet of the Noark universal service switches.

International Western Electric Company, New York, N. Y., has issued the latest edition of "Electrical Communication." It is a 150-page booklet containing such articles as Telephone Transmission Over Long Distances, Recent Developments in Telephone Equipment for Train Dispatching Circuit, Telephone Traffic Control for Tramways and other instructive reviews.

MacGovern & Company, Inc., New York, N. Y., has issued a twenty-four-page booklet dated November, 1923, and entitled "Power Machinery—Electrical, Hydraulic, Steam, Gas."



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and a s-t-r-o-n-g pull!*

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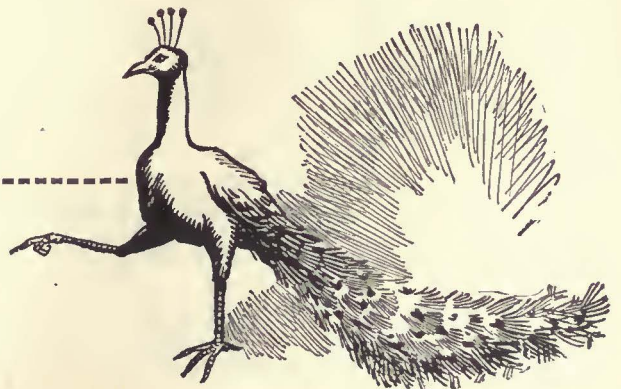
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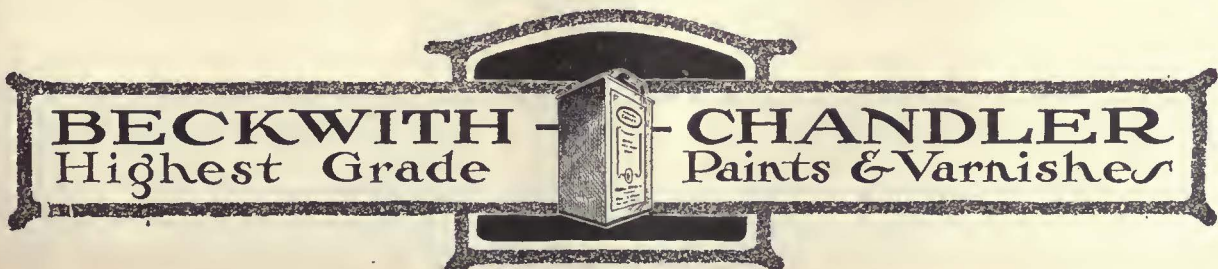
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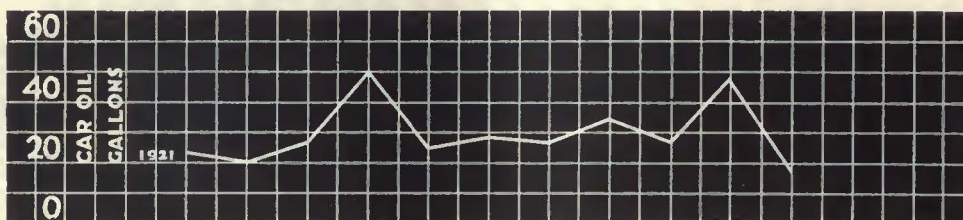
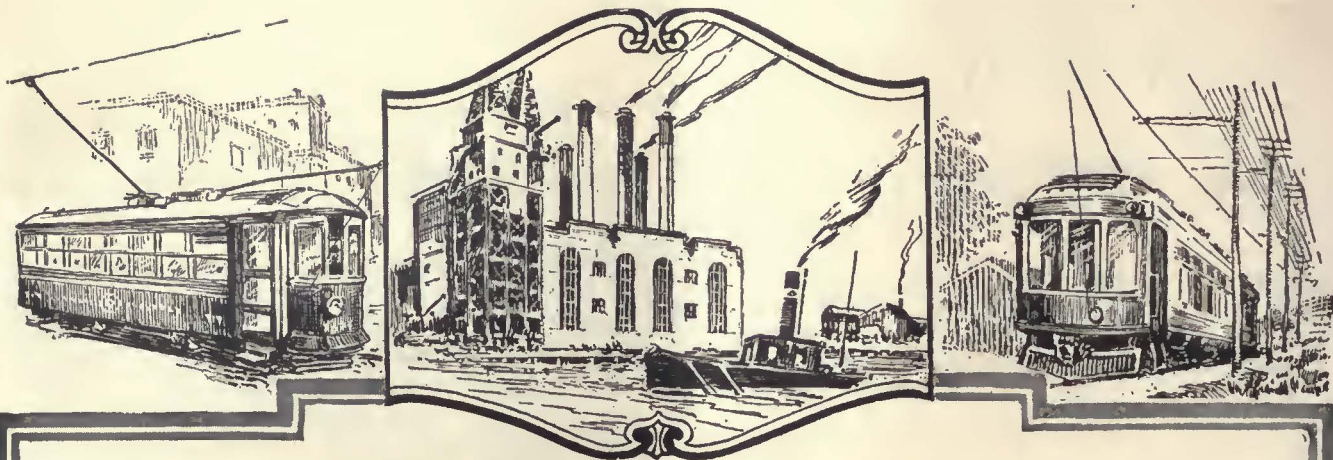
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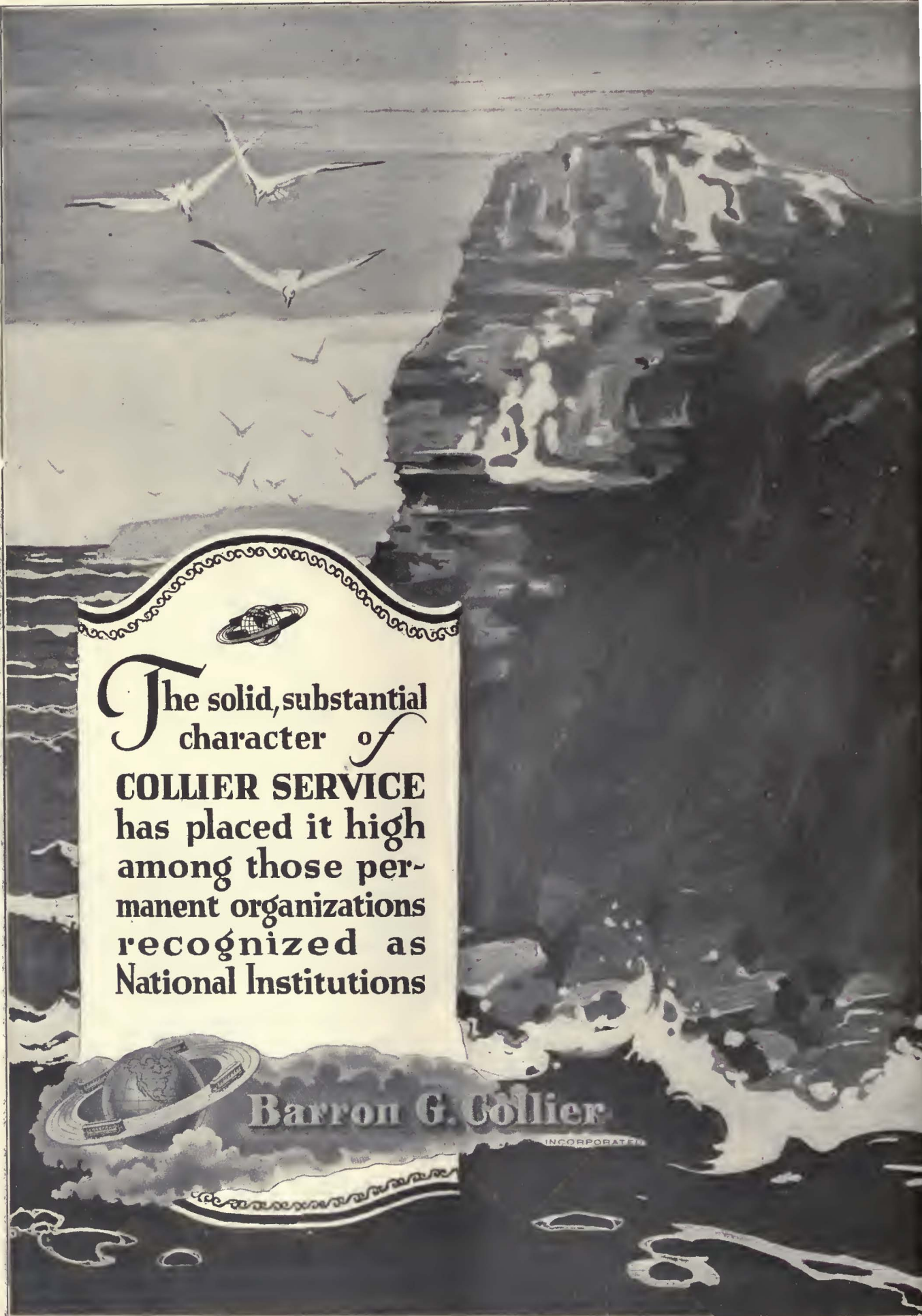
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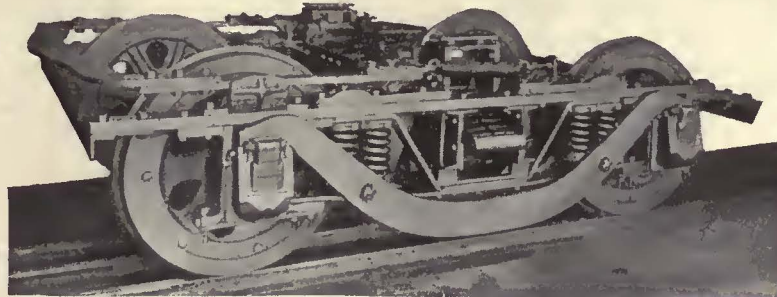
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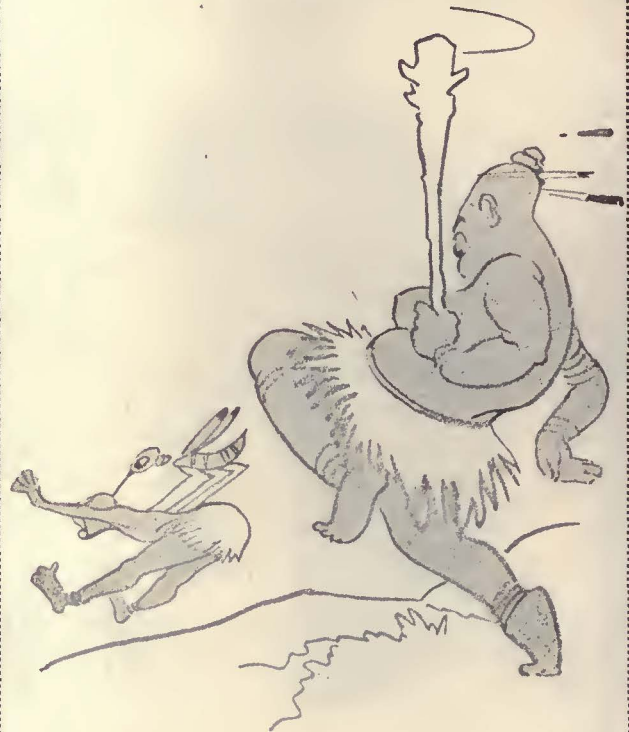
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Occupation

E.R.J. 12-1-23



Inkubis

Inkubis is the locust of the Kaffir country—larger than the one we know—and more vicious.

It has a sharp hickey on its legs so that it draws blood when it kicks, and once it lights on you, it sticks with cootielike tenacity.

The man underneath it is in much the same fix as an operator who finally gets some mischosen brushes to actually work on a machine. He is afraid to touch them, fearing a kick-up that will spoil commutation—he is bewildered—he looks to the left, then to the right, you'd think he was working a Urelite.

His furtive question: "What to do?"

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- Baltimore**, O. T. Hall, Sales Engineer, 1926 Edmondson Ave.
- Revere, Mass.**, J. F. Drumme, 75 Pleasant Street.
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- Son Francisco**, Special Service Sales Co., 202 Russ Building.
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New City Cars for Indiana Service Corporation, Fort Wayne, Ind.

These new double-track, one-man, front-entrance and exit cars are arranged with double selective-type doors at front to expedite loading; the exit is the rear door controlled from the motorman's position; there is a motorman's signal light in each vestibule connected with the rear exit-door.

These cars are 39 ft. 11 in. long over all with 2 ft. 4½ in. post spacing and seating capacity of 44 passengers. Trucks are St. Louis AM 64 diamond arch, bar type equipped with quadruple 25 H.P. motors.

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"The Birthplace of the Safety Car"

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TAYLOR STRAIGHT ACTION BRAKE



SMOOTH RIDING
LOW MAINTENANCE COST—Absolute Safety

Center Plate Height 22¾ in. with 26 in. Diam. Wheels

For Modern Low Level Double Truck Cars, the Taylor R. H. Truck, equipped with Taylor S. A. Brake, with large diameter hard steel pins, will provide the best possible service results from every standpoint.

TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.

SPECIFICATIONS ON REQUEST

Established 1892

SEND FOR PORTFOLIO

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDER
TRIPLEX

Arc Weld and Flame Weld

*Send for new
Rail Bond Book*

**American Steel & Wire
Company**
CHICAGO
NEW YORK

International Creosoting & Construction Co. Galveston, Texas

Plant—Texarkana Beaumont Galveston
MONEY SAVERS TO RAILWAYS

Treated railway ties, poles, piling,
bridge timbers, etc.

*See our full page advertisement
in last week's issue.*

High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE
CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

No. 2



AIMCO Electric Railway
Automatic
Signals

for Accessibility
and Reliability

EST. 1863 **AIMCO** INC. 1918
"American"
**INSULATING
MACHINERY
COMPANY**

Philadelphia, New York, Paris, England

Sole Agents:
Electric Service Supplies Co.
Philadelphia New York Chicago



U. S. ELECTRIC AUTOMATIC SIGNAL

for single track block signal protection

United States Electric Signal Co.
West Newton, Mass.

GODWIN STEEL PAVING GUARDS

Adapted to all types
of rails and
paving.

W. S. GODWIN CO., Inc.



Proven by
service to
economically pre-
vent scapage and
disintegration of
street railway paving.

Write for Illustrated
Catalog No. 20.
Race & McComas Sts.,
Baltimore, Md.

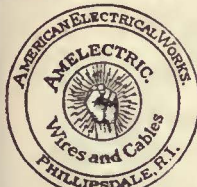


INSULATED WIRES AND CABLES
JOHN A. ROEBLING'S SONS CO., TRENTON, NEW JERSEY

The Most Successful Men in the Electric Railway
Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week



AMELECTRIC PRODUCTS
BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

Reg. U. S. Pat. Office
 Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
 Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

The Baker
Wood Preserving Company
CREOSOTERS

Washington Court House, Ohio

Cross Ties Bridge Timbers
 Lumber Posts

Piling

Treated and Untreated

We solicit your inquiries

Creosoting Plant located
 Washington Court House, Ohio
 On—Penna. R.R., B. & O. R.R., D. T. & I. R.R.
 Operating Mills in Southern Ohio

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
 Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request

ELECTRIC RAILWAY EQUIPMENT CO.
 CINCINNATI, OHIO
 New York City, 30 Church Street

Shaw Lightning Arresters

Standard in the Electric Industries
 for 35 years

Henry M. Shaw

150 Coit St., Irvington, Newark, N. J.

Chapman
Automatic Signals

Charles N. Wood Co., Boston



DUNDEE "A" AND "B" FRICTION TAPES

are
 Okonite
 Products

'Nuff Said!



Write for Samples and Circulars

THE OKONITE Co., Passaic, N. J.
 Incorporated 1884

Sales Offices: New York—Atlanta—San Francisco
 Agents: Central Electric Co., Chicago, Ill.; Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.

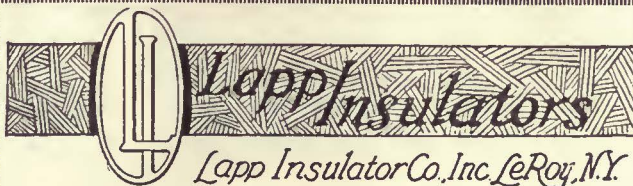


Standard Underground Cable Co.
 Pittsburgh, Pa.



Manufacturers of
 Copper, Brass, Bronze Wires, Rods, Tubes
 Copper Clad Steel Wire
 Insulated Wire of all kinds
 Lead Covered and Armored Cables
 Cable Terminals, Junction Boxes, etc.

Boston, Washington, Philadelphia, Pittsburgh, Seattle, Chicago,
 New York, Atlanta, San Francisco, Detroit, Los Angeles, St. Louis



Trade Mark

Lapp Insulator Co., Inc. LeRoy, N.Y.

ANACONDA
TROLLEY WIRE

ANACONDA COPPER
 MINING COMPANY

THE AMERICAN
 BRASS COMPANY

Conway Building, Chicago, Ill.

General Offices: Waterbury, Conn.



Peirce Sign Hangers
For Span Wires

The hinged joint keeps the sign in position
 at all times, regardless of the twisting of
 the span wires.

HUBBARD & COMPANY
 PITTSBURGH CHICAGO

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, North American Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
TUCSON, ARIZ., 21 So. Stone Avenue
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS

Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, Southern Pacific Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, I. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, PORTO RICO, Royal Bank Building

WHARTON

Special Trackwork
For Street and Steam Railways

Steel Castings Gas Cylinders

ORIGINATORS OF
Manganese Steel Trackwork

WM. WHARTON JR. & CO., Inc.

Easton, Pa.

Other Plants:

Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Philadelphia Roll & Machine Co., Philadelphia, Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.

Series Type

Arc Welding and Bonding
Outfit

Rugged series resistance coil
Indestructible Mica insulation
Normal welding current at half voltage

The Electric Railway Improvement Co.
Cleveland, Ohio

ERICO RAIL BONDS

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

The Differential Car

An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

The Differential
Steel Car Co.
Findlay, Ohio



RAMAPO AJAX CORPORATION

Ramapo Automatic
Return Switch
Stands
for Passing
Sidings



RACOR Tee Rail
Special Work.
Manganese
Construction

GENERAL OFFICES: HILLBURN, NEW YORK
Chicago New York Superior, Wis. Niagara Falls, N. Y.
Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.

Metal Safety Railway Tie Co.

522 North American Bldg., Philadelphia, Pa.

All-metal cross ties

Types for open and closed tracks
"More flexible than wood"

See advertisement, Issue, Sept. 29, page 86.
Ask for circular on either type. Prices upon application.

BUCKEYE JACKS

High-grade R. R. Track and Car Jacks

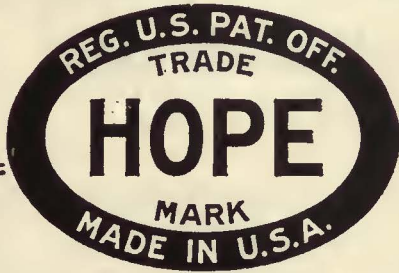
The Buckeye Jack Mfg. Co.

Alliance, Ohio

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



The

Standard of Quality

The precise and delicate requirements of manufacturers of dynamos, magnetos and other electrical apparatus prescribe the use of electric tape that is known to be of constant high quality.

Quality is the sum total of good basic materials and careful manufacture—the best grades of yarn plus painstaking, skilled workmanship.

That is why thickness, width, weave, finish and absorption are uniformly correct in HOPE tapes. That is why, for 40 years, manufacturers of electrical apparatus have found HOPE products to be the Standard of Quality.

Let us send you the HOPE Sample Booklet of electric tape, so that you can pick out a tape to meet your own special requirements.

HOPE Electric Tape

HOPE WEBBING COMPANY, INC.
 PROVIDENCE - RHODE ISLAND
 New York Troy Chicago

Fare Registration on a Modern Basis



Simple and accurate as the International method has always been the modern tendency in street railway practice toward automatic operation is reflected in the newest type registers, equipped with electric Backs, removing the last drag on the platform worker, and contributing to the quicker handling of traffic.

Registers made in various types to meet the requirements of service on Electric Railways.
 Exclusive selling agents for **HEEREN ENAMEL BADGES.**

The International Register Co.

15 South Throop Street, Chicago, Illinois

Advertisements for the Searchlight Section



Can be received at the New York Office of Electric Railway Journal until 10 a. m.

Wednesday

For issue out Saturday

0220



Use only Awebco Tape on your Armatures Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

ANCHOR WEBBING COMPANY
 300 Brook Street, Pawtucket, Rhode Island

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
 Second and Diamond Sts., Philadelphia

OXYGEN

FOR CUTTING, WELDING, ETC.

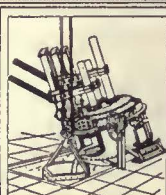
INTERNATIONAL OXYGEN COMPANY
 NEWARK NEW YORK PITTSBURGH TOLEDO



CHILLINGWORTH

One-Piece Gear Cases
 Seamless—Rivetless—Light Weight
 Best for Service—Durability and Economy. Write Us.

Chillingworth Mfg. Co.
 Jersey City, N. J.



Moore Rapid **Sectromelt** Furnaces

Ten Standard Sizes ½ to 24 Tons Capacity
 Most Rapid and efficient for making
 Tool Steels, Alloy Steels, Forging Steels
 Steel Castings, Malleable Iron, Grey Iron
 Carbide, Ferro-Alloys etc.
PITTSBURGH ELECTRIC FURNACE CORPORATION
 P.O. Box 1125. PITTSBURGH, PA.

An Independent Inspection Service For Electric Railways

Embracing

Progressive Inspection of Cars, Rails, Track Fastenings, etc., from the raw material to the finished product. Our Bulletin No. 26 tells the story—write for your copy.

Pittsburgh Testing Laboratory

Inspecting Engineers and Chemists

Branch Offices in the Principal Cities

Pittsburgh, Pa.



HIGH SPEED MONEY CHANGERS

1923 model
—without
rivets—
ready for
delivery



Supplied in
one or four
tube Combi-
nations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them.

Prices and Literature sent on request

J. L. GALEF, 75 Chambers St., N. Y. C.
Exclusive Manufacturer's Selling Agent

Fare Boxes Change Carriers

COIN
COUNTERS SORTERS WRAPPERS
THE CLEVELAND FARE BOX CO.

CLEVELAND, OHIO
Canadian Branch, Preston, Ontario.



Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

75% of the electric railways

use
B-V Punches



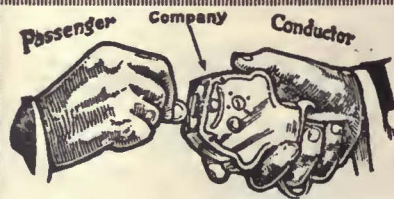
Send for Catalog
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



No.
478E

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.



**Direct
Automatic
Registration**
By the
Passengers
Rooke Automatic
Register Co.
Providence, R. I.

PROVIDENCE H-B FENDERS LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

Heywood-Wakefield CAR SEATS

of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.

HEYWOOD-WAKEFIELD CO.
Factory at Wakefield, Mass.

Offices at New York, Chicago, San Francisco



"Boyerized" Products Reduce Maintenance

Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
Case Hardened Bushings	Manganese Body Bushings
Case Hardened Nuts and Bolts	Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

HALE-KILBURN CAR SEATS

For Every Class of Service

General Offices and Works: Philadelphia
Offices: New York, Chicago, St. Louis, Washington, San Francisco

B. A. Hegeman, Jr., President
 Harold A. Hegeman, Vice-President, and Acting Sec'y
 W. C. Lincoln, Manager Sales and Engineering

Charles C. Castle, First Vice-President
 Harold A. Hegeman, Vice-President, Treas. and Acting Sec'y
 W. C. Lincoln, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., N. Y.

BRANCH OFFICES:

Munsey Bldg., Washington, D. C.; 100 Boylston St., Boston, Mass.; Hegeman-Castle Corporation, Railway Exchange Bldg., Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Plions	Power Saving and Inspection
Pittsburgh Forge & Iron Co.'s	Meters
Products	Fort Pitt Spring & Mfg. Co.,
Anglo-American Varnish Co.	Springs
Varnishes, Enamels, etc.	C-H Electric Heaters
National Hand Holds	Garland Ventilators
Drew Line Material & Railway	E-Z Car Control Corp. Safety
Specialties	Devices
Genesco Paint Oils	L-10d Aluminum Field Coils
Turnstile Car Corporation—Turn-	Flaximum Insulation
stiles	National Safety Car Equipment
Economy Electric Devices Co.	Co.'s One-Man Safety Cars
Anderson Slack Adjusters	



Ohmer Indicating and Recording Fare Registers

are especially well adapted for use in one-man cars, either for city or interurban service.

The operation is quick and snappy. Each fare is clearly indicated and a correct printed record made of it.

Ohmer Fare Registers offer the only means of placing fare collecting on an absolutely correct business basis.

OHMER FARE REGISTER CO.
 Dayton, Ohio



*Defective Wheels
 Corrected While They Run*

WHEEL TRUING BRAKE SHOES

—keep your cars and wheels in service. Abrasive blocks in various sections correct flattening or wear on any part of flange or tread. Write for booklet.

Wheel Truing Brake Shoe Co.
 Detroit, Mich.

Trade Mark—Wheel Truing Brake Shoe



The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



THE STAR BRASS WORKS
 KALAMAZOO, MICH., U. S. A.

100 New Users in the Last Nine Months
KASS SAFETY TREADS
 HIGH
 in efficiency and lasting qualities
 LOW
 in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago



*Only reliable products
 can be continuously
 advertised*



"OSKELITE"

The Stop Light for street cars. Operates from brake system. Details on request

The Oskel Equipment Co.
 940 McCormick Bldg., Chicago, Ill.

Brake Shoes A.E.R.A. Standards

Diamond "S" Steel Back is the Best Type



**Standard
Patterns**

for

**SAFETY
CAR**

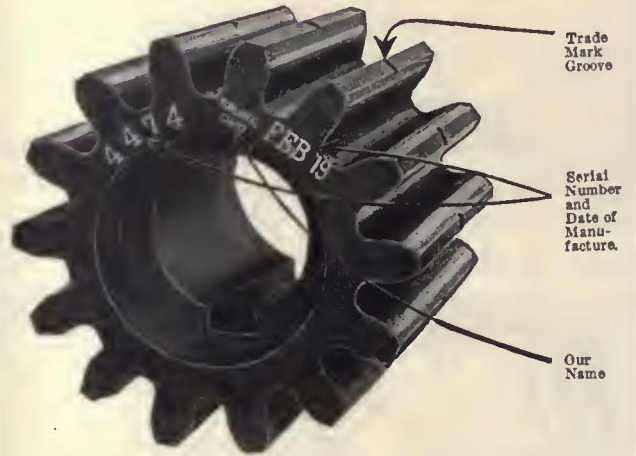


D-67 for Narrow Treads
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.
30 Church Street, New York**

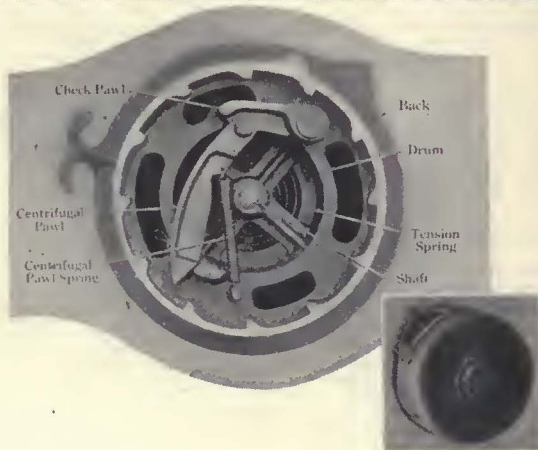
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

Cincinnati "Tool Steel" Quality marks.



Even when greasy you can tell "Tool Steel" by the groove.

**The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.**



**Ever stop your watch by
winding it?**

Overwinding will put the average retriever or catcher out of action. Added maintenance expense.

**EARLL
Catchers and Retrievers**

cannot be overwound. The one-piece tension spring maintains steady even tension throughout long years of service. It requires a minimum of winding effort, saving time, avoiding delays.

This and four other exclusive Earll Catcher and Retriever Features are vitally important. Get the whole story.

B. J. Earll, York, Pa.

**Griffin Wheel Company
McCormick Building
Chicago, Ill.**

**GRIFFIN
F. C. S.
WHEELS**

**For Street and Interurban
Railways**

FOUNDRIES:

Chicago
Detroit
Denver

Boston
Kansas City
Council Bluffs

St. Paul
Los Angeles
Tacoma

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E.R.J.

POSITIONS VACANT

COMPETENT Division Superintendent wanted on large Ohio property. Give full outline of experience, references, and salary desired in first letter. P-627, Elec. Railway Journal, Leader-News Bldg., Cleveland, Ohio.

DRAFTSMEN-COMPUTERS wanted on railway trackwork working knowledge of and facility in trigonometry essential. State in letter, age, education, experience and approximate salary. Employment Dept., Bethlehem Steel Co., Steelton, Pa.

FIRST-CLASS trolley lineman wanted. One with railway sub-station experience preferred. Must be well recommended. In reply give experience, references and salary expected. R. S. Thomas, Engineer, Arkansas Valley Interurban Railway Company, Wichita, Kansas.

ROADMASTER wanted for electric road in the East. Must be thoroughly efficient in the handling of material and labor and competent in the maintenance of city and interurban track. State experience, salary expected and when available. P-622, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

ELECTRIC arc welder, experienced in joint welding, bonding and surface work. Can furnish good references. Open for immediate employment. PW-618, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

ENGINEER of equipment, technical graduate, with several years' experience. PW-623, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER MECHANIC city or interurban railway experienced on all branches. 14 years' experience. PW-619, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

POSITION wanted, with small road in Penna. or N. Y., as working barn foreman or general repair work. With chance of promotion. Twenty-six years old, eight years' experience. Reference. PW-614, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

WANTED position by master mechanic, 18 years' electric railway maintenance, rebuilding cars, track, trolley and rewinding armatures. Best of reference. PW-620, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

Three Electric Cars

New cars still in the shop, modern in every way, 45 passengers, standard gauge, designed for interurban service in Cuba, each equipped with two G. E. 50 hp. motors for D.C. 1200 v. Acquired by judgment. We will sell cheap.

The Davison Chemical Company
Garrett Building, Baltimore

FOR SALE

320 LEWIS & FOWLER FARE REGISTERS

FS-626, Electric Railway Journal
10th Ave. at 36th St., New York City.

FOR SALE

MOTORS

36—68 or 68 C.

In Perfect Condition

THE S. SNYDER CORPORATION
14 Mart Place, Rochester, N. Y.

S EARCHLIGHT
E RVICE
E CURES
A TISFACTORY
A LES

2004

Good Relaying Rails Are as Serviceable as New Rails, with a Big Saving on the Price

We have ready for prompt shipment First-Class Relaying Rails in various weights. Get in touch with us, stating what weight rail and tonnage desired, and we will submit quotations.

HYMAN-MICHAELS COMPANY

531 Peoples Gas Bldg., Chicago
OFFICES AND PLANTS AT
St. Louis, Mo. Pittsburgh, Pa. Detroit, Mich.
1324 Woolworth Bldg., New York City.
San Francisco, Cal. McKees Rocks, Pa.

FOR SALE

50—G. E. No. 80-A Motors.
50—Controllers, K-28-B; K-12.
35—B-2 Compressors.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

RAILS

Cars, Locomotives, Tanks, Steel Piling
Fairbanks-Morse standard gage Gasoline Motor
Car; seats 34 people.

ZELNICKER IN ST. LOUIS

SNOW PLOW

1—Double truck express car with snow plow ends. Operated by air. Brill truck. Complete equipment overhauled.

TRANSIT EQUIPMENT CO.
501 Fifth Ave., New York

The "Searchlight Advertising" in this Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

THE BEST PROOF

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

- advertising, Street Car
Collier, Inc., Barron G.
Air Receivers, Aftercoolers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Armature Shop Tools
Elec. Service Supplies Co.
Automatic Return Switch
Stand
Ramapo Ajax Corp.
Automatic Safety Switch
Standa
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
St. Louis Car Co.
Axles, Bus
Timken-Detroit Axle Co.
Axle Straighteners
Columbia M. W. & M. I. Co.
Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Babbitting Devices
Columbia M. W. & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.,
The
Barges, Steel
Amer. Bridge Co.
Batteries, Dry
Nichols-Lintern Co.
Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
A. Gilbert & Sons, B. F. Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Bearings, Center and Roller
Side
Baldwin Locomotive Wks.
Stucki Co., A.
Bearings, Roller
Stafford Roller Bearing Car
Truck Corp.
Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heating
Co.
Elec. Service Supplies Co.
Benders, Rail
Railway Track-work Co.
Boiler Tubes
Nat'l Tube Co.
Boilers
Babcock & Wilcox Co., The
Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Indianapolis Switch & Frog
Co.
Ohio Brass Co.
Railway Track-work Co.
Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse Elec. & M. Co.
Book Publishers
McGraw-Hill Co.
Brackets and Cross Arms
(See also Poles, Ties, Posts
etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
Amer. Brake Shoe & Fdry.
Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe
Co.
Brakes, Brake Systems and
Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.
Brushes & Buildings
American Bridge Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
La Carbone Co.
Morganite Brush Co., Inc.
Westinghouse Elec. & M. Co.
Brushes, Graphite
Morganite Brush Co., Inc.
Brush Holders
Anderson Mfg. Co., A. &
J. M.
Columbia M. W. & M. I. Co.
Brushes, Wire Pneumatic
Ingersoll-Rand Co.
Bunkers, Coal
American Bridge Co.
Buses, Motor
Brill Co., The J. G.
St. Louis Car Co.
Bushings, Case Hardened and
Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cables
(See Wires and Cables)
Cambrie Tapes, Yellow &
Black Varnish
Irvington Varnish & Ina. Co.
Carbon Brushes
(See Brushes, Carbon)
Car Lighting Apparatus
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating
Co.
Westinghouse Elec. & M. Co.
Cars, Bump
Differential Steel Car Co.,
Inc.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Cars, Gas Rail
St. Louis Car Co.
Cars, Passenger, Freight
Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.
Cars, Second Hand
Davison Chemical Co., The
Electric Equipment Co.
Transit Equipment Co.
Cars, Self-Propelled
General Electric Co.
Castings, Brass, Composition
or Copper
Anderson Mfg. Co., A. &
J. M.
Columbia M. W. & M. I. Co.
Castings, Funnel
Wharton, Jr. & Co., Inc.,
Wm.
Castings, Gray Iron and Steel
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Wharton, Jr. & Co., Inc.,
Wm.
Castings, Malleable and Brass
Amer. Brake Shoe & Fdry.
Co.
Catchers and Retrievers,
Trolley
Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
Catenary Construction
Archbold-Brady Co.
Celling, Car
Pantasote Co., The
Change Carriers
Cleveland Fare Box Co.
Galef, J. L.
Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.
Clamps and Connectors for
Wires and Cables
Anderson Mfg. Co., A. M. &
J. M.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.
Cleaners and Scrapers, Track
(See also Snow-Flows,
Sweepers and Brooms)
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Clusters and Sockets
General Electric Co.
Coal and Ash Handling
(See Conveying and Holst-
ing Machinery)
Coils, Armature and Field
Columbia M. W. & M. I. Co.
Economy Elec. Device Co.
General Electric Co.
Coil Bauding and Winding
Machines
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.
Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Coin-Counting Machines
Cleveland Fare Box Co.
Galef, J. L.
International Register Co.
The
Coin Sorting Machines
Cleveland Fare Box Co.
Galef, J. L.
Coin Wrappers
Cleveland Fare Box Co.
Galef, J. L.
Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.
Compressors, Air, Portable
Ingersoll-Rand Co.
Compressors, Gas
Ingersoll-Rand Co.
Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.
Condenser Papers
Irvington Varnish & Ina. Co.
Conduits, Underground
Std. Underground Cable Co.
Connectors, Solderless
Westinghouse Elec. & M. Co.
Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Controller Regulators
Electric Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.
Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Conveying and Hoisting
Machinery
Columbia M. W. & M. I. Co.
Copper Wire
Anaconda Copper Mining Co.
Rome Wire Co.
Cord, Bell, Trolley, Register,
etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.,
The
Roebings Sons Co., John A.
Samsom Cordage Works
Cord Connectors and Couplers
Electric Service Supplies Co.
Samsom Cordage Works
Wood Co., Chas. N.
Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Cranes
Allis-Chalmers Mfg. Co.
Cross Arms (See Brackets)
Crossings
Ramapo Ajax Corp.
Crossing Foundations
International Steel Co.
Crossing Fogs and Switches
Ramapo Ajax Corp.
Galef, J. L.
Wharton, Jr. & Co., Inc., Wm.
Crossings, Manganese
Indianapolis Switch & Frog
Co.
Ramapo Ajax Corp.
Crossing Signals .See Signal
Systems, Highway Cross-
ing)
Crossings, Track, (See Track,
Special Work)
Crossings, Trolley
Ohio Brass Co.
Crushers, Rock
Allis-Chalmers Mfg. Co.
Curtains and Curtain Fix-
tures
Brill Co., The J. G.
Edward Co., Inc., The O. M.
Electric Service Supplies Co.
Morton Mfg. Co.
Pantasote Co., The
Dealers' Machinery
Electric Equipment Co.
Transit Equipment Co.
Derailing Switches, Tee Rail
Ramapo Ajax Corp.
Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Detective Service
Wish Service, P. Edward
Door Operating Devices
Consolidated Car Heating
Co.
National Pneumatic Co., Inc.
Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.
St. Louis Car Co.
Doors, Folding Vestibule
National Pneumatic Co.,
Inc.
Draft Rigging, (See Coup-
lers)
Drills, Rock
Ingersoll-Rand Co.
Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.
Dryers, Sand
Electric Service Supplies Co.
Ears
Ohio Brass Co.
Electric Grinders
Railway Track-work Co.
Electrodes, Carbon
Indianapolis Switch & Frog
Co.
Railway Track-work Co.,
Electrodes, Steel
Indianapolis Switch & Frog
Co.
Railway Track-work Co.
Electrical Wires and Cables
American Elec. Works
Roebings Sons Co., J. A.
Enamels
Beckwith-Chandler Co.
Engineers, Consulting, Con-
tracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Bibbens, J. Rowland
Buchanan & Laying
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly Cooke & Co.
Ong, Joe E.
Parsons, Klapp, Brinkerhoff
& Douglas
Richey, Albert S.
Sanderson & Porter
Shaw, Henry M.
Stevens & Wood, Inc.
Stone & Webster
Wortham, Edwin
Engineers, Inspecting &
Chemists'
Pittsburgh Testing Lab.
Engines, Gas, Oil and Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.
Expansion Joints, Track
Wharton, Jr., & Co., Inc.,
Wm.
Fare Boxes
Cleveland Fare Box Co.
Economy Elec. Devices Co.
Galef, J. L.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Fences, Woven Wire and
Fence Posts
Amer. Steel & Wire Co.
Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Sup. Co.
Star Brass Works
Fibre and Fibre Tubing
Westinghouse Elec. & M. Co.
Field Coils (See Coils)
Flangeway Guards
Godwin Co., Inc., W. S.
Flaximum Insulation
Nat'l Ry. Appliance Co.
Floodlights
Electric Service Sup. Co.
Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Frogs & Crossings, Tee Rail
Ramapo Ajax Corp.
Frogs, Track, (See Track
Work)
Frogs, Trolley
Ohio Brass Co.
Furnaces, Electric
American Bridge Co.
Pittsburgh Electric
Furnace Corp.
Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
Consolidated Car Heating
Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.
Gaskets
Westinghouse Tr. Br. Co.
Gas-Electric Cars
General Electric Co.
Gas Producers
Westinghouse Elec. & M. Co.
Gates, Car
Brill Co., The J. G.
Gear Blanks
Carnegie Steel Co.
Gear Cases
Chillingworth Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & M. Co.
Gears and Pinions
Bemis Car Truck Co.
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Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion
Co.
Generating Sets, Gas-Electric
General Electric Co.
Generators
Allis-Chalmers Mfg. Co.
English Electric Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Gilder Ralls
Lorain Steel Co., The
Goggles, Safety
Indianapolis Switch & Frog
Co.
Gongs (See Bells and Gongs)
Grasses (See Lubricants)
Grinders and Grinding
Supplies
Indianapolis Switch & Frog
Co.
Railway Track-work Co.
Grinders, Portable
Railway Track-work Co.
Grinders, Portable Electric
Railway Track-work Co.
Grinding Blocks and Wheels
Railway Track-work Co.
Guard Rail Clamps
Ramapo Ajax Corp.
Guard-Rails, Tee Rail &
Manganese
Ramapo Ajax Corp.
Guards, Cattle
American Bridge Co.
Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.
Hammers, Pneumatic
Ingersoll-Rand Co.
Harps, Trolley
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.
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Electric Service Sup. Co.
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Headlining
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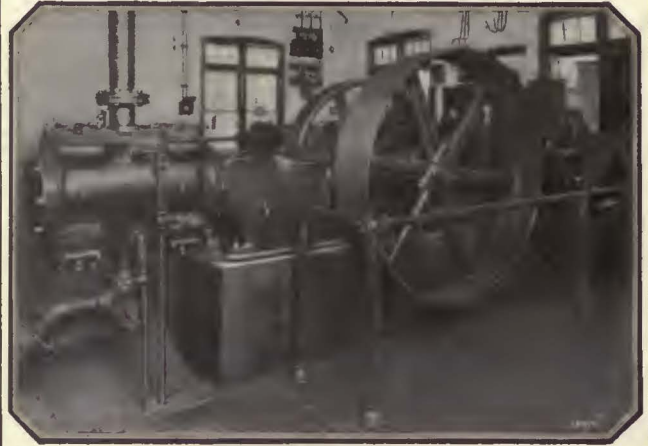
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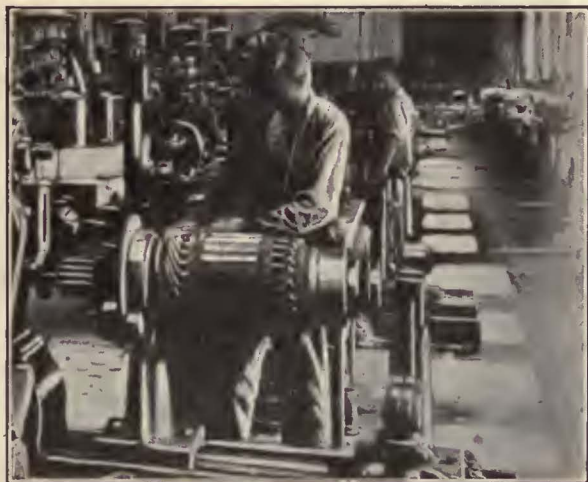
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 ing and Recording
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 Electric Service Sup. Co.
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 Anchor Webbing Co.
 General Electric Co.
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 Standard Underground
 Cable Co.
 Westinghouse E. & M. Co.
 Insulating Machinery
 Amer. Ins. Machinery Co.
 Insulating Silk
 Irvington Varnish & Ins. Co.
 Insulation (See also Paints)
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 Electric Ry. Equipment Co.
 Electric Service Sup. Co.
 General Electric Co.
 Irvington Varnish & Ins. Co.
 Okonite Co.
 Westinghouse Elec. & M. Co.
 Insulators (See also Line
 Material)
 Anderson M. Co., A. & J. M.
 Electric Ry. Equipment Co.
 Electric Service Sup. Co.
 Irvington Varnish & Ins. Co.
 Ohio Brass Co.
 Westinghouse Elec. & M. Co.
 Insulator Pins
 Electric Service Sup. Co.
 Hubbard & Co.
 Insulators, High Voltage
 Lapp Insulator Co., Inc.
 Insulation, Slot
 Irvington Varnish & Ins. Co.
 Insulating Varnishes
 Irvington Varnish & Ins. Co.
 Insurance
 Travellers Insurance Co.
 Jacks (See also Hoists and
 Lifts)
 Buckeye Jack Mfg. Co.
 Columbia M. W. & M. I. Co.
 Electric Service Sup. Co.
 National Ry. Appliance Co.
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 Bemis Car Truck Co.
 Brill Co., The J. G.
 Junction Boxes
 Standard Underground
 Cable Co.
 Lamp Guards and Fixtures
 Anderson M. Co., A. & J. M.
 Electric Service Sup. Co.
 General Electric Co.
 Westinghouse E. & M. Co.
 Lamps, Arc and Incandescent
 (See also Headlights)
 Anderson M. Co., A. & J. M.
 General Electric Co.
 Westinghouse E. & M. Co.
 Lamps, Signal and Marker
 Nichols-Lintern Co.
 Lanterns, Classification
 Nichols-Lintern Co.
 Lightning Arresters
 Shaw, Henry M.
 Lightning Protection
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 Electric Service Sup. Co.
 General Electric Co.
 Ohio Brass Co.
 Westinghouse Elec. & M. Co.
 Line Material (See also
 Brackets, Insulators, Wires,
 Etc.)
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 Archbold-Brady Co.
 Columbia M. W. & M. I. Co.
 Electric Ry. Equipment Co.
 Electric Service Sup. Co.
 Ensign Electric Co.
 General Electric Co.
 Hubbard & Co.
 Westinghouse Elec. & M. Co.
 Locking Spring Boxes
 Wharton, Jr. & Co., Inc.,
 Wm.
- Locomotives, Electric
 Baldwin Locomotive Wks.
 General Electric Co.
 Westinghouse Elec. & M. Co.
 Lubricating Engineers
 Galena-Signal Oil Co.
 Texas Co.
 Universal Lubricating Co.
 Lubricants, Oil and Grease
 Galena Signal Oil Co.
 Texas Co.
 Universal Lubricating Co.
 Lumber (See Poles, Ties,
 etc.)
 Machine Tools
 Columbia M. W. & M. I. Co.
 Manganese Parts
 Bemis Car Truck Co.
 Manganese Steel Guard Rails
 Ramapo Ajax Corp.
 Manganese Steel, Special
 Track Work
 Indianapolis Switch & Frog
 Co.
 Wharton, Jr. & Co., Inc.,
 Wm.
 Manganese Steel Switches,
 Frogs and Crossings
 Ramapo Ajax Corp.
 Meters, Car Watt-Hour
 Economy Elec. Devices Co.
 Motor Buses
 (See Buses, Motor)
 Motormen's Seats
 Brill Co., The J. G.
 Electric Service Sup. Co.
 St. Louis Car Co.
 Wood Co., Chas. N.
 Nuts, Electric
 Allis-Chalmers Mfg. Co.
 General Electric Co.
 Westinghouse Elec. & M. Co.
 Motor and Generator Sets
 General Electric Co.
 Nuts and Bolts
 Allis-Chalmers Mfg. Co.
 Barbour-Stockwell Co.
 Bemis Car Truck Co.
 Columbia M. W. & M. I. Co.
 Hubbard & Co.
 Oils (See Lubricants)
 Oxygen
 International Oxygen Co.
 Packing
 Electric Service Sup. Co.
 Westinghouse Tr. Br. Co.
 Paints and Varnishes, Pre-
 servative
 Beckwith-Chandler Co.
 Paints and Varnishes for
 Woodwork
 Beckwith-Chandler Co.
 National Ry. Appliance Co.
 Pavement Breakers
 Ingersoll-Rand Co.
 Paving Guards, Steel
 Godwin Co., Inc., W. S.
 Paving Material
 Amer. Br. Shoe & Fdry. Co.
 Pickups, Trolley Wire
 Electric Service Sup. Co.
 Ohio Brass Co.
 Pinion Pullers
 Columbia M. W. & M. I. Co.
 Electric Service Sup. Co.
 General Electric Co.
 Wood Co., Chas. N.
 Pinions (See Gears)
 Pins, Case Hardened, Wood
 and Iron
 Bemis Car Truck Co.
 Electric Service Sup. Co.
 Ohio Brass Co.
 Westinghouse Tr. Br. Co.
 Pipe
 National Tube Co.
 Pipe Fittings
 Westinghouse Tr. Br. Co.
 Planers (See Machine Tools)
 Plates for Tee Rail Switches
 Ramapo Ajax Corp.
 Pliers, Rubber Insulated
 Electric Service Sup. Co.
 Pneumatic Tools and
 Accessories
 Ingersoll-Rand Co.
 Pole Line Hardware
 Ohio Brass Co.
 Pole Reinforcing
 Drew Elec. & Mfg. Co.
 Hubbard & Co.
 Poles, Metal Street
 Electric Ry. Equip. Co.
 Hubbard & Co.
 Poles and Ties, Treated
 Bell Lumber Co.
 International Creosoting &
 Construction Co.
 Poles, Ties, Posts, Piling and
 Lumber
 Baker Wood Preserving Co.
 Bell Lumber Co.
 International Creosoting &
 Construction Co.
 Poles, Trolley
 Anderson M. Co., A. & J. M.
 Columbia M. W. & M. I. Co.
 National Tube Co.
 Nuttall Co., R. D.
 Poles, Tubular Steel
 Elec. Ry. Equip. Co.
 Electric Service Sup. Co.
 National Tube Co.
 Porcelain, Special High
 Voltage
 Lapp Insulator Co.
- Potheads
 Okonite Co.
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 Economy Elec. Devices Co.
 Nat'l Ry. Appliance Co.
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 General Electric Co.
 Westinghouse Elec. & M. Co.
 Pumps
 Allis-Chalmers Mfg. Co.
 Ingersoll-Rand Co.
 Pumps, Vacuum
 Ingersoll-Rand Co.
 Punctures, Ticket
 Bonney-Vehslage Tool Co.
 International Register Co.,
 The
 Wood Co., Chas. N.
 Rail Braces and Fastenings
 Ramapo Ajax Corp.
 Rail Joints
 Carnegie Steel Co.
 Rail Joints, Welded
 Indianapolis Switch & Frog
 Co.
 Rail Grinders (See Grinders)
 Railway Paving Guards
 Steel
 Godwin Co., Inc., W. S.
 Railway Safety Switches
 Consolidated Car Heating Co.
 Westinghouse Elec. & M. Co.
 Railway Welding (See Weld-
 ing Processes)
 Rattan
 Brill Co., The J. G.
 Electric Service Sup. Co.
 Hale-Kilburn Co.
 Heywood-Wakefield Co.
 St. Louis Car Co.
 Registers and Fittings
 Brill Co., The J. G.
 Electric Service Sup. Co.
 International Reg. Co., The
 Ohmer Fare Register Co.
 Rooke Automatic Reg. Co.
 Reinforcement, Concrete
 Amer. Steel & Wire Co.
 Carnegie Steel Co.
 Repair Shop Appliances (See
 also Call Banding and
 Winding Machines)
 Columbia M. W. & M. I. Co.
 Electric Service Sup. Co.
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 Calls)
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 Replacers, Car
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 Electric Service Sup. Co.
 Resistance, Grid
 Columbia M. W. & M. I. Co.
 Resistance, Wire and Tube
 General Electric Co.
 Westinghouse Elec. & M. Co.
 Resistances
 Consolidated Car Heating Co.
 Retrievers, Trolley (See
 Catchers and Retrievers,
 Trolley)
 Rheostats
 General Electric Co.
 Westinghouse Elec. & M. Co.
 Roofing, Car
 Pantasote Co., The
 Sanders, Track
 Brill Co., The J. G.
 Columbia M. W. & M. I. Co.
 Electric Service Sup. Co.
 Nichols-Lintern Co.
 Ohio Brass Co.
 Sash Fixtures, Car
 Brill Co., The J. G.
 Sash, Metal, Car Window
 Hale-Kilburn Co.
 Scrapers, Track (See Clean-
 ers and Scrapers, Track)
 Screw Drivers, Rubber
 Insulated
 Electric Service Sup. Co.
 Seating Materials
 Brill Co., The J. G.
 Pantasote Co., The
 Seats, Bus
 Hale-Kilburn Co.
 Heywood-Wakefield Co.
 St. Louis Car Co.
 Seats, Car (See also Rattan)
 Brill Co., The J. G.
 Hale & Kilburn Corp.
 Heywood-Wakefield Corp.
 St. Louis Car Co.
 Second-Hand Equipment
 Electric Equipment Co.
 Michaels, Hyman Co.
 Snyder Corp., The S.
 Transit Equipment Co.
 Zelnicker Supply Co., W. A.
 Shades, Vestibule
 Brill Co., The J. G.
 Shovels
 Hubbard & Co.
 Shovels, Power
 Allis-Chalmers Mfg. Co.
 Brill Co., The J. G.
 Signals, Car Starting
 Consolidated Car Heating Co.
 Electric Service Sup. Co.
 Nat'l Pneumatic Co., Inc.
 Signals, Indicating
 Nichols-Lintern Co.
 Oskel Equipment Co.
- Signal Systems, Block
 Electric Service Sup. Co.
 Nachod Signal Co., Inc.
 Union Switch & Signal Co.
 U. S. Electric Signal Co.
 Wood Co., Chas. N.
 Signal Systems, Highway
 Crossing
 Nachod Signal Co., Inc.
 U. S. Electric Signal Co.
 Slack Adjusters (See Brake
 Adjusters)
 Slag
 Carnegie Steel Co.
 Sleet Wheels and Cutters
 Anderson M. Co., A. & J. M.
 Columbia M. W. & M. I. Co.
 Electric Ry. Equip. Co.
 Electric Service Sup. Co.
 Nuttall Co., R. D.
 Smokestacks, Car
 Nichols-Lintern Co.
 Snow-Plows, Sweepers and
 Brams
 Brill Co., The J. G.
 Columbia M. W. & M. I. Co.
 Consolidated Car Fender Co.
 Snow Sweeper, Raitan
 Heywood-Wakefield Co.
 Soldering and Brazing (See
 Welding Processes and Ap-
 paratus)
 Spikes
 Amer. Steel & Wire Co.
 Special Adhesive Papers
 Irvington Varnish & Ins. Co.
 Special Trackwork
 Lorain Steel Co., The
 Splicing Compounds
 Westinghouse Elec. & M. Co.
 Splicing Sleeves (See Clamps
 and Connectors)
 Springs, Car and Truck
 Bemis Car Truck Co.
 Brill Co., The J. G.
 St. Louis Car Co.
 Taylor Electric Truck Co.
 Sprinklers, Track and Road
 Brill Co., The J. G.
 Steel and Steel Products
 Morton Mfg. Co.
 Steps, Car
 Morton Mfg. Co.
 Stokers, Mechanical
 Babcock & Wilcox Co.
 Westinghouse Elec. & M. Co.
 Stop, Signals
 Oskel Equipment Co.
 Storage Batteries (See Bat-
 teries, Storage)
 Strain Insulators
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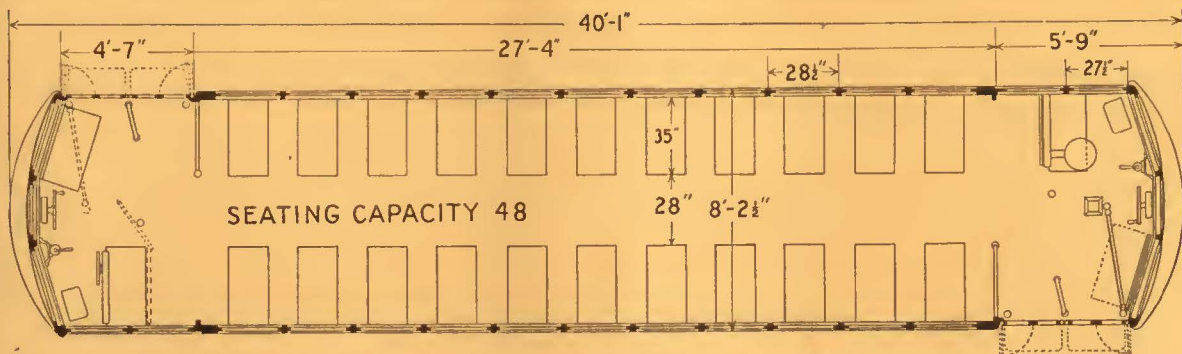
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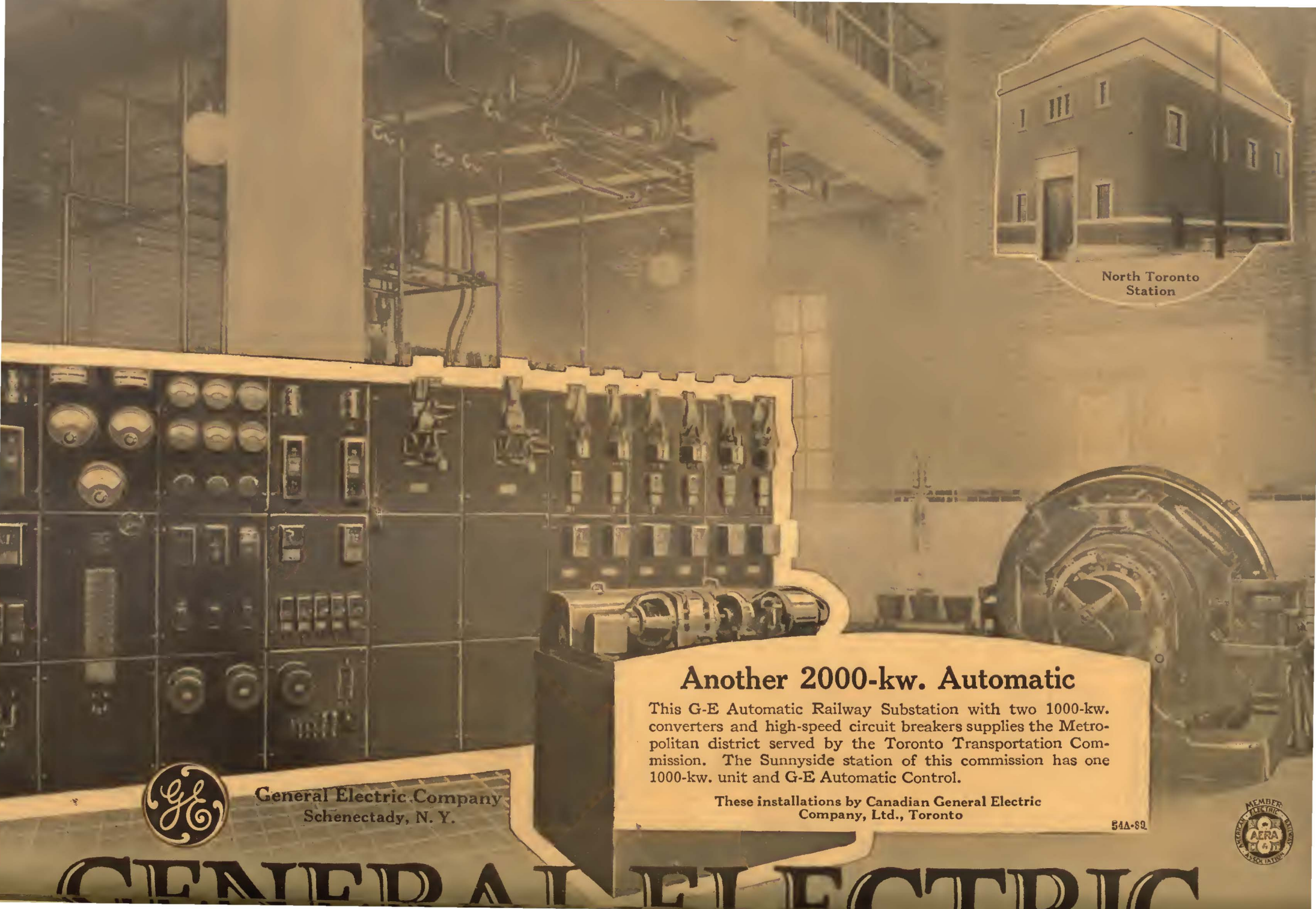
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