

ELECTRIC RAILWAY JOURNAL



A section of the track of the Nashville Railway & Light Co., Nashville, Tenn. This track is cushioned with Carey Elastite Rail Filler.



H. C. Benagh, Engineer of Maintenance of Way for the Nashville Railway & Light Co., Nashville, Tenn. Mr. Benagh has had long experience with electric railway engineering problems, and is a recognized authority in the South.

“It absorbs vibration, and protects the pavement”

says H. C. BENAGH

“IN the construction of a T-Rail track along a paved street—especially where the wearing surface is asphaltic—the flangeways are the weak points in the pavement.” That is the view recently expressed by H. C. Benagh, Engineer of Maintenance of Way for the Nashville Railway & Light Co., Nashville, Tenn.

“The dust and dirt accumulating in these flangeways are packed and crushed downward into the wearing surface. This causes a rupture of the street paving, and rail vibration tends to make the situation worse.

“The harmful effects, we find, can be greatly minimized by installing an asphaltic rail filler along the rail. This resilient compound forms a most satisfactory flangeway. And in addition, it absorbs the shock and vibration to a large extent. Thus, in both ways, it protects the pavement contiguous to the rails.”

Over 12,000 feet of Carey Elastite System of Track Insulation have been installed on the lines of the Nashville Railway & Light Co. with results that are highly satisfactory to the Company. The mastic compound of asphalt and fibre used in the Carey System comes in preformed slabs to fit any rail. Easily driven into place. And the small cost of installation is quickly regained by savings effected in maintenance. Write today, for full details.



THE PHILIP CAREY COMPANY, Lockland, Cincinnati, Ohio



“Prosperity Special”

Enroute to Richmond

FIFTEEN modern, light-weight trolley cars, loaded on one train, and comprising a “Prosperity Special”, traveled half across the country from St. Louis to Richmond, Va.

Into every city and town, through its hundreds of miles of travel, this “Prosperity Special” carried evidence of the progressive spirit of the Virginia Electric and Power Company.

These new cars bring better trolley service to Richmond, more comfortable and convenient service. Each

has cushioned seats for forty-four passengers. All have Westinghouse 508 motors and Westinghouse control.

Attracting and holding patronage will be easier in Richmond—now—as it is in hundreds of other cities where new, modern cars are in service. Long and economical service is assured the City of Richmond by Westinghouse equipment, the product of years of experience and intimate contact with the industry.

Discuss your problems with the Westinghouse representative.

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1926

Westinghouse

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ELECTRIC RAILWAY JOURNAL

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News!

IN ADDITION to its other functions, the JOURNAL is a weekly newspaper of the electric railway industry. Regular correspondents are located in the leading cities of this country and Canada. An office is maintained in London and important transportation developments throughout the civilized world are reported by special correspondents located at strategic points.

News correspondents visit frequently the railway offices in their territory. They are trained newspaper men and know the value of "news" while it is timely. Telegrams and air mail are used freely to get important new developments before the industry at the earliest possible moment. It is not at all unusual for the JOURNAL to print important general or financial news of the industry before it reaches the daily papers, despite their elaborate news-gathering mechanism. The co-operation of many railway men who make a practice of mailing or wiring at our expense news of developments on their own properties for the information of the industry has been no small factor in making these results possible.

The large volume of news material received each week is carefully culled, selected and condensed, in order to save the reader's time and give him the pertinent facts. The policy of the News Department is to give the facts fully and concisely, yet in a readable way; to confirm the correctness of information received and to print it uncolored, without fear, favor or malice.

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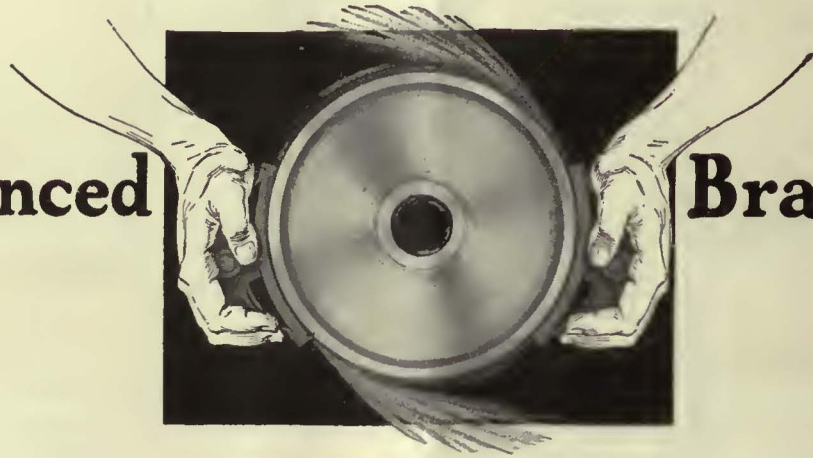
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Balanced



Braking

In line with modern principles

Higher rates of retardation are demanded as a part of the program of speedier suburban and street railway service. With two brake shoes per wheel instead of one, the clasp brake is admirably suited to producing maximum retarding effect, with minimum strain and wear on truck and journal parts.

Balancing the heavy braking forces on opposite sides of the wheel has many advantages

1. Less journal box wear.
2. Permits wheel to follow freely, vertical inequalities in track.
3. Makes use of flanged brake shoes practical.
4. Higher co-efficient of friction.
5. Divides energy absorption between two shoes, thus reducing heating effect from brake application.
6. Reduces frequency of brake shoe replacements on the car.

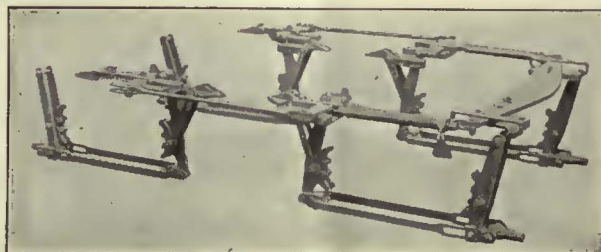
AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS

American Multiple Unit Clasp Brake





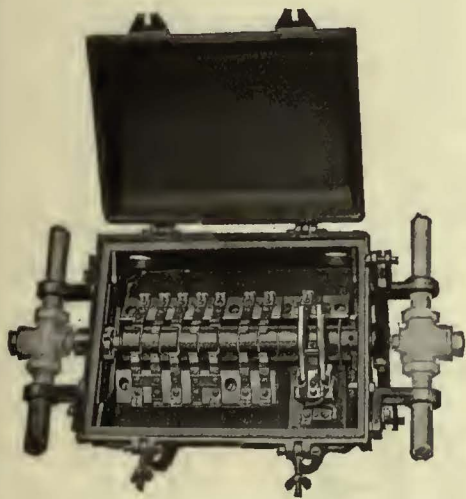
Tomlinson Couplers for 100 New Chicago Surface Lines Cars

TO PROVIDE its usual high standard of service for three-fourths of the riders in Chicago, in the presence of a phenomenal increase in street car riding, the Chicago Surface Lines recently purchased 100 additional new cars, equipped for multiple unit operation.

On all these new cars Tomlinson Automatic Couplers, Form 10, are standard equipment. Previous use which demonstrated the effectiveness of Tomlinson Couplers, led to this repeat order.

Always in alignment, ready for action, and fully automatic in operation, these couplers insure safe, convenient and rapid assembly of cars in rush periods. And the design and construction are such as to give long, care-free operation under the widely varying conditions which must be met in city service.

Complete details gladly sent on request, without obligation.



Electric Disconnecting Switch for Tomlinson Couplers

Ohio Brass Company, Mansfield, Ohio
 Dominion Insulator & Mfg. Co., Limited
 Niagara Falls, Canada

164C

Ohio Brass Co.  **PORCELAIN INSULATORS
 LINE MATERIALS
 RAIL BONDS
 CAR EQUIPMENT
 MINING MATERIALS
 VALVES**

Buyers who buy specially treated poles for their long years of service help check waste of trees. Thus the Yearstick, a measure of service, becomes also a measure of forest conservation.



The Yearstick— a new measure for pole buyers

THE yardstick tells you the dimensions of the poles you buy. That's all. But a new measure, the Yearstick, measures what you cannot see—the years of service.

When you buy poles, apply the Yearstick—and see the long years of service in a specially treated pole. Careful pole buyers have found that pine poles, for instance, creosoted by scientific pressure treatment, defy rot and moisture, and that the active life of a pole so treated is doubled.

Let Graybar Electric specialists show you how treated poles measure longest—by the Yearstick.

OFFICES IN 58 PRINCIPAL CITIES. EXECUTIVE OFFICES, 100 EAST 42ND ST., NEW YORK.

GraybaR

Successor to Western Electric Supply Dept.

Electrical Supplies



THE GRAYBAR TAG UNDER WHICH 60,000
QUALITY ELECTRICAL SUPPLIES ARE SHIPPED



An American Product that goes abroad *must* be good

THE merits of Twin Tie construction are getting the rapid recognition of foreign engineers, a test for any product in the face of low costs abroad and unfavorable rates of exchange for the foreign buyer.

In 1925 shipments were made to Barcelona in Spain, Birmingham, England, Monte-

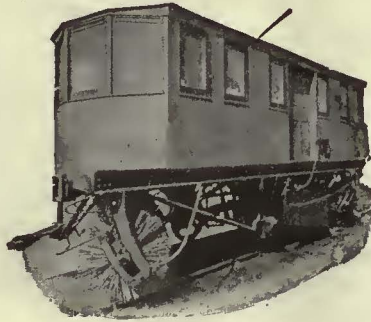
video, Uruguay, Rio de Janeiro in Brazil, Havana, Cuba and to Mexico City—nearly 9 percent of our total business was for export. This does not include the Canadian Electric Railways whose Twin Ties are made in Canada of Canadian steel by the Sarnia Bridge Company of Sarnia, Ontario.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track — Permanent Foundation

SNOW!



*it's sure
to come*

Get ready now—check up on
your snow-fighting equipment
for the coming winter

McGuire-Cummings Single and Double
Truck Snow Sweepers and Plows are
“Standard Equipment” on practically
every Electric Street Railway Line in the
United States and Canada that has snow
to contend with.

CUMMINGS CAR AND COACH COMPANY

Successors to McGuire Cummings Mfg. Co.

111 W. Monroe St., Chicago, Ill.

Light Weight City and Interurban Cars

Single and Double Truck Snow Sweepers and Plows

ESSCO BULLETIN

Devote this week
to improving —

Convenience!

Keep these always
in mind -----

*Safety
Publicity
Illumination
Convenience
Maintenance*

TO HAVE reliable push buttons within easy reach of every passenger is a convenience greatly appreciated by the riding public.

The use of Faraday Passenger Signal Systems assures this reliable service to your passengers at all times. They eliminate the chance of numerous complaints and arguments about not stopping at the proper corner.

Let us send you more complete information.

ELECTRIC SERVICE SUPPLIES CO.

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FARADAY CAR SIGNALS



Type B
Push Button



Type A
Push Button



No. 19103
Buzzer



FARADAY Car Signal Systems are made for every requirement—high or low voltage systems, buzzers, vibrating bells or single-stroke bells, resistance panels, flush or surface type push buttons.

TIMKEN



In Detroit

— where the city's rapid growth has congested the streets with a terrific flow of traffic, the Detroit Motorbus Company operates 243 motor coaches — equipped with Timken Axles, front and rear.

These vehicles are averaging 968,000 miles per month, and the operating company reports, "Axles are rendering extremely satisfactory service."



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES



Building up a

**YELLOW
COACH
FLEET**

in Washington

by the
WASHINGTON
RAILWAY and
ELECTRIC CO.





They started with

2



From two to twenty-one—within a year!

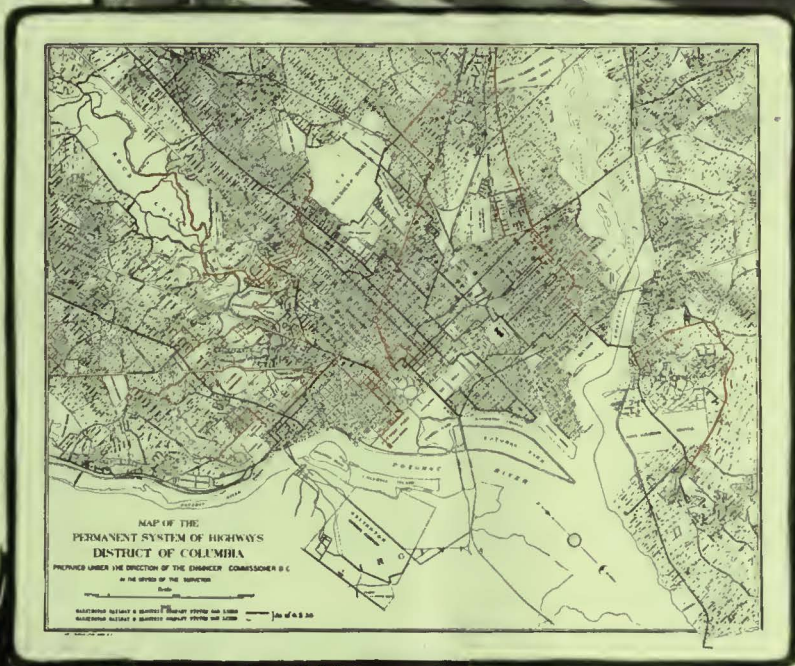
Just about one year ago the Washington Railway & Electric Company bought their first Yellow Coach. Adding new equipment, as the need arose, they now operate 23 Yellow Coaches; 18 Type Z, 6-cylinder 29-passenger type and 3 type X.

That's the way the Washington Railway & Electric Company has been building its fleet of Yellow Coaches, choosing Yellow Coach equipment on the basis of performance.

Washington's riding public looks to the Washington Railway & Electric Company for good transportation service. Communities not served with street cars demand motor coaches to bring them to the shopping and business sections. The operations of the traction company provide, in many cases, that traction service be augmented with auxiliary coach lines, carrying a transfer privilege.

And into this picture fit Yellow Coaches, bearing the brunt of motor coach service and representing the majority of coach equipment.

Behind the growth of this Yellow Coach fleet are reasons that account





for Yellow Coach selection by the Washington Railway & Electric Company. Investigation shows that—

- 1 The railway company is convinced that Yellow Coaches are past the experimental stage. It knows that in buying Yellow Coaches it takes no chances.
- 2 That the equipment has been free from mechanical trouble, thus proving reliability of service on the road, where money is earned.
- 3 That despite constant starting and stopping, Yellow Coaches have failed to develop any weakness. They are built to stand the gaff, and are demonstrating this ability.
- 4 That, after careful comparison and operating check-up, Yellow Coaches are looked upon as a very finished piece of work and a safe investment.

Such reasons form a good gauge for buying, and in all parts of the country operators are increasing their Yellow Coach fleets and standardizing on Yellow Coach equipment. They are duplicating the findings found at Washington and investing accordingly.

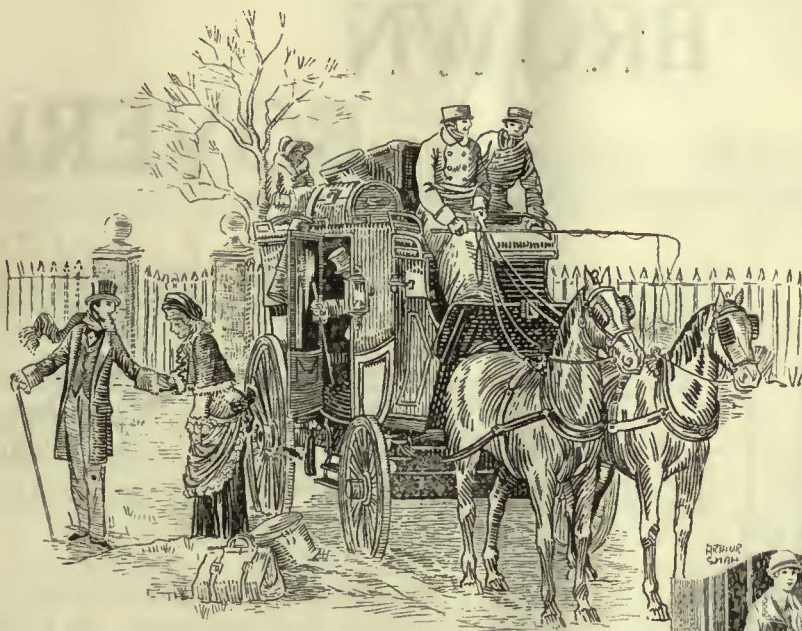
The engineering skill and vast operating experience of Yellow Coach *plus* the unlimited technical resources of General Motors assure economy of operation, financial stability and freedom from all danger of orphan equipment.

YELLOW TRUCK & COACH MANUFACTURING CO.

SUBSIDIARY GENERAL MOTORS CORPORATION

5801 WEST DICKENS AVENUE, CHICAGO, ILL.





THEN AND NOW

IN THE early days of transportation, the opening of a carriage, railway coach or chair door was a slow and pompous ceremony. Today—in cars equipped with National Pneumatic Door and Step Controlling Mechanisms—the opening of a door is equally as courteous but much quicker and far more convenient for the passenger as well as for the men who operate your cars.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

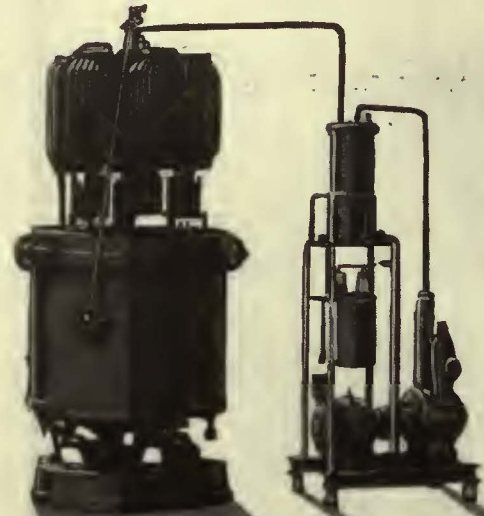


American BROWN BOVERI

1. High efficiency

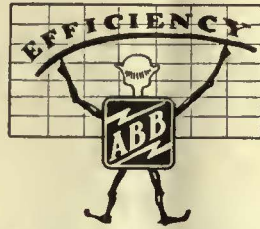
From less than one quarter rated capacity to loads far above rating, the efficiency curve is high. Not merely high, but materially higher than for the standard rotary converter of equivalent capacity.

Where load fluctuations are so extreme and so constantly in progress, as in electric railway operation—the mercury arc power rectifier will pay for itself in actual savings at the A. C. switchboard.



Principal Products

Mercury-Arc Power Rectifiers (steel enclosed)	Mining Locomotives	Relays
Electric Locomotives—for any system of current, high or low tensions	Switches, Controllers and all Auxiliary Equipment	Turbo Compressors and Blowers
Complete equipment for rail- way electrification	Steam Turbo Generators for normal or high pressures and superheats	Electric Furnaces
Rotary Converters	Automatic Regulators	Induction Regulators
Motor Generators	Oil Switches	Ships
Diesel-Electric Locomotives	Condensers and Auxiliaries	Diesel Driven Turbine Driven Electrical Driven
		Structural Steel Fabrication



Mercury-Arc Power Rectifiers

over wide range of load!

Chief Advantages

- (1) Efficiency high over the whole working range.
- (2) Simple operation and minimum attention.
- (3) No synchronising.
- (4) Very high momentary overload capacity and insensibility to short circuits.
- (5) Negligible maintenance.
- (6) Low weight. No special foundations.
- (7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.
- (8) New sub-stations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

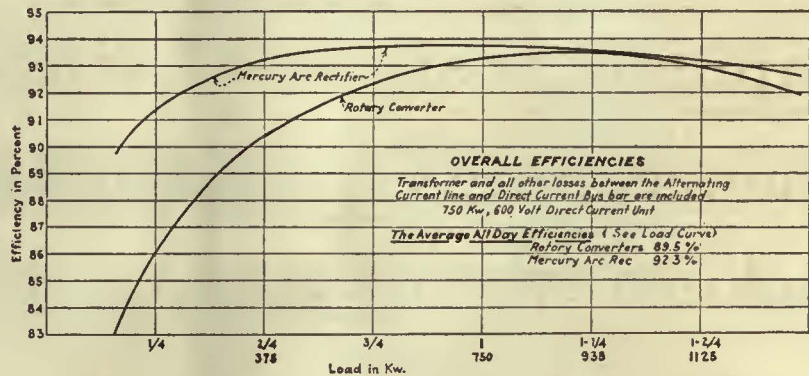
With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Inter-urban Railroad in one of the Eastern States. The substation

rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

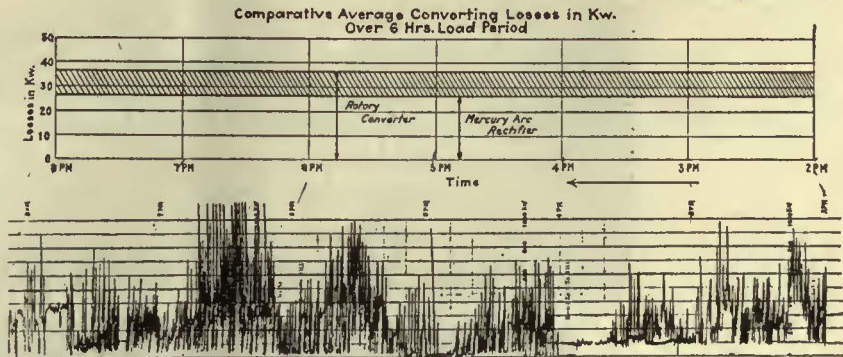
for Rotary Converters..... 89.5%
for Mercury Arc Rectifiers..... 92.3%



The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is \$730.00, which is

the INTEREST on MORE THAN \$10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.



American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y.

Camden, New Jersey

230 South Clark Street, Chicago, Illinois

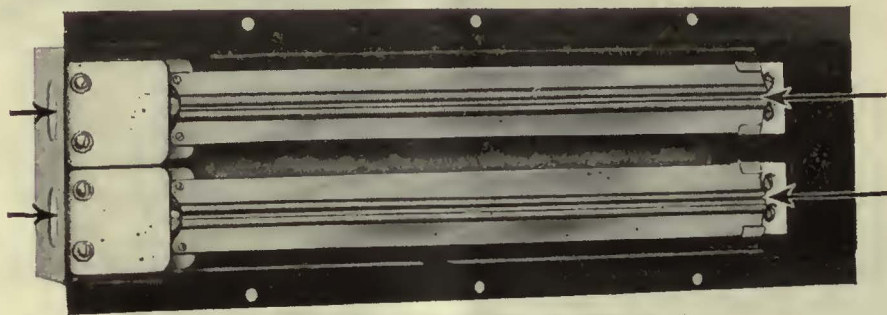
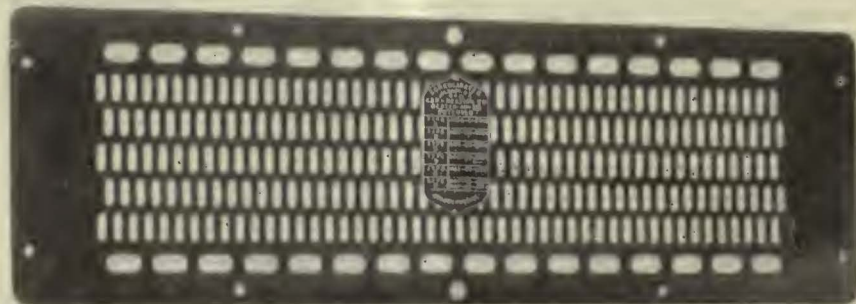
AMERICAN BROWN BOVERI

CONSOLIDATED HEATERS

for

ARTICULATED CARS

Thirty-five units (105 cars) of the new Articulated Triplex Subway cars of the New York Rapid Transit now being built are to be equipped with Consolidated Car-Heating Co.'s enclosed type Electric Heaters.



Terminals completely enclosed.
Wires clamped.
Positive connections.

G. E. brass sheath wire units

CONSOLIDATED CAR-HEATING CO.

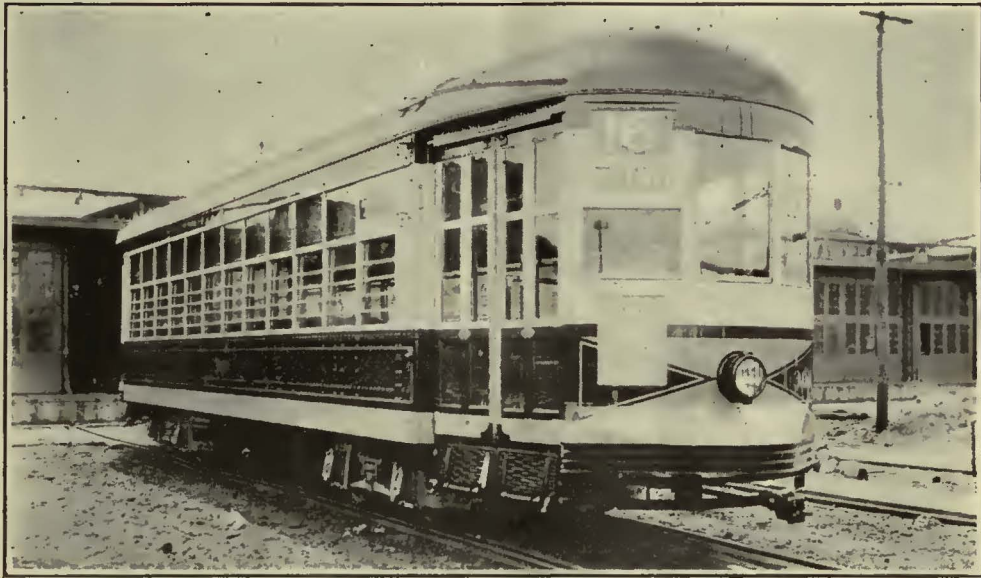
CHICAGO

ALBANY

NEW YORK

Memphis Street Railway

—installs *New Modern Cars*—◆
—stream line painting and plush upholstered seats

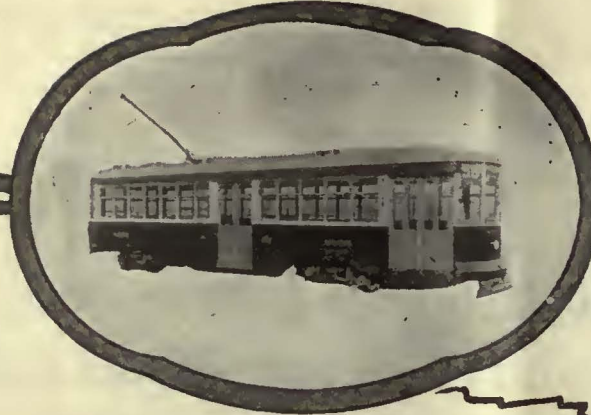


32 of these new cars *just delivered*
to Memphis Street Railway by the
Quality Shops



Further particulars on request

St. Louis Car Company
St. Louis, Mo.



in Philadelphia

Service Talks

PHILADELPHIA RAPID TRANSIT COMPANY

Under Mitten Management

June 22, 1926

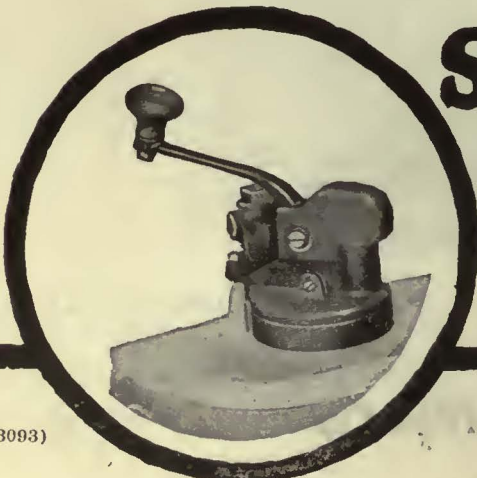
Vol. 7, No. 14

WHY THE ONE-MAN CAR

Rumblings are occasionally heard against the one-man car. To Mitten Management, however, and to the car-riding public, this form of transportation has sold itself because it has enabled P. R. T. to increase service, at the same time showing a better accident record than two-man operation. If it were not so, P. R. T. would be the last to advocate its use, since accidents aside from the humane standpoint, are the most costly by-product of transportation.

Mitten Management recognizes as its greatest problem the desire on the part of car-riders for better service as expressed in more seats to passengers carried. The one-man car is a step in this direction, because it is cheaper to operate and permits of more service for the same cost. When operated in connection with subway fare collection, it also enables a speeding up of service. The one-man car is particularly expedient at this time, in that economical operation is essential if P. R. T. is to help carry the operating loss resulting from Broad street subway operation.

The Philadelphia Rapid Transit Company now operates over 900 cars equipped with Safety Car Control Devices that permit one-man operation. This practice represents one phase of the Mitten Management's Policy to create public good will by giving transportation worthy of the city it serves, and giving it in perfect safety.



SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



...each, in fact the background for the reception room in front is furnished in the style used during the Colonial period.

EXCLUSIVE BUSES FOR RICH PATRONS

Kansas City, June 25.—Kansas City is operating de luxe busses "for millionaires." The busses make the trip to the city's most select residential district and charge 25 cents a passenger.

The busses are the limousine type, equipped with every safety and comfort device. The exterior is painted in blue and gold. The seats are richly upholstered with overstuffed cushions in blue, and soft velvet carpets are on the floors.

Dainty blue drapes cover the large glass windows, harmonizing with the deep color scheme of the interior decorations.

The busses make it possible for patrons to travel to and from town on regular schedule with all the comforts of their own motor car, eliminating traffic and parking difficulties.

ORDERS PLACED FOR MORE GAS ELECTRIC CARS BY RAILROADS

Philadelphia, Pa., railroad companies have

Westinghouse Air Brakes!



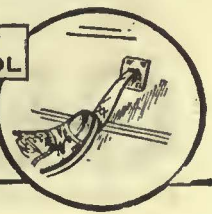
WESTINGHOUSE TRACTION BRAKE CO.
AUTOMOTIVE DIVISION
General Offices and Works, WILMERDING, PA.



HAND CONTROL

WESTINGHOUSE
Automotive AIR BRAKES

FOOT CONTROL





Grade-M Gearing typifies those products of General Electric which have profited so much from adequate facilities as well as from a sincere desire to produce equipment that will render the fullest measure of satisfying service.

DAY after day Grade-M Gearing is making new records of superlative service. Despite the exacting conditions from which the operation of railway gears and pinions is inseparable, Grade-M continues to exhibit an endurance that measures up to the highest modern standards.

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of *Street Railway Journal* and *Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 68

New York, Saturday, August 14, 1926

Number 7

The Radio Sells Rides at Melbourne

ELSEWHERE in this issue appears an abstract of a radio talk by W. O. Strangward, secretary of the Melbourne & Metropolitan Tramways Board, on the ticklish subject of "Tramway Finances and Fares." One may suspect that the average radio listener is not keen on hearing statistics and why his fare had to be increased, but a reader of the article will realize that Mr. Strangward's simple and pleasant handling of the subject must have brought the subject home effectively to his listeners. Some of the flavor has remained even in the abstract imposed by space limitations.

This talk is only one in a series of twenty-minute lecturettes broadcast every fortnight by heads of the different departments. Thus the chairman has discussed "The Constitution and Activities of the Board"; the chief engineer, "Building a Tram Line and Planning the Tramway Development of the Metropolis"; the manager, "How the Trams Are Run"; the rolling stock superintendent, "The Building and Maintenance of a Tramcar," and one of the staff officers, "A History of Melbourne's Street Transportation."

It is quite obvious from the foregoing alone that the Melbourne tram-bus system is heartily in accord with the "tell-the-people" policy which our own W. H. Sawyer recently recommended to the government light and power officials. Furthermore, our Melbourne brethren have gone American trolley broadcasters a kangaroo's jump further through weekly use of the radio for direct ride-selling suggestions. For ten minutes every Friday night the radio fan receives suggestions on how to use the service for travel to this or that pleasure objective on Saturday and Sunday. The best proof that these "lecturettes" and shorter talks are appreciated is that the broadcasting station makes no charge for this valuable contact with the public.

Bus Progress in Europe

WHILE the use of the bus as an integral part of the general transportation system has been progressing rapidly in this country, development in Europe has been somewhat less extensive. The total number of buses now in operation in Europe is not much more than 30,000, as compared with about 80,000 in the United States.

In the United Kingdom the number is estimated to be approximately 18,000, of which some 5,500 are in London. The latest figures obtainable from official sources in France, appearing elsewhere in this issue, show a total of 4,500 buses in operation, of which 1,368 are in Paris. Throughout the rest of Europe the best available figures indicate that there are not more than 10,000 additional buses.

London and Paris have more bus service than cities

of corresponding size here. Outside of these two capitals, however, bus operation has not been developed on a scale comparable to that in the United States. Inter-urban service in Europe has lagged far behind its counterpart in this country.

Compared to the situation in Europe, development has progressed with remarkable rapidity here. Today nearly all the large American cities are planning additional bus service. Intercity service has been growing by leaps and bounds. The contrast illustrates once more how the riding habit has been developed in the United States and how greatly the transportation demands here exceed those of other countries.

Latent Public Opinion Aroused at Newark, Ohio

NEWS of the shutting down of the Southern Ohio Public Service Company's electric car and bus operation in Newark is published elsewhere in this issue. Reports of the causes of this action make a story of political chicanery startling in its stark disregard of the best interests of the riding public. As usual the man on the street was unaware or uninterested in the machinations of his representatives until they resulted in the loss of a valuable service. Only then did the public itself take cognizance of the plight of its transportation company. But, bad as the situation appears on its face, there is now a ray of hope in the attitude taken by the public, once the facts were brought home by a shut-down in service.

The system at Newark is a part of the old Columbus, Newark & Zanesville Electric Railway that has twice passed through receivership and about a year or so ago emerged from a second reorganization. Zanesville, a part of the same system, has granted the new company a favorable franchise and is now receiving an excellent service with twenty new cars and several high-grade buses. Shortly after the Zanesville settlement Newark granted a similar franchise to the company for 25 years. In accordance with the terms of this franchise the company asked the Council for a 10-cent cash, four for 25 cents fare, the same as has existed in Zanesville for many months. No action resulted, and an attempt by the company to institute this fare resulted in an injunction. But the city went further. It granted a city-wide franchise at a 5-cent fare to an independent bus line despite the terms of the railway franchise. In an attempt to provide service the company had previously co-ordinated all bus operations with its own by buying up the almost worn-out competing buses and had acted in good faith in an attempt to provide an adequate service in Newark.

So much for history. No sooner had operations ceased than an indignation meeting was held that vented its wrath against the Council and the new bus

company alike. A special meeting of the Council called for Tuesday night was not held; perhaps the indignation meeting of 600 citizens was too ominous.

At first blush, the Newark situation looked like another abandonment, and perhaps it may so result, as the company is justly firm in its decision. But despite the seeming apathy of the public during the negotiations, it now manifests an interest in the situation that promises to bring quick and definite action. It is this aroused public opinion, grounded in a faithful performance of public service, that renews faith in the security of a public transportation service founded on public friendship.

Balanced Consideration Important in Improving Cars

INTEREST in the improvement of electric railway cars is growing apace in the industry. There is evidence on every hand that railway operators and car manufacturers are taking active steps to provide cars with features that will be attractive to passengers. There is a stimulated interest in paints and finishes, floor covering and seat materials. The industry is beginning to move definitely toward the objective of supplying its rides in a more attractive package.

Now, however, that the industry has begun to make definite progress in improving its cars a word of caution may not be amiss. Here and there are indications that rapidly growing enthusiasm may soon result in overstepping the bounds of practicability. Attractiveness of finish and fittings does not call for "doodads." Street cars are mass transportation vehicles, and any features which are obviously unsuited to such service become incongruous. The limits of both good taste and reasonable maintenance cost may be easily exceeded. If this is permitted to occur the very object for which improvements are made will be defeated.

As in the case of light-weight construction, one-man operation, use of buses and similar movements which have taken place in the industry there is a tendency in some instances to swing from one extreme of the pendulum to another. From slat seats to lace curtains offers a range within which there is a happy medium of desirable and practicable improvement.

In such a movement as this there is also a tendency to grab a hobby and ride it hard. A particular color, a type of floor covering or seat material is not a short cut to attractive cars. A given seat material may or may not be justified under certain operating conditions. But it is only when judged in combination with the general character of the rest of the interior that the final effect produced can be determined. On the exterior paint helps materially and it covers a multitude of sins. But the paint in itself will not entirely compensate for awkward lines and angles that result from inadequate consideration of the general effect produced. The exterior lines and appearance of cars may well be the subject for much more attention than this phase of design is receiving.

All this may be summarized in the single word "balance." In the past there was a tendency to abandon considerations of merchandising attractiveness in the effort to achieve economy of maintenance. That policy has proved to be unwise. In the new movement looking to more attractive cars, however, consideration of maintenance economy must not be entirely abandoned.

A Victory Without Laurels in California

MOVING horrors in California are something of an anomaly. With "movie" horrors the case is different, but that is neither here nor there. One of the California cities recently had what some were inclined to think was a moving horror. The case got into the courts, but the judge decided on the basis of the facts, and the facts alone. So the electric railway won the right over the city's objections to use advertisements on the outside of its cars. The learned jurist admitted that the advertisements in question were not pleasing to the eye, but added that the esthetic was not a consideration in deciding what constituted the peace and safety of the citizens. Thus one sees the limitations of the law and likewise its impotence as a social force.

But the need for things of beauty in car advertising is not indigenous to that state. Once a railway imbibes the psychology of picture advertising as regards the transportation business its esthetic sensibilities will be too keen to permit inharmonious insignia to screech their messages from the side panels of the cars. This increasing appreciation of the need of art in industry has been stressed before in *ELECTRIC RAILWAY JOURNAL*, notably in the issue of Aug. 22, 1925. It is being achieved in increasing measure in this industry. Art in industry is not unattainable. Only a few weeks ago the *New York Times*, in commenting on the advertising show at the fifth annual exhibition of the Art Center in New York, said that the exhibit displayed "increasing ability of artists, working in harmony with the demands of business, to produce pictures of intrinsic beauty and merit."

Considering the enormous sums of money being expended yearly to perfect art in advertising and the resultant stimulating effect on the public, it should be construed as an arraignment for a judge to rule that the advertisements were more or less of an eyesore even if the safety of the patrons were not impaired. The slogan "it pays to advertise" has long since been amended to "it pays to advertise well." Witness the heights to which soap, soup and sermons have transported us in recent years. In view of the court's comment the California railway won a legal and technical victory only. Some day when a judge rules that advertising on the outside of cars is permitted because it is a mental and moral stimulus the victory for the railway will be a glorious one.

Soliciting Contributions with a Club

THERE exists in the utility industries an insidious practice. It is the policy of exacting tribute from manufacturers in the form of advertising in house organs, subscriptions to employees' benefits, purchase of customer-ownership stock and similar forms of "voluntary contributions" which are unwarranted impositions upon the seller's relationship with the purchaser.

Should a railway wish to encourage a benefit performance for its disabled employees, then immediately the equipment manufacturers who have enjoyed this company's trade in the past, or who hope to share in it in the future, are "invited" to take a page in the program which is to be sold at the performance. Should the mutual aid association of some utility find that its monthly bulletin is proving somewhat of a burden, there

is always the opportunity graciously to allow a few manufacturers to express their friendship for the purchaser by taking space in the publication. Should a utility decide to sell a block of stock to its customers to encourage community interest in the company's welfare, again the manufacturers are canvassed to participate, although it could hardly be imagined that their friendliness toward the utility needed bolstering up.

The practice has reached a point where some one ought to ask the utilities to consider these requests in their true light. They are not justifiable requests. In each particular instance the amount at stake is no very disconcerting sum. And often the cause is a worthy one. But the manufacturer must deal not with one case nor with ten, but with hundreds of such proposals every year. In one instance the annual outlay in these channels reached nearly 1 per cent of the gross income for the year or an amount which, if added to net profit, would increase the sum available for dividends by 6 per cent.

There is no reasonable ground for levying tribute against the manufacturer under the guise of advertising. This is simply an indirect way of soliciting contributions—with a club in the hand of the solicitor. Customer ownership of stock is an excellent plan for raising capital and building good will, but manufacturers selling to the utilities are not customers and they cannot afford to tie up their funds in such paper. Such transactions are based on the relationship between buyer and seller in a way that transcends the limits of modern business ethics.

Traffic Congestion Relief

Needs More Active Community Spirit

ACTIVITY by railway men in grappling with the growing seriousness of traffic congestion in American communities is not only justified by their direct interest in the mitigation of this widespread evil but is to be commended as a public-spirited effort to apply their experience as transportation men to the service of their communities.

There is always danger, however, that their motives may be questioned. The very growth of traffic congestion to its present intensity is attributable in large part to the number and variety of interests responsible and affected. There has been a lack of any agency which on the one hand had the incentive to tackle this situation seriously, while at the same time having a broad enough community consciousness to knit together the many diverse elements interested in some phase of the problem.

It is becoming increasingly evident that the local common-carrier transportation companies have the broadest interest in the subject, and that where the approach is made in such a way as to eliminate any suspicion of selfishness, they can lead the way to effective improvement. In Chicago notable relief has been accomplished through the efforts of the Chicago Surface Lines, working in conjunction with the Association of Commerce.

Retail merchants are quickly alert to any move in the direction of traffic regulation. Real estate boards, automobile and automobile supply dealers, and shippers are all directly interested, in addition to the general automobile driving public, both as individuals and through automobile associations. In general, the attitude of most of these groups tends to become a defensive one whenever the subject of traffic regulation is approached.

In most instances the interests of the community as a whole take a secondary position.

Success on the part of local transportation men in taking the leadership looking toward congestion relief is dependent to a large extent on their own breadth of view and method of approach. Local chambers of commerce furnish an excellent medium for contact with the other agencies affected. When this contact is made with a flexibility of mind that permits the other fellow's position to be so thoroughly understood that his co-operation may be won in making unbiased studies to determine the facts of the situation and their effect on his own business, definite progress toward relief may be expected.

Properly Designed One-Man Cars

Earn Their Way to Popularity

MODERN one-man cars continue to show real improvements in operating conditions wherever they have been instituted with due regard to traffic requirements. An example of the case in point is found in the experience of three Fitkin properties which have recently taken definite steps to expand this form of operation. As recounted elsewhere in this issue, the Youngstown, Scranton and Altoona properties placed orders toward the end of last year for a number of light-weight one-man cars to be used in the various communities served. These cars have now been in operation for several months and have elicited nothing but words of commendation from railway men and patrons alike.

Of course the usual number of knockers were on hand to foretell dire happenings, such as retarded schedules, accidents and sundry evils. But no satisfaction has been accorded them; their prophecies have succeeded in arousing nothing more serious than the badinage of local wits, and the cars themselves have justified their existence from the first in reduced operating costs and in improved public good will. Particularly noticeable has been the evident pride in the equipment taken by the men who have been selected as operators of the cars. They feel the greater responsibility which has been accorded to them and measure up to it with an appreciable improvement in personal efficiency.

Here is an important element in the successful introduction of one-man operation. New and attractive equipment designed specifically for operation by one man helps to "sell" the new idea to both public and employees through the obvious improvement which is made. Remodeled old equipment lacks this "selling" feature and much of the opposition to one-man operation is attributable to attempts to utilize former old and heavy two-man cars.

The success of the venture was not prejudiced by a lack of adequate publicity on the part of the railways. In Youngstown, where the one-man car was being tried for the first time, a thorough educational campaign was conducted prior to the inauguration of the service to banish any prejudices which might be held by patrons of the lines affected. This is the essential step which all railway managements should take in making a similar change-over from two-man operation. If a person knows all about a thing he is less likely to shy away from it when asked to accept it as an everyday factor in his life. So a stressing of the manifest advantages of one-man cars cannot but prove beneficial as a preliminary step.

Record Cards of Many Types Used by Boston & Worcester Street Railway In Connection with Its New Bus Operations

Daily Gas and Lubrication of Vehicles										
MONTH _____ 19__										
Day	Mileage	Gas Used	Miles per Gal.	Qts. Engine Oil Used	Miles per Qt.	Lbs. Cup Grease Used	Miles per Lb.	Lbs. 600W Used	Miles per Lb.	
1	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
2	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
3	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
4	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
5	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
6	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
7	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
8	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
9	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
10	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
11	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
12	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
13	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
14	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
15	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
16	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									
17	Rev. Vehicles									
	Non-Rev. Vehicles									
	Other Vehicles									

Daily Garage Report

Weather condition _____ Date _____

Inspected and Oiled by _____ Lbs. Cup Grease Used _____ Lbs. 600W Used _____ Ebony Comp. _____

Boston & Worcester Street Railway Company

CONDITION OF MOTOR VEHICLE

INSPECTION AND REPAIRS

SPEEDOMETER READING _____ DATE _____ 19__

VEHICLE NO. _____

	Inspector's Name	Mark OK, or REP. if Required	Inspector's Name
ENGINE		Actuating Arm for Tie Rod	
Starting Crank Test		BRAKES—Service Condition	
Connecting Rods		— Service Rod Adjustment	
Main Bearings		— Emergency Condition	
Crank Bearings		— Emergency Rod Adjustment	
Wrist Pins		— Emergency Equalizing Rod	
Cam Gears		— Emergency Rad-on Rods	
Push Rods		CLUTCH	
Valves		AXLE, Front	
Valve Springs		— Rear	
Cam Shaft Bearings		Differential	
Staves		SPRINGS, Front	
		— Rear	
DRIVING SYSTEM		— Cross	
Oilier		— Hangers	
Exhaust Pipes		— Shackles	
Leaking Tank Case		COUNTER SHAFT BEARINGS	
Leaking Transmission Case		SPROCKETS	
Oil Cups		CHAFFS	
Grease Cups		WHEEL Bearings	
COOLING SYSTEM		Hubs	
Radiator		Front Wheel Alignment	
Pump		Rear Wheel Alignment	
Connections		TRANSMISSION	
Fan		Shifting Rod Pins	
Fan Bearings		Gear Shift	
Fan Belt		FRAME	
CARBURETOR		Cross Member Back of Motor	
GASOLINE FEED PIPE		Sub Frame	
SPEEDOMETER GEAR		ELECTRIC Starting System	
IGNITION SYSTEM		— Lighting	
Batteries		Body Outside	
Magneto		— Inside	
Coil		Doors	
Timer		Seats	
Spark Plugs		Windows	
Wiring and Connections		Guards	
GOVERNOR		Fare Boxes	
TIRTS—Front		Destination Signs	
— Rear		Heaters	
— Retaining Rings		Fare Extender	
STEERING GEAR			
— Knuckles, Right			
— Knuckles, Left			
— Arms			

FILL IN REVERSE SIDE OK _____

DAILY BATTERY CHART

Boston & Worcester St. Ry. Co. 192

Date _____

Bus No. _____

Bus No. _____

Bus No. _____

DAILY AIR CHART

Boston & Worcester St. Ry. Co.

Bus No. _____

Month _____

Date	FRONT		REAR			
	Left	Right	R. Outer	R. Inner	L. Inner	L. Outer
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

TIRE RECORD

NO. _____

MAKE _____ SIZE _____ DATE REC'D _____ MFG. NO. _____

COST _____ COST PER MILR _____

REASON REMOVED	Month	Mileage	Month	Mileage

TIRE CHANGE RECORD

Operator or Mechanic _____ 192

Coach No. _____

Time _____ AM _____ PM _____ Place _____

Position (check in square the tire removed or applied)

Front, Right Front, Left Rear, Right, Outside

Rear, Right, Inside Rear, Left, Inside Rear, Left, Outside

Spare Tire No. _____

Tire Removed—Make _____ No. _____

Tire Applied—Make _____ No. _____

Reason for Removal _____

Tire Applied—Make _____

Speedometer Reading at Time of Change _____

Send to Chief Engineer _____

NOTE—To be used by Garage Foreman Only

DAILY GASOLINE REPORT

Date _____ 192

Vehicle No.	Pump Reading	Gal.	Recd.	Std.	Speedometer Reading



Intercity Bus Operated by the Boston & Worcester Street Railway Passing the Historic Wayside Inn at Sudbury. The Highway Route Between Boston and Worcester Traverses Different Territory from that Served by the Electric Railway Line

Recovering Revenue Through Bus Operation

Boston & Worcester Street Railway Establishes Service on 44-Mile Route and Recovers a Daily Average of 500 Through Passengers—No Co-ordination with Rail Service

THROUGH bus service between Boston and Worcester was begun June 1 by the Boston & Worcester Street Railway. In some respects this adoption of service is unique. It is not supplementary to nor co-ordinated with the electric rail service, which has been and still is in operation by the same company. The route followed by the buses covers for the most part a distinctly separate territory, that adjoining the so-called "The Yellow One Trail," known locally as the Weston Road, passing the historic Wayside Inn and thence leading through Marlboro, Northboro and Shrewsbury to Worcester. Thus the company operates a service for passenger travel quite independent of existing rights of way, and in so doing has extended its field of service.

Secondly, this railway becomes the exclusive through passenger carrier between Boston and Worcester by means of buses. The ruling of the Massachusetts Department of Public Utilities has acknowledged to this company rights of priority in service and by such act has eliminated competition by independent bus operators who for more than a year have contested for the growing passenger travel between these two cities.

Establishment of motor bus service by this company is of interest for another reason also. Whereas it has been a not uncommon practice to substitute buses for electric cars, with the subsequent abandonment of tracks, in this case the procedure has been different. It is the intention to continue rail service over the regular line and to rehabilitate to an efficient standard both rolling stock and track. Justification for this plan is found in the growing revenue from an increasing electric freight service, a not inconsiderable proportion of the total income now derived by this company, as told in *ELECTRIC RAILWAY JOURNAL*, Nov. 5, 1925.

During the past year careful study was made of methods for increasing revenue from passenger travel and decreasing the cost of operation. Experience gained in the operation of ten street car type buses on branch lines of this company, the Framingham-Marlboro-Hudson, Framingham-Saxonville and the Framingham-Framingham Center routes, on which electric cars were abandoned, has proved invaluable as a basis on which to consider motor bus service on other routes within the territory served. For the reconstruction of 12 miles of branch line track and efficient rolling stock

more than \$100,000 was estimated as a first and immediate cost; against this figure was set an outlay of \$70,000 for new buses to operate along thoroughfares adjoining the track lines. The decision in favor of bus operation on these branches has been fully justified.

The problem of through bus service on the main line, on the other hand, involved a number of different problems. The route for a considerable portion is double track and on the western, or Worcester, end is on a private right-of-way. The highway adjoining the main-

each of 25-passenger capacity, are leased to the Boston & Worcester Street Railway at the rate of 30 cents per vehicle-mile, of which 5 cents is charged to depreciation of equipment. Not only is the holding company responsible for providing adequate equipment but it also assumes the responsibility of furnishing well-trained, reliable drivers. Fourteen have been selected for this service. Costs of operation and repair are carefully checked at the offices of the Boston & Worcester Street Railway.

Inspection of motor buses is made at the expiration of each daily run. On arriving at the garage the driver reports his speedometer reading, and after recording the gasoline pump reading he fills his supply tank and records again the final pump reading. Calculations of gasoline consumption and mileage are later carried out by the office force. The bus is then inspected by the garage attendant and entries made on daily record cards for air pressure in each tire, hydrometer readings of each battery, amount of lubricating engine oil replaced and pounds of grease required for replenishment of cups and containers.

At the expiration of each 5,000-mile run a thorough overhauling of each bus is made and a complete record kept of the condition of the motor vehicle. This practice insures an accurate accounting for the condition of the buses in operation. Tire records are maintained for individual tires and a form is used separately for each brand. Whenever special repairs are required a record is kept of both kinds of work and the cost. These are entered on a card, of which there is one kept separately for each vehicle.

The company has commenced a survey of a number of factors affecting cost of operation of vehicles employed on the regular Boston-Worcester run. Outstanding as a condition affecting economy is the matter of proper lubrication, both amount and quality. To this end experiments are in process and these require engine oil tests in regular routine travel. Five gallons of a specified oil are placed in a clean engine; after a day's run under definite mileage this oil is drained and tested for solids, viscosity and flash. Using again the same engine cleaned, and under similar conditions of traffic and mileage, other oils are subjected to tests. It is expected after these tests have been carried on for a reasonable time that data will be obtained that can be used to arrive at a decision as to the most suitable engine oil under actual conditions of operation. Similarly tire wear is being studied. The fact that much of the highway on this route is concrete with little crown and that curves are frequent and at places quite sharp warrants close attention to these items of cost keeping.

AVERAGE DAILY REVENUE INCREASED \$750

At the end of the first month of operation the record of passenger traffic showed some interesting information. The average number of daily passenger rides for the month was 500; the peak load carried on holidays and Sundays reached more than 1,200. These figures multiplied by the trip rate, which is \$1.50 between Boston and Worcester, give an indication of an encouraging recovery of revenue. Conversely, they also show to what extent independent operators might well infringe on the returns of the company if such competition were allowed to continue unrestrained.

Under agreement with the Boston Elevated Railway,

Franklin T. Miller, Receiver of
BOSTON & WORCESTER ST. RY. CO.
BUS TIMETABLE

Between
BOSTON, WORCESTER and Intermediate Points

BOSTON to WORCESTER			WORCESTER to BOSTON			
	A.M.	P.M.		A.M.	P.M.	
Boston Lv.	8:30	9:30	11:00	Worcester Lv.	8:00	10:00
Watertown	8:55	9:55	11:25	Shrewsbury	8:15	10:15
Waltham	9:00	10:00	11:30	Northboro	8:30	10:30
Weston	9:15	10:15	11:45	Marlboro	8:45	10:45
Weyland	9:30	10:30	12:00	So. Sudbury	9:10	11:10
So. Sudbury	9:35	10:35	12:05	Weyland	9:15	11:15
Marlboro	10:00	11:00	12:30	Weston	9:30	11:30
Northboro	10:15	11:15	12:45	Waltham	9:40	11:40
Shrewsbury	10:30	11:30	1:00	Watertown	9:50	11:50
Worcester Ar.	10:45	11:45	1:15	Boston Ar.	10:15	12:15 a.m.

Franklin T. Miller, Receiver of
Boston & Worcester St. Ry. Co.
BUS RATES
from
WORCESTER
to

SO. SUDBURY . . .	1.30
WAYLAND . . .	1.30
WESTON . . .	1.30
WALTHAM . . .	1.30
WATERTOWN . . .	1.50
BOSTON . . .	1.50

Beautifully appointed
De Luxe Buses
Careful and Courteous Operators
Legalized and Bonded
Bus Service

Franklin T. Miller, Receiver of
Boston & Worcester St. Ry. Co.
BUS RATES
from
BOSTON or WATERTOWN
to

WESTON	\$.90
WAYLAND90
SO. SUDBURY90
MARLBORO90
NORTHBORO	1.50
SHREWSBURY	1.50
WORCESTER	1.50

Beautifully appointed
De Luxe Buses
Careful and Courteous Operators
Legalized and Bonded
Bus Service

Rate Cards and Timetables Distributed by Railway

line track throughout the eastern end is not, at the present time, the popular route from Boston to Worcester, nor is the condition of the road surface such that heavy bus traffic can be maintained as satisfactorily so far as time and safety are concerned as is the case on the well-known and widely used route through Weston and Sudbury. Thus there was practically only one motor bus route available between the two cities, and on this, though outside its immediate territory, the Boston & Worcester Street Railway has been granted licenses by the municipalities served and a certificate for operation by the Massachusetts Board of Public Utilities.

These permits are issued to the Weston Transportation Company, a subsidiary company acting as holding company and from which the Boston & Worcester Street Railway leases equipment for the purpose of carrying passengers over the route. Such a procedure became necessary in order that the new routes might be established and also because this direct through line could be more advantageously managed as an independent unit.

Under agreement, seven de luxe type Mack buses,

the Middlesex & Boston Street Railway and the Worcester Consolidated Street Railway the buses operated by the Boston & Worcester Street Railway do not accept passengers within zones of these former companies for local stops. On the other hand, through passengers are accepted, with fares so arranged as to avoid encroachment on territorial rights of local operating companies.

Rate cards and time-tables are distributed by the Boston & Worcester Street Railway to acquaint its passengers with schedules and fares. A terminal has been established at Park Square, Boston. Here passengers can secure hourly service to Worcester on a scheduled time of 2½ hours. In order to accommodate theatergoers who desire to attend Boston theaters special late buses, held until some time after the starter has received announcement by phone from the principal theaters that the last curtain has been rung down, wait for the convenience of the public. This feature of accommodation alone has added much to the popularization of motor bus travel over the route recently opened for operation by this company.

New Cars Make Money on Fitkin Properties

Purchase of Modern Equipment for Altoona, Scranton and Youngstown Popularizes the Introduction of One-Man Operation—Passengers and Employees Welcome Improved Facilities

FURTHER proof as to the efficacy of light-weight cars in reducing operating costs has been obtained by the results on three railways under Fitkin management. In November and December of last year the Youngstown & Suburban Railway, the Scranton Railway and the Altoona & Logan Valley Electric Railway received a number of new cars, designed for one-man or two-man operation and built by the Osgood-Bradley Car Company. These cars were identical in construction for the three railways, but have been subjected to somewhat dissimilar operating conditions.

In Scranton, Pa., prior to the receipt of the ten new

cars obtained under this order, one-man operation had never been attempted. With the new equipment it was introduced. Now, in addition, the company has 29 P-A-Y-E cars which have been remodeled for one-man operation. The ten new units replace old-style cars with longitudinal seats and of much heavier construction.

One-man operation had previously been adopted by the Altoona and Youngstown companies, but a number of refinements of design and operation were effected with the Osgood-Bradley cars. The thirteen new cars ordered for Altoona replaced a number of old and obsolete single-truck wooden cars and two heavy double-truck units of wood construction. Favorable comments have been received from patrons of the line with regard to the improved riding comfort and appearance of the light-weight cars.

The cars for the Youngstown & Suburban Railway now run between Youngstown and Leetonia, a distance of 19½ miles. It was not thought advisable to place them in interurban operation during the height of the holiday rush and they were accordingly limbered up in local service, where light-weight one-man cars had been in operation for a number of years. The older interurban units, which were replaced, were unsatisfactory for a change-over to one-man operation. The new cars in Scranton and Altoona are used principally for local service and are giving excellent performances as well as meeting with considerable popularity.

Considerable interest centers on the interurban operation of the new cars by the Youngstown company. Schedules, ordinarily presumed to be slowed up by one-man operation, have been maintained even better than with the two-man cars. The company states that the one-man operators are thoroughly sold on the new type of operation and would be loath to return to the two-man system. While the cars have not been in service long enough to make possible a definite statement as to the reductions which will be effected in maintenance of equipment, the company believes that 1 cent per mile is a conservative estimate of the savings which will be possible. The scheduled speed of the new units is the same as that of the old, while a reduction in energy consumption from 3.1 kw.-hr. to 2.1 kw.-hr. per



Exterior View of One of the Youngstown Cars. This Car Is Exactly Similar to Those in Use in Scranton and Altoona

car-mile has been made. Total platform wages have been reduced from \$1.10 per hour to 60 cents per hour. This allows for an increase of 5 cents per hour for one-man operators.

Considerable thought and study were necessary in determining the method of fare collection to be used with one-man interurban operation. It was desired to adopt a system which could be readily checked and still would not be a burden on either passengers or operators. The Macdonald ticket box for cash fare receipts was chosen to care for passengers paying cash. It was further determined to encourage the use of tickets and commutation rates by the daily rider, and ten-ride

Attention Patrons!

Soon after January 1, 1926, new cars will be placed in service between Youngstown and Leetonla. These cars are of the most modern type, low, light, sanitary, one-man operated and equipped with all known safety devices.

With the inauguration of this new equipment certain changes will be necessary in the method of fare collection. We are adopting the method now working very satisfactorily on a number of interurban lines, as same is, we believe, one that will meet the approval of our patrons and account for passengers carried.

On all through cars fares will be collected on a pay as you enter basis; all passengers boarding at stations will be asked to purchase tickets. These tickets will be punched by operator as passengers board car, ticket thus punched will be returned to passenger by operator and will serve as an indication of fare paid. ON LEAVING CAR PLEASE RETURN THIS CANCELLED TICKET TO OPERATOR.

In case of passengers boarding en route and tending cash fare operator will issue cash receipt for fare paid. THIS CASH FARE RECEIPT PASSENGER WILL PLEASE RETURN TO OPERATOR UNFOLDED AS YOU LEAVE THE CAR.

On local cars operating between Youngstown and Lowell Avenue and Youngstown and Boardman no change in the present method of fare collection will be made.

Your co-operation will be appreciated.

THE YOUNGSTOWN & SUBURBAN RAILWAY COMPANY,
E. O. SHRYOCK, Manager.

Card Given to Patrons of the Youngstown & Suburban Railway Prior to the Adoption of One-Man Operation

family tickets were provided for those not riding frequently enough to warrant the purchase of commutation books.

Signs were placed in all agencies requesting passengers to purchase tickets before boarding cars. A week previous to placing the new cars in through service the change in methods was well advertised by car cards and station signs. In addition, all passengers were presented with cards giving full instructions concerning the methods to be used in collecting fares under the new service. A reproduction of one of these cards appears herewith. So carefully were the instructions read and digested by the patrons that company officials state it would have been practically impossible for a stranger riding over the line on the day the change was made to become cognizant of the fact that a complete metamorphosis of methods had been made. One hundred per cent one-man operation is now in vogue over the company's lines, with the exception, of course, of the freight work.

In Scranton fewer schedule failures have been experienced since the introduction of one-man service. The company believes that this improvement may be attributed to the fact that with one-man operation the responsibility is placed upon a single individual and that this man appreciates the greater import of his job, is more alert and performs his work better. With two-

man operation, on the other hand, the men are inclined to divide the blame for schedule failures and accidents. One-man operators are paid 8 cents over the maximum two-man wage, or 72 cents per hour. This high wage rate was the result of an arbitration on the 1925 contract, the award being made by Thomas J. Williams of the Department of Labor.

Operation in Altoona during the peak load in the morning is front-entrance, pay-as-you-enter and exit both doors. This method is employed for approximately two hours each day, due to the number of men who must be transported to the Pennsylvania Railroad shops. During the balance of the day the operation is rear entrance, front exit and pay-as-you-leave.

The 27 new cars in use on the three railway properties are fully equipped with safety devices and have the following specifications:

Builder of car body...Osgood-Bradley	Gears and pinions.....Nuttall
Type of car..One-man, double-end	Hand brakes...Peacock staffless
Seating capacity44	Heater equipment...Consolidated Car Heating Co.
Weight, car body....35,000 lb.	Headlights...Ohio Brass, Gold Ray; Electric Service Supplies
Bolster centers, length...21 ft. 4 1/2 in.	Journal boxesSymington
Length over all...41 ft. 10 in.	Lightning arresters..Aluminum cell
Truck wheelbase....5 ft. 6 in.	Motors....Four Westinghouse 510-A, 2,600 volt
Width over all....8 ft. 4 1/2 in.	Safety devicesSafety Car Devices Co.
Height, rail to trolley base...11 ft. 1 1/2 in.	Sanders...Osgood-Bradley traps
BodyAll steel	Sash fixtures....O. M. Edwards
Interior trimCherry	SeatsHeywood-Wakefield reversible
HeadliningAgasote	Seating material.....Leather
RoofArch	Step treads.....Kass safety
Air brakesWestinghouse	Trolley retrieversKnutson
AxlesPollak heat treated	Trolley baseOhio Brass
Car signal system....Faraday buzzers	Trolley wheels.....Ohio Brass
Compressor..Westhouse DH-20	TrucksOsgood-Bradley 45-66-FE
Control....Westinghouse K-35	VentilatorsEight Garland C-1 fr. type
Curtain fixtures...Morton Mfg. Co. pinch handle	Wheels26 in. diameter
Curtain materialPantasote	
Destination signsHuntel illuminated	
Finish..Pratt & Lambert enamel	

Tramways Operate One-Third of All Buses in France

CO-ORDINATION of rail and bus service is making steady progress in France. According to the latest French governmental reports approximately 4,500 buses of all kinds are now in operation. Of this number about 1,500 are run by the various tramways, some 2,000 are used in regular intercity service and 1,000 more are in special service, such as sightseeing, touring, etc.

By far the largest single tramway bus operator is the Société des Transports en Commun de la Région Parisienne, with 1,368 such vehicles on Aug. 1, 1926. Classified according to types these were:

	Aug. 1, 1926	Aug. 1, 1925
Four-wheel buses.....	1,265	1,263
Six-wheel buses.....	51	51
Express buses.....	30	28
Sightseeing buses.....	22	22
Total.....	1,368	1,364

Passengers carried by the buses of the Société des Transports en Commun de la Région Parisienne increased steadily from 1921 to 1924. In 1925 the fare was raised and some loss of traffic resulted. Figures for the various years follow:

1921.....	245,902,430
1922.....	290,146,147
1923.....	337,503,838
1924.....	356,529,851
1925.....	344,800,583

Melbourne Tramways Bolster Up City's Finances

Strenuous Efforts Being Made to Safeguard the Goose Which Lays the Golden Eggs—Mr. Strangward Points Out Why It Is Necessary to Increase Tramway Fares in the Australian Metropolis

By *W. O. Strangward*

Secretary Melbourne & Metropolitan Tramways Board

EDITOR'S NOTE

This article is based on a recent radio talk made by Mr. Strangward in Melbourne. It presents that portion of his remarks which indicates the peculiar tax situation that has been allowed to grow up. It is scarcely conceivable that such conditions can exist in a modern, progressive city. The Melbourne Tramways are supporting even the sick, the halt and the blind. Conditions in some parts of the United States are sufficiently bad, but it is to be doubted if they can approximate the *mélange* which is Melbourne.

HERE are some facts which cause tramway fares to be very much higher than they would otherwise be. Although we are expected to run the trams upon business lines and to make each year's revenue balance the expenditure, we are compelled by act of Parliament or by time-honored custom to meet expenditure out of tram fares which cannot be justified upon commercial principles and most of which would not be paid by a tramway management if it were privately owned. Of course this expenditure is not waste or a loss to the community, because if we did not pay it some one else would have to do so.

TRAMWAYS ARE FORCED INTO THE RÔLE OF PUBLIC BENEFACTOR

The first item to which I refer is a sum of about £28,000 per annum which the state government used to contribute to the Queen Victoria Infectious Diseases Hospital. No one can urge that the tramways should be responsible for a proportion of the upkeep of an infectious diseases hospital, yet since 1919 an act of Parliament has compelled the Tramways Board to relieve the state of this burden. It is now paid out of tramway fares.

Then a sum of £53,000 per annum is required to supplement the contributions of the Councils and the insurance companies so that the Metropolitan Fire Brigade, of which we are so justly proud, may continue to protect the people's properties from destruction by fire. The Tramways Board pays this, although it is difficult for any one to see why tramway passengers, as such, should contribute to the upkeep of the Fire Brigade.

ANOTHER CHANCE TO STING THE TRAMWAYS BOARD

Some of you may remember that long before there were any tramways in Melbourne an alteration was made in the method of collecting license fees for public houses. This alteration deprived the local Councils of the publicans' license fees, which up to that date they

were accustomed to collect. The government, however, decided to pay to the Councils a sum equivalent to what they were deprived of. This now amounts to £23,000 per annum. In 1919 an act of Parliament shifted the payment from the government onto tramway passenger fares, and we have paid it every year since that date. As the Mikado would have said, "It's a fool of an act, but still, that is what the act says!"

Now these three items alone cost the Tramways Board £104,000 per annum. The payment is a loss to us, but of course if we were not compelled to pay it the government would have to raise your income tax, or land tax, or some other tax, to a similar extent.

THE OLD STORY OF THE PAVING CHARGES

I could continue for quite a while quoting payments made by the board which save an equivalent expenditure by some one else. For example, we know that the railway finances have to bear the cost of making and maintaining the railway tracks. The Tramways Board also pays for the construction and maintenance of its tracks. There is this difference, however. No one, other than the railway department, has any right to use the railroads, but any one, even the motor buses, which would like to entice our tramway passengers away from us, can freely use the tramway tracks. As a matter of fact, our tramcars do hardly any damage to the roads which we make, because the tram wheels run only on the tram rails. Most of the damage to our tracks is done by ordinary vehicles. Just consider for one moment the immense value of the tram tracks to the people and the immense amount we save the municipalities every year.

We have constructed about 130 miles of the highest class of road, an average of 19 ft. in width, and we also maintain it in a condition which generally is much superior to the sides of the road, which are under the care of the Councils. You all know that our portion of the street is usually the best-kept portion of the road; the Councils see to that and promptly phone us if, as occasionally occurs, a rut temporarily escapes the notice of our track inspectors. Sometimes the Councils complain of the condition of our portion of the road at a time when the sides of the road are in a most deplorable condition, and we have to see that the complaints receive prompt attention. In many of the outer suburbs drivers of ordinary vehicles refuse altogether to run on the sides of the roads, and our tram drivers are sometimes compelled almost to stop before such vehicles will allow the tram to pass. If no tramways had been constructed the Councils would have been com-

pelled to spend about £1,500,000 in making the central portion of these roads, and the interest and sinking fund on this expenditure would cost the ratepayers about £100,000 per annum. The Councils would also be required to maintain the roads and would thus be involved in an annual expenditure of £250,000 per annum. I leave you to estimate what increase in municipal rates would be involved. In America the ratepayers are commencing to relieve the tramway companies of this burden, as they recognize its injustice.

TRAMWAYS ARE FAIR GAME FOR MUNICIPAL TAXES

I don't want to pick out every large item which tends to increase tramway fares, but it is worth while remembering that although the board up to last month was carrying the public at slightly less than cost price, it is compelled to pay the Councils about £13,000 per annum in municipal rates upon the portion of the road which, as I have just told you, was constructed and maintained by the board. Of course, we pay rates on our depots and other buildings as well; no one complains of that.

EVEN HAVE TO LIGHT THE STREETS

Are you aware that the board pays for the street lighting of 80 miles of suburban streets which are used by our trams? This costs us about £10,000 per annum. If there were no trams this expenditure would have to be met by the Councils out of your rates. I do not know of any other tramway undertaking in the world which pays for the lighting of the streets.

I will just mention one other item. I refer to the enormous amount of free traveling which the board is practically compelled by public opinion to grant. For example, we carry all members of the police force, while in uniform, free. Then the board runs a large number of so-called "workmen's" cable tramcars, upon which any one may travel at concession rates at practically half fare. Then we give passes to hundreds of blind people which entitle them to unlimited free travel. If the blind person is a returned soldier we also allow his attendant to travel free. We issue about 500,000 free passes per annum to returned soldiers whose war injuries seriously impair their means of locomotion. Scholars attending school are carried at rates which are about one-fourth of the adult fare and thousands of concession tickets are issued to school children visiting the sea baths, dental clinics, etc. It is estimated that these concessions, for which we receive no refund, are worth at least £30,000 per annum.

AT ANY RATE THE GOVERNMENT SAVES MONEY

The items I have mentioned represent an expenditure by the board amounting to a community value of at least £400,000 per annum. In other words, they are a loss to us, but the government, the Councils or the people thereby save that sum per annum. British and American tramway men who have visited Melbourne tell us that they have never heard of a tramway management which is subjected to such huge and unreasonable public burdens.

When the Church Street bridge was erected a few years ago Parliament ordered the board to pay £20,000 toward its cost. The Spencer Street Bridge Commission has recommended Parliament to direct the board to pay £80,000 toward the cost of constructing a bridge over the Yarra at Spencer Street. These payments must

eventually be paid out of tramway fares, yet the board's passengers only use the bridges in the same way as passengers in motor cars or motor buses use them. Payments of this nature render increases in tramway fares inevitable.

HAD TO OPEN NEW TRACK EVEN THOUGH TRAFFIC FAILED TO JUSTIFY IT

Since the board was appointed, seven years ago, we have opened more than 50 track-miles of new tramways. Not one of these new tramways (desirable as they are from the standpoint of public convenience) is yet able to meet its operating expenses and its proportion of the charges imposed upon the board by act of Parliament.

On some lines the passengers are not charged much more than half of what it costs to carry them. But these new tramways open up the comparatively cheap lands of the metropolis; the value of the land is greatly increased, the public is provided with a good road at the board's expense and the Councils are able to raise big rates from the properties. These new tramways are a good thing for the metropolis, but they all help to cause an increase in tramway fares.

The Trolley Car the Safest Vehicle on the Street

MUCH has been published about the small amount of street area per passenger taken by the electric railway car as compared with other means of transportation in the city streets. Not so much has been said about the relative safety of the various means of transport, but probably in most cities just as good a case for safety to passengers and pedestrians could be made out for the street car as in economy of street area occupied.

Some instructive figures of this kind have recently been compiled in Berlin, Germany, for accidents reported in 1925. Here it was found that, on the basis of passenger trips, the street car was 50 times as safe as

RATIO OF BERLIN STREET ACCIDENTS CLASSIFIED BY VEHICLE CAUSING ACCIDENT

	1925			
	Private Passenger Automobile	Taxi	Motor Bus	Street Car
Accidents, total.....	58	26	2.77	1
Persons injured.....	25	12	2.2	1
Persons killed.....	29	24.5	6	1
Accidents for which operator was responsible.....	103.6	53	4.4	1

the private automobile, and that on the basis of responsibility for accidents caused it was 100 times as safe. Necessarily, rather broad assumptions had to be made as to the number of passenger trips made daily in private automobiles and taxis in Berlin by the author of the compilation, Doctor Wentzel, professor in the Technische Hochschule in Aachen. But on the bases assumed, and taking the figure of the street car in each case as unity, the proportions work out about as shown in the accompanying table. The table appears in the issue for July 2 of *Verkehrstechnik*.

Corresponding figures for a number of the cities in this country would be of interest.

Application of Automatically Controlled Equipment to Substations

Complete Control Sequence of Substation Apparatus Is Necessary from the Time a Unit Receives Its Initial Starting Impulse Till It Is Taken Out of Service—Various Forms of Supervisory Control Systems Meet Requirements

By R. E. Powers

General Engineering Department, Westinghouse Electric & Manufacturing Company

SELF-STARTING synchronous converters and motor-generators with automatic switching have now become used quite generally in railway substations. Relays have been developed to indicate at all times the electrical and mechanical condition of the conversion unit and its associated switching equipment. Relays function to initiate the impulse that automatically starts the converter or motor-generator set when the voltage of the trolley circuit indicates the necessity for the capacity of the idle unit. Specific relays continuously check the supply line electrically, to determine the value of the voltage, the phase rotation and single or unbalanced phase conditions. Deviations from normal, within predetermined limits, will prevent an idle machine from starting and will take an active machine out of service until suitable line conditions are again restored.

In the case of the converter, synchronous speed and polarity are indicated by the action of a polarized relay, which functions to complete a portion of the sequence of operation when the polarity builds up in the correct direction. Should the polarity build up in the wrong direction, this relay closes certain auxiliary contacts that reverse the shunt field circuit momentarily, causing the converter to slip a pole and correct the polarity. Thermal relays that indicate the temperature of the bearings, windings and load limiting grids close their contacts when the temperature approaches a limit at which it is dangerous to operate the equipment. The closing of the thermal relay contacts shut the unit down temporarily if the grids or windings overheat, and permanently should a bearing overheat. Relays that indicate overload, overspeed, reverse current, etc., are constantly in attendance, checking the conditions under which the equipment operates, so that they may function to protect the equipment if a dangerous operating condition is indicated.

Automatic switching equipment has reached a stage in its development where the automatically controlled substation is considered superior to the manually controlled station. The tendency in railway practice is toward the installation of a larger number of small substations equipped with full automatic control. These can be located at the load centers, thus establishing a more uniform system voltage, eliminating long and costly feeder systems, mitigating the effect of electrolysis and securing the benefits and savings effected by automatic operation of the various elements of conversion equipment.

Every effort is being made to establish continuous service. Duplicate conversion equipment is placed in

important substations so that a spare unit is always ready to be put on the line in case the operating, or "lead off," unit is automatically taken out of service by one of its protective devices. In order to increase the reliability of the high-tension supply it is recommended in such cases that duplicate transmission lines, each capable of carrying the substation load, be supplied from the same or independent power sources. The switching equipment should be so designed that an

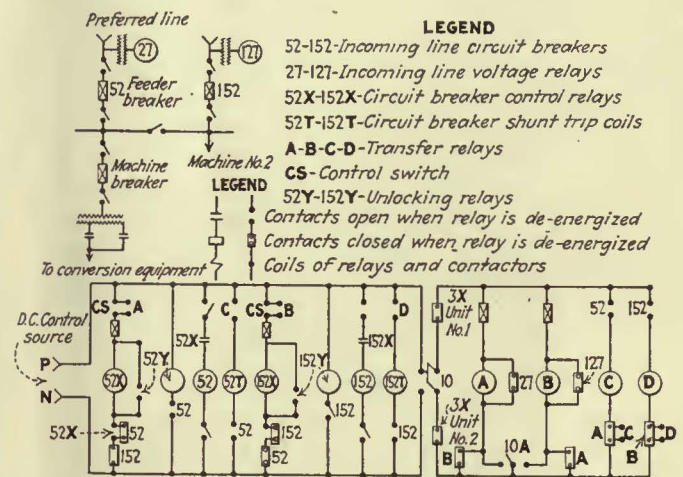


Fig. 1—Sequence of Operation to Automatically Transfer from the Preferred to Emergency Feeder System

automatic transfer from the preferred to the emergency feeder system is effected upon failure of the preferred feeder.

A typical scheme of rapid transfer from the preferred to the auxiliary source of power in case the preferred source fails is shown in Fig. 1. This shows the relays, contactors, and breakers in the de-energized position. A single-pole, double-throw switch 10A is used to select the preferred source of supply. With the double-pole switch 10 in the closed position, connecting the transfer relays A, B, C and D to the control potential, and knife switch 10A thrown to select breaker No. 52 as the connecting link to the preferred source of power, the sequence of operation is as follows:

Relays A and B will attempt to pick up, but the auxiliary contacts of relay A will open to prevent relay B from closing. A second set of contacts on relay A, which are closed when relay A is closed, will complete a circuit to the closing coil of relay 52X. Upon the closing of the main contacts of 52X the circuit to the closing coil of breaker 52 is completed, thus closing the breaker and latching it in. Auxiliary contacts on breaker 52 close when the breaker is closed and en-

energize the unlocking coil on relay 52X. This relay will cut off current from the closing coil of breaker 52 and from its own circuit, thus leaving the feeder breaker mechanically latched. The main busbars are now energized from the preferred source of power through breaker 52.

If the machines are operating and the incoming line through circuit breaker 52 fails, the machines in the station will be disconnected immediately from the alternating-current and direct-current ends by the action of the reverse current relays. Upon opening of the auxiliary master relay 3X of the machine automatic switching equipment, the transfer scheme becomes operative as follows:

Low voltage relay 27 being de-energized will close its contacts and de-energize relay A, thus causing relay B and C to close. Relay C will energize the shunt trip coil 52T to trip out feeder breaker 52. The opening of breaker 52 will complete a circuit through 152X to close breaker 152, as described above. The sequence of operation to retransfer from breaker 152 to breaker 52 can easily be checked by following the circuits in the sketch.

The automatic switching equipment controlling the machine is so designed that the rotating equipment may not be reconnected to the station alternating-current bus until the induced voltage due to rotation has been reduced to a low value. In order to decrease the normal time element of the induced voltage due to rotation, a block of high resistance is automatically inserted in the field circuit during the closing down period. This will effectively kill the field, and rapidly reduce the voltage to a minimum so that the equipment may be restarted without loss of time. Upon reduction of the induced voltage the automatic features of the switching equipment function to reconnect the units to the station bus and restore service with the minimum outage.

SELECTION OF CONVERSION EQUIPMENT

It is difficult to make a general statement as to whether motor-generator sets or synchronous converters should be installed in a given railway substation or system without first making a complete study of the conditions under which the equipment is to operate. Certain situations are ideal for synchronous converters while others indicate clearly that motor-generator sets would be more efficient and reliable. Motor-generator sets should be used at the ends of long transmission lines where the voltage is subject to sudden fluctuations, such as result from switching operations or sudden shifting of large blocks of power. If the resistance of the transmission line is excessive the operation of synchronous equipment in general will not be satisfactory.

On voltages of 13,200 or lower, the comparison between converters and motor-generator sets must be made on the basis of converters with their step-down transformers as units. On voltages above 13,200 the motor-generator set must be supplied with a step-down transformer, which gives a decided advantage to the converter in the items of over-all efficiency, space requirements and weight. In smaller sizes, however, up to and including 1,500 kw. at 13,200 volts, the installations of synchronous converters with automatic switching equipment are about on a par with the installations of automatically controlled motor-generator sets. With the transformers on the same floor level there is little

difference in space required. There is little difference in first cost for equipment in capacities of 1,000 to 1,500 kw. The over-all efficiency is in favor of the converter.

PROTECTION OF CONVERSION AND FEEDER EQUIPMENT

On large 60-cycle converters, approximately seven times full load will cause the rotor to drop back and pull out of step if the load is not removed in a sufficiently short period of time. Obviously the pull-out will occur at much lower load values as the alternating-current voltage is lowered. A synchronous commutator-type machine cannot slip a pole, under operating conditions, without serious flashing. To prevent flashing under the above conditions a quick-acting circuit breaker must operate to relieve the converter of its excessive load before it can drop back to its "pull-out" position. If the resistance of the short circuit path, including the converter windings, is such as to limit the current to less than this value, high-speed circuit breaker protection is not required. Such equipment or resistance is necessary with any arrangement of the converter if interruption to service from short circuit is to be prevented. In general, the same reasoning applies to motor-generator installation except that the motor-generator is inherently more stable and the commutating limits are not so narrow. Slipping of poles in the synchronous motor does not inherently cause a flash on the generator commutator.

When the feeder network is of such low resistance that the short-circuit current will exceed the commutating capacity of the generator, high-speed circuit-breaker or flash suppressor protection is necessary.

In order to secure a quick-acting direct-current breaker capable of opening or limiting the current in such a case, a radical departure from standard breaker design is necessary. Fig. 2 is a schematic diagram showing the arrangement of levers, pivots, springs and solenoids, incorporated in the latest designed high-speed direct-current breaker.

In the open position with all electrical parts de-energized, the opening and closing springs hold the main floating member solidly against stops, causing the plunger to be drawn out of the closing solenoid. When potential is impressed on the closing circuit, the closing plunger is drawn into the solenoid, causing motion of the closing lever around the fixed pivot A. By the action of the closing lever the main floating lever is rotated around the upper stop as a center, causing the closing spring to be distended and the sealing armature to come into contact with the magnetic circuit of the holding-in coil. Potential is now applied to the holding-in magnetic circuit. The sealing of the armature makes the pivot D a fixed point. Thus when potential is taken from the closing coil the closing spring rotates the floating member around pivot D as a center to close the breaker and place the opening spring in tension as shown in an accompanying illustration.

Standard carbon circuit breakers open in from 0.1 to 0.2 second, while a high-speed breaker, to be of any value in preventing flashovers, must open the circuit in the incredibly short period of time required for a synchronous converter to drop back in phase position sufficiently to fall out of step or for the commutator of a motor-generator set to become sufficiently heated to cause vaporization of the copper and the establishment of an arc between brushes of opposite polarity.

A description of the improved type of Westinghouse high-speed circuit breaker was published in the *ELECTRIC RAILWAY JOURNAL* for May 29, 1926, on pages 935 and 936.

In the oscillogram shown a direct short circuit was thrown on a 2,000-kw. 1,500-volt synchronous motor-generator set by closing a quick-acting knife switch. Sufficient cable to connect into the circuit the high-speed breaker shunting current-limiting resistance constituted the only external resistance at the time the short was applied. The breaker functioned to limit the short-circuit current to 12,500 amp. in 0.009 second. Complete opening of the breaker and rupture of the arc in 0.017 second inserted the current-limiting resistance to reduce the current to 4,810 amp. The average rate of rise of the short-circuit current during the first 0.009 second was at the rate of 1,400,000 amp. per second.

Direct-current feeder breakers equipped with short-circuit detector relays and service-restoring features, in combination with a high-speed breaker in the machine circuit, make a very flexible type of feeder and machine protective equipment. This type of feeder equipment utilizes the ordinary electrically operated circuit breaker provided with the short-circuit detector relays and automatic reclosing equipment. The circuit breaker is mechanically latched when closed and is tripped by an "impulse coil," which is in reality a through-type current transformer, the feeder circuit being the primary.

The short-circuit detector relay is operated from the induced secondary current of this impulse coil or current transformer. The amount of current induced in the secondary of the impulse coil depends entirely on the rate at which the current is changing in the feeder circuit. The rate of rise of direct-current short circuits depends on the character of the short and the distance from the station bus. A short circuit of trolley to rail just outside the substation constitutes practically a terminal short circuit, and the rate of current rise will be of the order of 3,000,000 amp. per second, depending upon the machine characteristics. Short circuits between the third rail and track, at an appreciable distance from the substation, have been recorded in which the current rise was of the order of 500,000 amp. per second. Under such conditions appreciable current is induced in the impulse coil secondary, causing the breaker to be tripped. Under normal conditions or conditions of slowly changing loads the rate of current change is so small that the induced secondary current is negligible and the breaker is not opened. Therefore,

due to its design features, the breaker selects between short circuit the overload, opening only on short circuit.

In situations where an appreciable amount of current may be dropped suddenly, as might occur by the sudden interruption of the current required to accelerate a large eight or ten-car train, the short circuit detector relays are provided with auxiliary windings excited from the station bus when the feeder breaker is in the closed position. The flux set up by this bias winding is in such a direction as to neutralize the flux set

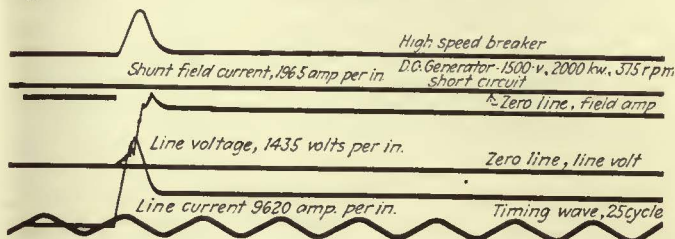


Fig. 3—Oscillogram Showing Voltage and Current Values in the External Circuit of a 2,000-Kw., 1,500-Volt D. C. Synchronous Motor-Generator Set. Type HS Direct-Current Breaker Functioned to Limit the Short-Circuit Current and to Insert Current-Limiting Resistance Between the Terminals of the Generator

up in the detector circuit due to a rapidly decreasing load current. Therefore the detector relay will not operate to open the feeder breaker on rapidly decreasing values of load current.

Fig. 4 shows a single-line diagram of a two-unit automatic substation equipped with a high-speed circuit breaker in the machine circuit, and short-circuit detector service restoring feeder breakers in each of the three feeder circuits.

A short occurring on any of the feeder circuits, through independent means, will trip the high-speed breaker in the machine circuit and the carbon breaker in the feeder circuit. Due to its high-speed characteristics the machine breaker will open first and insert a resistance in the machine circuit to limit the short-circuit current to a value within the commutating limits of the conversion equipment. The feeder breaker, being slower in action, opening on the order of 0.2 second, will then function to open the feeder circuit, disconnecting the conversion equipment from the fault.

As soon as the short-circuit condition has been relieved by the opening of the feeder breaker, the high-speed breaker, through the action of automatic switching equipment, will reclose to establish full bus potential. The feeder breaker is equipped with resistance measuring relays that function automatically to reclose the feeder breaker when the resistance of the

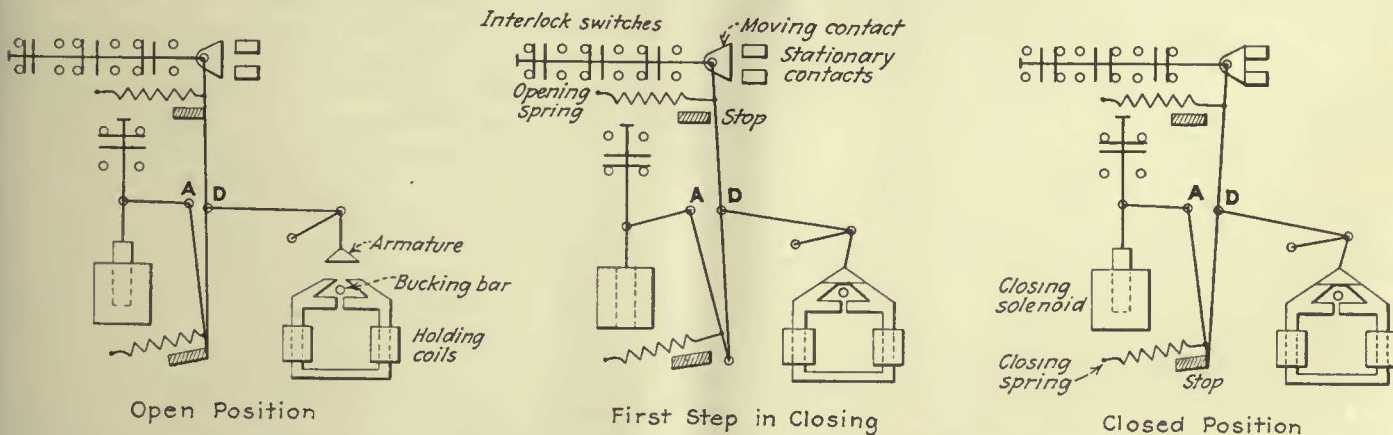


Fig. 2—Single-Line Diagram Showing Pivots, Levers, Solenoids, Springs, etc., Incorporated in the Latest Designed High-Speed Direct-Current Circuit Breaker

external circuit is such that the breaker may be safely closed in.

Under legitimate overload conditions, such as often occur from congestion in the downtown district during the rush hour, the feeder breaker and high-speed breaker will remain closed and load will be shifted from the overloaded station by automatically inserting load-shifting resistance between the machine terminals and the bus, thus allowing adjacent stations to pick up the

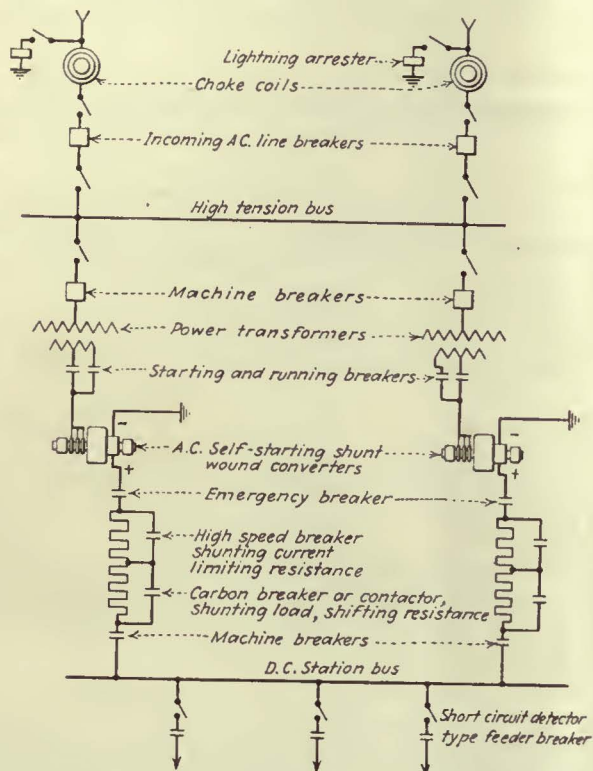


Fig. 4—Two-Unit Automatic Substation Equipped with Shunt-Wound Rotary Converters, High-Speed Breaker Shunting Current Limiting Resistance in the Machine Circuits, Direct-Current Feeder Breakers Equipped with Short Circuit Detector Relays and Automatic Reclosing Features

overload. The feeder breaker is of the "latched in" type and remains closed regardless of the bus voltage. Overload protection on the feeders may be secured by thermostats mounted on the feeder itself. The thermostats allow taking advantage of short time-overload capacity of the feeder, tripping the breaker only when the copper reaches a predetermined temperature.

The application of automatic switching equipment to units in the various substations of railway systems made necessary the development of a new form of communication between the load dispatcher and the substation. This was done so that the automatic operation of the various units in the stations could be under control, that knowledge of their operation and load condition could be transmitted automatically from the non-attended station to the dispatcher whose function is to control and co-ordinate the operation of the system substations, thus securing the most efficient operation under normal conditions and the most beneficial and reliable under conditions of system disturbances.

Various forms of supervisory systems, each with its field of application, have been developed to meet the requirements of different types of automatic electrifications. The Westinghouse synchronous all-relay type of supervisory control uses the principle of step by step synchronous selection. In this type of control a minimum of four wires are used between the dispatcher's office and the substation to be controlled, over which

the rotating equipment may be started, stopped or locked out, feeder breakers may be opened or closed, station bus or feeders sectionalized, readings of the station instruments may be transmitted—in fact, any operation may be performed that is usually carried on by the operation of an attended station.

By means of two of the lines and a simple synchronous control circuit, signaling relays in the dispatcher's office and the substation are kept in step and moved from point to point in a definite sequence. The remaining two wires are switched by the step by step action of the synchronous selector circuit from one control and supervisory point to another. Thus when any operation is to be performed a clear metallic circuit is established between the control in the dispatcher's cabinet and the desired apparatus unit to be operated.

The dispatcher's control keys and supervisory signaling lamps are connected to a set of selecting relays while the apparatus units at the substation are connected to a similar set. The selecting relays operate in absolute synchronism at every step or not at all.

Should the dispatcher wish to actuate any mechanism in a distant substation, he operates a key associated with the apparatus unit desired, and then a start key. Signaling relays in the dispatcher's office and distant substation pull up in regular sequence with both equipments in exact synchronism until the required key is reached. The two signaling wires are thus connected to the station battery, through the key associated with the apparatus unit, in the dispatcher's office. Operating current passes from the battery through the operating key circuit and associated selector relay to the signaling wires. At the substation the current flows from the signaling circuit through its associated selector to the desired apparatus unit to initiate the required impulse automatically to perform a given co-operation. This impulse is not in the form of a code and is usually obtained by a contact of the interposing relay making an electrical connection to initiate some automatic operation, such as energizing the master relay of the automatic switching equipment in order to start and connect a rotary converter to the station bus, or to energize the closing motor or solenoid of a circuit breaker from the station bus or battery in such a manner that the breaker will be closed automatically. After an operation has been completed, auxiliary contacts on the apparatus unit transmit the signal back through the same signaling relays and circuits to operate the indicating lamps at the dispatcher's office. The signaling relays are released by the action of the proper answer back or signaling circuit, indicating that the correct operation has been performed. The relays then continue to step up in synchronism until all signaling relays have been pulled up and released, thus completing the chain of operation.

When an operation occurs in the distant station such as opening of a breaker, stopping of a unit due to one of its protective devices, etc., the selecting relay action is effected rapidly and the signaling wires are switched from position to position. When the wires connect the apparatus unit, that has changed its position, to the corresponding signaling equipment at the dispatcher's office the indicating lamps are changed to show the operation that has taken place. The equipment comes to rest immediately after the sequence of operations has been completed, therefore insuring long life of equipment and minimum service from the battery, as

control energy is used only during the period that the equipment is in operation. There is no counting of impulses, checking back of circuits, or totalizing of impulses to perform an operation. The selecting relays in the dispatcher's and substation equipment operate in absolute synchronism to assign the signaling wires in a definite sequence to the points of control until the desired point of control is reached. The sequence is then stopped until the desired operation has been performed and correct visual answer back received, thus releasing the relays and allowing the chain of operation to continue until all relays have been pulled up and the sequence completed.

The signaling circuit of two wires, which are switched by the signaling relays, provides a clear metallic circuit which may be used for selective remote metering in conjunction with its use for control and supervision of apparatus units. Indications of any character may be secured, such as volts, amperes, watts, power factor, reactive volt-amperes, etc., or any desired indication of electrical or mechanical condition that can be made to operate the remote metering sender. Stop keys associated with each signaling point permit reading any one of the indications for as long a time as desired.

The continued installation of automatic switching equipment in the substations of various railway systems having d.c. trolley voltage from 600 to 3,000 indicates that automatic operation is here to stay and that it is playing a very important part in our railway electrifications.

The most efficient and reliable method of substation operation may be secured by the automatization of the various substation units and the co-ordination of their operation by supervisory control in order that the system as a whole may be operated as a unit. Automatic equipment performs, without error or waste of time, and eliminates the human factor from the switching operations. Automatic operation of substation equipment insures reliability of operation, full protection to equipment, minimum delay in service restoration and economic operation of substation equipment.

Street Cars Advertise Milwaukee

SIGNS teaching safety lessons and to encourage street car riding are displayed on the cars of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. While brevity is essential on signs of this nature, the messages cover a fairly wide range of interesting and helpful suggestions. Here are some examples:

The motorman is doing his part to avoid accidents. Are you?
We appreciate your patronage. Ride again.
Flashing red lights mark street car crossings.
Golf! Go by street car.
Think before you cross ahead of this car.
Ride with us and save the difference.
Progress and street cars go hand in hand.
Your parking problems solved. Ride with us.
Visit the zoo at Washington Park. Take street car.
Play tennis? Take the street car.

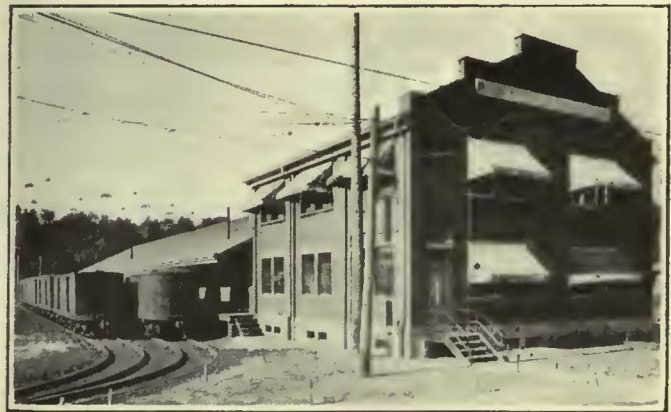
Some of these signs have already been used and a new message is to be broadcast each week.

In addition to the dash signs, the company has cards inside the cars. One that has drawn much favorable attention bore the message: "Thank you! Ride with us again. Use the street car and save the difference." In this card the words "Thank you!" just seemed to pop out of the picture, as if they were spoken.

New Freight House Built at Akron

CONSTRUCTION of a new freight house costing \$80,000 has just been completed by the Northern Ohio Power & Light Company at Akron. The new structure is located just east of the old freight house, which will be utilized by the company's line department and for the storage of electrical supplies. The building is of brick and steel construction, 256 ft. long and 45 ft. wide. The front 48 ft. is used for offices and is two stories in height. In that section is housed the freight auditing department, which has been moved there from the company's Terminal building.

Plans for the building were drawn by J. P. Colwell of the Commonwealth Power Corporation, who supervised the construction. The freight room proper is 204x45 ft. of clear space. Rail tracks are on the west side, with a 45-ft. concrete team loading drive on the



Double Rail Tracks Give Loading Facilities for Ten Cars in Addition to Space for Through Freight Trains at New Akron Freight House of Northern Ohio Power & Light Company

east side. Double-rail tracks give loading facilities for ten cars in addition to the space provided for through freight trains. The freight room is equipped with the latest type of scales located on the driveway side so that freight may be taken from trucks, weighed and handled through the freight room car loading platform or direct into the cars as desired. A portable office is provided in the main room for the warehouse foreman.

Foundations of the building are of concrete throughout, having a basement under the office portion. The walls are brick with steel roof trusses. On each side of the freight house there are twelve of the latest type rolling steel doors. These are counterbalanced so that they may be raised by one man with little exertion. Doors are located opposite each other on both sides, giving a through route for trucking freight. The floor is of 3-in. planking painted with a hardening liquid which is intended to give long wear without splintering. A 7-ft. platform along the west side is completely sheltered. Special provisions for handling oil at the extreme north end of the building are being provided.

The new house is of fireproof construction throughout, there being little woodwork except the main freight room floor. Stairways are of steel with safety treads. The wall between the office and freight room is so constructed as to prevent fire spreading.

The system of lighting installed is completely modern and is planned to give uniform light on all parts of the working area. The type of unit selected was the Standard RLM Benox type. In the warehouse proper bowl enamel lamps are installed.

Maintenance Notes

Cars Showered and Scrubbed While You Wait

"HAVE you had your morning shower?" would no longer be an uncommon question could we but know the language of cars. Recent experiments of the Pittsburgh Railways have added to the morning's ablutions an automatic scrubbing process that bids fair to make the modern carhouse take on the aspects of a college dormitory twenty minutes before class time.

The accompanying illustrations show several views of an experimental equipment erected in one of the carhouse yards. This consists first of a shower a car length ahead of the scrubber that thoroughly wets the sides of the car. After this first wetting the windows are washed by means of a hydraulic wiper uniquely designed to slip between the glass of the lower sash and the window guards, thus avoiding the tedious task of unfastening and later replacing these guards. The wiper face consists of a piece of brussels carpet bolted around the surface. Several streams of water are forced through small jets from an attached hose. The whole arrange-



Hydraulic Window Washer Designed by Pittsburgh Railways

The washer fits between the lower glass and the window guards. This device avoids the task of unlatching the guards and re-fastening them in place after the windows are washed.

ment is handled by the operator and the windows are cleaned with dispatch.

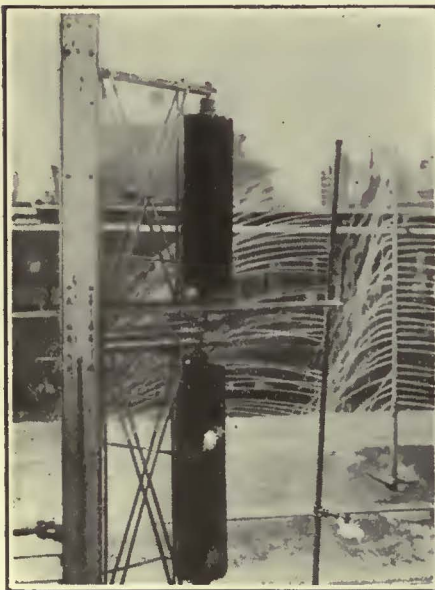
The car then wet, with the dust and dirt well soaked, passes rapidly revolving brushes that are mounted vertically and suspended on a spring

arrangement so as to hold the brushes firmly to the car sides. As the car passes through, the remaining dirt is flushed off by the spray at the sides of the brushes and the car comes out as clean or cleaner than if washed by hand.

There is no lack of water in the scrubbing process and the car looks like an airdale pup emerging from a pond. The actual amount of water used is not great, however, as the car passes through the scrubber at a speed obtained by having the controller about on one notch and the water is shut off as soon as the car passes.

Fairly soft bristles are used in the brushes so that no damage is done the paint surface. They are stiff enough, however, to remove the grime that so soon collects on the car surface. The bristles are also long enough to reach between and below moldings, rivet heads, etc. Since this company has adopted the lacquer system of paint there are no resultant scratches from the rapidly-revolving brushes.

So far only experimental equipment has been built for cleaning one side of the cars so as to try out this arrangement carefully. If the com-



Many Jets of Water and Soft Revolving Brushes Perform the Work of Several Men

At the left is shown the trial equipment that scrubs the car sides. Here the shower is running but the brushes are not revolving to illustrate the method of drive. A small 500-volt motor erected to the side in a watertight compartment is bevel geared to a vertical shaft, which in turn revolves the

brushes by means of a chain drive. The brushes, mounted on long arms, have springs that hold them against the car sides. The whole structure is supported on a vertical J-beam set in concrete.

In the middle view the car is about to enter the scrubber and the shower. The

device was built for one side only. Until a second unit is installed the opposite side is cleaned by hand.

The view at the right shows the car half way through the scrubber, proceeding on one notch of power. Only a few seconds is consumed in the process.

pany decides to adopt this plan a corresponding set of brushes will be erected on the opposite side of the work track and the entire arrangement will be inclosed or placed within a carhouse so that it may be used equally well in winter weather.

Experiments are also being conducted to see if a brush can be developed that will wash the windows behind the guards and thus avoid this hand operation. Also, plans are being developed for automatically scrubbing the car ends which now must be done with hand brushes.

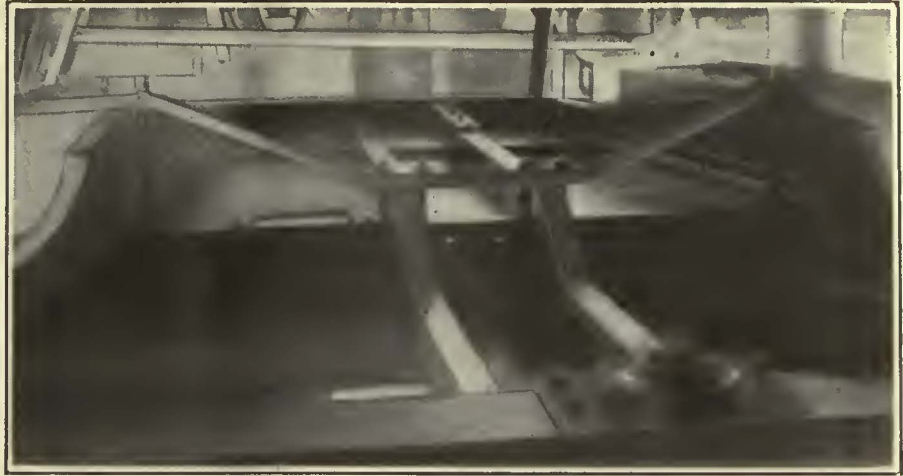
If this device can be perfected it will be an easy matter to run each car through the shower and scrubber every day by the crew that first takes the car out on a run.

Protection for Journals Prevents Damage

FOR saving of space in the storage of wheels when mounted on their axles, it is common practice to have one pair of wheels set with respect to the adjacent pair so that the faces will roll by until the flanges of the wheels come in contact with the axles. If particular care is not used when placing the mounted wheels in position, there is danger that the flanges of one pair of wheels will damage the journal bearings of the adjacent pair. To provide a protection for the journals while handling, transporting on shop cars and in storage, the Department of Street Railways, Detroit, Mich., uses a special covering for the journals.



A Special Fixture Placed Around the Journal Prevents Damage from the Flanges of Adjacent Wheels



A Shaped 3-In. Channel Is Used to Strengthen Long Platform Supports on Certain Wheeling Cars. The Firm Anchor to the Center Sections Add Great Stiffness to the Side Members. Drooping Platforms on These Cars Are Thus Avoided

The covering consists of a $\frac{1}{8}$ -in. steel shell lined with $\frac{1}{4}$ -in. felt. The shell is made in two parts, hinged along one side while the other is provided with a catch and hasp so that the covering can be held firmly in position. This arrangement provides a covering that can be quickly attached and which is very effective in preventing damage.

Platform Knees Stiffened on Wheeling Cars

CHANNELS of 3-in. section bent to a form shown in the accompanying illustration are used under certain cars of the Wheeling Traction Company, Wheeling, W. Va., to prevent platform sagging. A few cars on this property have long platforms that are supported on long members shaped to slope together toward the

front. A slight bump tends to bend these supports inwardly, which in turn tends to cause the platforms to sag.

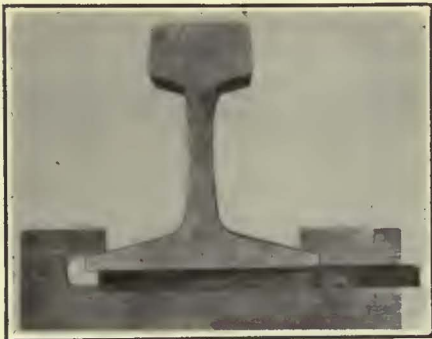
To overcome this trouble the 3-in. channel was cut and shaped and applied in the manner shown. The side members were first spread apart to the normal position by jacks, and while under this pressure the channel was bolted tightly in place. By this means sagging platforms on these cars has been cured and the car is considerably stronger should other bumps occur.

New Equipment Available

Rail Anchor Fits Any Standard Tee Rail

PROVISION for sufficient adjustment to fit rails in any condition and an original design which prevents the two parts of the anchor from being separated are outstanding features of the "Bethco" rail anchor, just put on the market by the Bethlehem Steel Company, Bethlehem, Pa.

While the anchor is of two-piece construction, it is shipped and installed as one piece. The two pieces can be separated only with considerable difficulty and by a very unusual manipulation of the parts. This two-piece construction allows sufficient adjustability to take care of more than one rail section, over or undersize rails, and the increasing tendency of rails to wear thin where they rest on the tie plates or because of corrosion.



Section Showing How New Anchor Is Applied to a Rail

The anchor consists of a heavy flat yoke which hooks over the base of the rail on both ends and a heavy key which is driven horizontally between the base of the rail and the yoke. This key provides the wedging action to hold the rail in place and can only be removed in a similar manner to the way it is installed. Since there is no force acting upon the key in this direction it will not become loosened while in service. The wedging action of the key is crosswise of the rail, along practically the entire base of the rail. This fact and the channel shape of the key prevent in from being forced sidewise off the yoke.

The working forces are exerted against the anchor at right angles to the yoke and key. The deep, broad surface of the yoke, along its entire length, bears against the surface of the tie, distributing the pressure over a large area, avoiding damage or destruction to the tie after it is in place.

The installation of the anchor is extremely simple. The yoke is hooked over the base of the rail and the key is driven home by means of a hammer, rail chisel or other handy tool. No special tools are required. Since the key cannot be dislodged



Rail Anchor After Installation

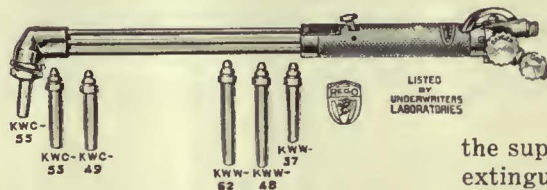
except by driving, no further attention is required until renewal of the ties or other work makes the removal of the anchor necessary. Slippage of the rail through the anchor can only be accomplished by practically destroying it.

The anchor meets all the specifications of the A.R.E.A. requirements for rail anchors or anti-creepers.

The Bethlehem Steel Company is being assisted in the introduction of this device by Geo. L. Moore, former engineer of maintenance Lehigh Valley Railroad and chairman of the A.R.E.A. rail committee.

Carefully Balanced Torch Makes Handling Easy

CUTTING operations of all kinds on metals up to 3-in. section are taken care of by a light but rugged combination welding and cutting torch designated as Rego KW



New Type Cutting and Welding Torch

Medium, which has recently been brought out by the Bastian-Blessing Company, Chicago, Ill.

An assortment of three cutting tips, furnished with each torch, gives ample range for the different classes of work. Three welding tips KWW 37, 48 and 62, illustrated here, will be furnished at extra cost, if specified. Length of the tool is 10 in. and weight 34 oz.

This device, using oxygen and medium pressure acetylene, is said to be so well balanced and easy to handle that by simply changing tips it can be used for making welds up to 1-in. section.

Improved Shape for Mesh of Step Treads

BY GIVING an elongated S curve to the reticuline bar a mesh or opening has been created that is a distinct improvement in step tread construction by the Irving Iron Works, Long Island City, N. Y. With the new mesh there is less opportunity for dirt to collect and painting is facilitated, light diffusion is improved and the long double sweep of the bend makes a better traction surface. The combination of straight

and curved lines also gives a more pleasing flooring pattern.

With 7-in. rivet centers this new flooring is known as type M and with 3½-in. rivet centers as type O. Other distinctive Irving features of alternate deep and shallow bars are retained.

One-Gallon Extinguisher for Electric Cars

GREATER capacity than the usual quart size fire extinguisher was found desirable by the New York Westchester & Boston Railway for the size of fire extinguisher to be carried on its cars. As a result, this road has now adopted the Phister 1-gal. carbon tetrachloride fire extinguisher. Another advantage is that it can be pumped up to the desired pressure and kept in this condition ready for use, while with the smaller sizes of other types it is necessary to continue the pumping action while the liquid is being exhausted. With the larger size there is no danger of exhausting the supply of liquid before the fire is extinguished. The cost of this extinguisher, as stated by officials of the railway, is about three times that of the type previously used, but its greater capacity is thought to warrant the increased price.



One-Gallon Carbon Tetrachloride Fire Extinguisher

The extinguisher is recharged by unscrewing the filler cap and filling with carbon tetrachloride solution. The gage at top insures pumping to required pressure and maintaining it.

Association News & Discussions

Insurance Regulations for Cars and Carhouses*

Excerpts from the Latest Underwriters' Rules Are Given, with Comments on the Way that Some of Them Were Reached

BY JAMES S. MAHAN

President, Western Section, International Association of Electrical Inspectors

THE present regulations of the National Board of Fire Underwriters for electric railway carhouses and cars is the final outcome of some twelve or fifteen years of rather intensive work by a number of fire insurance engineers having to do principally with public utility properties.

In working out this standard the lessons learned from numerous traction property fires have been considered from all angles, with the idea in view of lessening fire insurance losses on traction property buildings and rolling stock as much as possible. Traction companies may deviate as far as they care to from this standard, but compensation will have to be made in the fire insurance rate; in other words, a property which follows this standard to the letter will receive a minimum insurance rate.

BUILDING CONSTRUCTION

Carhouses should be one story in height, without basement or closed roof spaces. The outside and division walls should not be over 25 ft. in height at the eaves, nor more than 30 ft. at the peak of the roof. Where, on account of the nature of the surroundings, it is absolutely necessary to build carhouses more than one story in height, wall dimensions are given in the tabulation in the standard. This standard, you will find, requires the walls to be of hard burned brick, stone or reinforced concrete of a specified thickness. These types of wall materials have been found to stand up better than tile under severe exposure to fire. Steel skeleton work in the walls does not lessen the required thickness of a wall proper.

Where traction property buildings are near other risks which may expose them to fire from outside sources, it is necessary to parapet the walls, or in other words carry the wall at least 3 ft. above the eaves where the roof is of a combustible material. If the roof, as well as the walls, is of concrete or other such material parapets are not necessary. Walls dividing the risk into fire sections shall be parapeted the same as outside walls and all division walls should project at least 8 in. beyond the outer edge of the cornice. All walls should be provided with a durable incombustible coping.

*Abstract of paper presented at meeting of Electric Railway Association of Equipment Men, Southern Properties, Chattanooga, Tenn., July 28-30, 1926.

One of the big contributing factors to the extensiveness of traction fires is the communication of fire from one section to another. To prevent such conditions the standard requires that only one opening, not exceeding 38 sq.ft., may be made in each 100 ft. of wall length. These openings must be protected on each side of the wall by standard automatic fire doors. To control the conflagration feature as much as possible, the floor area of any one section of a carhouse has been limited to 20,000 sq.ft.

Skylights and ventilators are an important feature in the prevention of the spread of fire in traction properties. These devices shall have metal frames and sash, with the frames and other parts riveted or otherwise securely fastened in addition to soldering. They should be glazed with wire glass, or plain glass may be used if protected above with stout copper or galvanized wire screens with mesh not larger than 1 in.

Brick, concrete, stones, cinders, earth or other incombustible material is recommended for floors. However, treated wooden blocks may be used when placed on a concrete base.

Car pits may either communicate or be separate units under each track. Under no circumstances shall they connect under more than four track sections. Pit walls shall be constructed of the same material as other building walls.

Arrangement of the tracks is another important feature in keeping down losses through fires. All tracks should run clear to the street without break or transfer table, and preferably should communicate to the outside at both ends of the building.

Track doors shall be of a type which will readily open in case of an emergency, preferably of the vertical roller type covering not more than two tracks, or they shall be swinging doors made in pairs and opening outward. Certain types of sliding doors should not be used; neither should doors opening in pairs.

All chimneys and stacks shall be of solid masonry, standard construction.

BUILDING WIRING

Suitable wood troughs should be provided above all trolley wire in the risk. For rigidity of construction it is recommended that T-iron or T-copper be used. Trolley wires, as well as T-con-

ductors, shall have a conductivity of not less than No. 0, B. & S. gage wire. All hangers and supports of trolley conductors shall be spaced so that in case of a break at one of the supports the trolley conductor would not come in contact with the rail.

Where it is necessary to break the continuity of the trolley wire, as at track doors, the wire shall be equipped with suitable sectional insulators. In order to be able to disconnect all trolley wires inside of buildings or yards, line insulators shall be installed with a feed around the insulators controlled by an emergency switch, this switch to deaden all trolley wires leading into the building and within 50 ft. of the building. Feed wire to the building or yards shall be of ample carrying capacity, but not less than No. 0, B. & S. gage. Rails forming the return circuit of a grounded trolley system shall be bonded at joints with not less than No. 0, B. & S. gage copper conductors. Current collectors of all types shall be removed from contact with trolley wires when cars are not in use.

CARHOUSE MAINTENANCE

Standard carhouse lighting shall be by electricity.

Heat shall be by steam, hot water, hot air or electricity, with all piping well supported and free from woodwork. Boiler and furnaces shall be located in a separate fire section, preferably outside of the main building with all openings into the main building protected by approved automatic fire doors.

A good supply of standard self-closing metal waste cans shall be provided for all oily waste and trash, and should be emptied daily. Approved watchman service shall be installed, with stations well distributed throughout the premises, rounds to be made not less than hourly.

Carhouses proper shall be used only for storage and cleaning of cars and for inspection and replacement of minor parts and minor repairs. General repair work should be in a separate fire section. Premises shall be kept entirely clear of accumulations of trash and rubbish. The use of sawdust and shavings to absorb oil and grease drip-page should not be permitted, sand being much preferable.

Smoking shall be prohibited in sections devoted to car storage, with prominent "No Smoking" signs posted throughout the premises.

WIRING AND ELECTRICAL EQUIPMENT OF CARS

Lighting circuits for cars may be operated upon potential not exceeding 750 volts maximum. All circuit appliances shall be approved for a nominal rating of 600 volts. For higher voltages not to exceed 1,500 volts, lighting circuits shall be run in grounded rigid

conduit with all circuit appliances approved for voltage.

When the circuit has a grounded return conductor, the capacity of the return conductor shall be equal to that of the conductors in the non-grounded side, or shall be adequate for the combined load of all circuits connected to it. Joints in ground wires shall be as required for joints in circuit wires. Ground wires shall terminate in a permanent ground connection to the car driving motors or trucks. It is permissible to run ground conductors bare, except where exposed to contact with unauthorized persons. This does not prohibit the use of the metal members of the car as a ground return for auxiliary circuits.

All conductors shall be stranded and shall have a rubber insulation. Their minimum size is to be as follows:

	No.	Minimum Size
Passenger signal circuits.....	No. 18	B.&S. gage—1,624 circ.mil
Lighting circuits.....	No. 14	B.&S. gage—4,107 circ.mil
Auxiliary motors and devices.....	No. 14	B.&S. gage—4,107 circ.mil
Heating circuits.....	No. 12	B.&S. gage—6,530 circ.mil
Motive power circuits.....	No. 6	B.&S. gage—26,250 circ.mil

In compiling this standard an effort has been made to establish one with a workable basis. In this connection three methods of wiring cars have been provided, leaving it to the choice of the operating company to select whichever it prefers.

Either rigid metal conduits with cable boxes or approved flame-retarding, moisture-repelling non-metallic ducts or cables with approved rubber insulation protected by approved flame-retarding and moisture-repelling outer coverings may be used.

All conductors except those run in rigid metal conduit or cable boxes must be so concealed or isolated that contact cannot be made accidentally with them by unauthorized persons.

Non-metallic ducts and the outer coverings of wires and cables must be constructed to resist mechanical injury. Such cables or ducts must be securely fastened into the cases with approved clamps, to be supported by non-conducting cleats or straps. They must be run in continuous lengths from box to box or from outlet to outlet, unless made-up cables are used, with joints and end taps covered with approved flame-retarding moisture-repelling coverings equivalent to those on the cables themselves.

Provision is also made for trolley leads on car roofs to be raised so as to permit suitable drainage under them. Conductors subject to abrasion through car sills or in other locations must be protected by short lengths of metal conduit with ends bushed. All conductors with inclosures must be kept well away from direct wheel wash, and where this is not possible should be provided with non-corrodible fenders or guards to protect them against such wheel wash.

Wooden cable boxes can be used only on the interior of the car and should be made of not less than 5-in. wood lined with 1/4-in. asbestos lumber or similar material. They must be provided with suitable fittings.

All car driving power circuits must

be protected by a main automatic circuit breaker located either in the cab or on outside of the car, with a reset control in the cab.

Circuits for other than car driving must be supplied ahead of the main circuit breaker and be provided with suitable fuse and switch protection close to the point of connection.

All switches, cutouts, circuit breakers, etc., having exposed live metal parts, must be inclosed in approved cabinets and be well guarded to prevent passengers or other unauthorized persons from coming into contact with the live parts. Headlight frames must not be used as conductors. Portable headlights must be wired for double plug connection. All plug connections must be so wired that the female end will be attached to the source of energy. (A new device just

heater expansion tanks, whistle pipes, etc., must either be grounded or insulated. The insulated joints must be located immediately below the car roof. All fuel-burning heaters located inside the car must be well grounded.

Wires connected to different sources of energy must not be cabled together or run in the same duct except in the case of jumper cables between cars.

Resistors must be mounted with ample air space between resistor grids and car body, with heat-resisting barriers of at least 1/4-in. fire-resistive insulating material, or sheet metal not less than 0.04-in. in thickness mounted above the resistance and extending sufficiently beyond the resistor supports.

Resistor grids must be thoroughly insulated from resistor frames, and the frames also insulated from supports. The insulation on the conductor to the resistors must be removed at least 6 in. from their terminals. The bared conductor must be filled with solder to make it rigid at the point of connection.

Electric heaters shall be of approved type for use in railway cars. By "approved type" is meant shall bear the Underwriters' Laboratories' label. Branch heater circuits shall be protected by fuses of no greater rated capacity than the normal heater current per circuit. The fuse capacity should be as follows:

Between 0 and 7 amp.....	10 Amp.
Over 7 and to 10 amp.....	15 Amp.
Over 10 and to 15 amp.....	20 Amp.
Over 15 and to 20 amp.....	25 Amp.

In this connection it may be of interest to give you a little of the history of this standard. The old standard for car heaters was one of installation; there was considerable discussion as to whether the standard should continue to be one of installation or should be one of performance.

Certain members of the committee insisted that the heater with its inclosing case be treated as a complete unit. The Underwriters' Laboratories and a representative of the Chicago Surface Lines very kindly offered to assist the committee in this connection. All of the heater manufacturers were invited to submit samples of their product for a heat run test to determine which type of installation should be considered as a standard.

The electrical engineer of the Underwriters' Laboratories, using the same temperature limit as is used on numerous other heat devices, set a temperature limit of 90 deg. C. (194 deg. F.) as the maximum temperature to any combustible matter adjacent to the heater (speaking of the heater case and all as a unit). The tests on the heaters submitted were run on regular car seats supplied by a traction company.

It was found that heaters could be manufactured which would be operated successfully below this maximum temperature. The sub-committee having this subject in charge then dictated the standard as it now stands in Sections 20 and 21 of the regulations of the National Board of Fire Underwriters. Later all of the heater manufacturers were invited to attend a conference on

on the market makes it impossible to pull a plugging device while a circuit is still energized.)

All equipment cases, except car-driving motors, must be constructed so that conductors entering them shall not be exposed. Ducts or coverings of such conductors must be securely clamped to such cases. Where outside connectors are used and wires must necessarily be exposed, they must be properly spaced, and connectors must be insulated equal to the insulation on conductors.

All locknuts and bushings used with conduits must be of such design as to prevent loosening by vibration.

Metal parts of the car extending above the roof, such as smoke pipes,

COMING MEETINGS OF *Electric Railway and Allied Associations*

Sept. 17-18—Mid-West Claim Agents Association, sixth annual convention, Elms Hotel, Excelsior Springs, Mo.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Oct. 10-15—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.

Oct. 25-29—Annual Congress and Exhibit, National Safety Council, Detroit, Mich.

Nov. 16-18—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.

November 16-19—American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.

the subject of the labeling of car heaters by the Underwriters' Laboratories. At this meeting it was definitely decided by them to subscribe to Underwriters' Laboratories' label service, designating that their heaters have been tested by the Laboratories and approved by them.

Wisconsin Utilities Association Studies Ways to Improve Public Relations

MORE than 100 delegates and friends assembled on Aug. 12 at La Crosse, Wis., for the two-day session of the Electric Railway Section of the Wisconsin Utilities Association. Many of the talks made at this meeting discussed the establishment of better public relations. An important note was sounded by C. R. Phenicie, vice-president Wisconsin Public Service Corporation, Green Bay, who said that any

attempts of this kind must not be too obvious.

Chairman Nels C. Rasmussen, superintendent railway department, Wisconsin Valley Electric Company, Wausau, estimated the present value of Wisconsin electric railway properties at more than \$67,000,000.

A forward-looking report on the subject of noise prevention has been developed by the Wisconsin association. Kent Wooldrudge, fellowship student at the University of Wisconsin, has devised a machine to measure a reverse direction. The noise is picked up in a standard loud speaker, then converted into an electric current which is greatly amplified and read on a milliammeter. Great possibilities are seen in the development of this machine and its application to the problem of noise reduction on electric railways.

Abstracts of papers and a full report of the meeting will appear in the next issue of ELECTRIC RAILWAY JOURNAL.

Shop Records and Their Value*

By A. TAURMAN

Superintendent of Equipment and Way and Structures,
Birmingham Electric Company, Birmingham, Ala.

FOR the proper and economical maintenance of cars and equipment it is necessary that we have adequate records, which should be kept in the simplest form and properly tied in with the records of the auditor and transportation departments, so when taken as a whole they will give a complete record of our activities.

Assuming that the proper records are available as to the type of equipment, date purchased and the manufacture thereof, the auditing department should furnish the shops with the accurate mileage of the individual cars which is obtained daily from the transportation department. This mileage is entered in a loose-leaf binder under the individual car numbers. A simple form is to add the mileage each day to that previously made, so that by simple subtraction the total mileage made between any two dates may be found.

Proper forms should be provided for the inspection, maintenance and complaint reports. Inspection and maintenance should be handled on a mileage basis and the blank forms should not only indicate the various parts of the equipment receiving attention but the workman's name and the dates on which the inspection and repairs are made.

The form for complaints should show the car number and various parts of the car with date and by whom the complaints are made and corrected. These forms should be filed by the car numbers and dates so that they may be easily referred to.

DATES ARE IMPORTANT

In the overhauling and repairing of equipment the dates on which they are made, class of material used and cost of labor should be kept. This is to ascertain if we are using the proper class of material and that the labor costs are not excessive.

*Abstract of paper presented at meeting of the Electric Railway Association of Equipment Men, Southern Properties, Chattanooga, Tenn., July 28-30, 1926.

When records are kept of the various parts of equipment, any weakness that develops or repeated failures will be called to our attention so that steps may be taken to remedy the defects. Where material is purchased under a guarantee, it is necessary that accurate records be kept as to its performance so the company may be reimbursed for the failure of the product to meet the manufacturer's guarantee.

A card index should be kept of all men employed, the date employed, their past record and present performance.

The shop should have access to the storeroom records of all material purchased, which should give the name of the manufacturer, cost, amount purchased and amount of each type used monthly.

Charts should be prepared showing cost of inspection, maintenance, number of failures, so that a comparison may be made with previous months and years.

Records should be kept of all buildings with their fire protection equipment and when repairs and inspection are made.

ACCURATE RECORDS WORTH THEIR COST

While the records outlined above appear at first glance to be expensive to keep, this is not the case when the proper system is put into effect. The inspection and maintenance of cars on a mileage basis insures that the equipment will receive attention at regular periods after certain service has been performed. The handling of complaints with the above system places responsibility for failures and insures that proper repairs will be made.

The keeping of records on material as to cost and life enables us to make the proper selection when it is purchased. This, in turn, assists in the proper and economical maintenance of our equipment.

Proper records in the equipment department not only help to prevent fail-

ures and accidents but materially assist the claim department in adjusting claims when accidents occur and make it possible for the transportation department to give adequate service to the public.

American Association News

Noise Reduction

A MEETING of the noise reduction committee of the American Electric Railway Association was held at Detroit Aug. 2, 1926. The meeting was attended by C. Bethel, motor engineering department, Westinghouse Electric & Manufacturing Company; Frank L. Hinman, assistant superintendent of rolling stock and bldgs. Philadelphia Rapid Transit Company, and H. S. Williams, assistant superintendent of equipment, Detroit.

During the year the committee has conducted a series of noise tests with apparatus built specially for this purpose as authorized by the A.E.R.A., the apparatus consisting of a noise pick-up device connected through radio amplification devices with a micro-ammeter giving definite readings, proportional to the amplitude of the noise vibrations. Tests were made on various track constructions and different types of gearing, in which the gears were tested independently of all other sounds.

The committee approved the method of testing and the preliminary tests. Further detailed tests are to be completed for submission with the committee's report to the Cleveland convention. It was decided to request of the association permission to exhibit the noise-measuring apparatus at Cleveland for the purpose of stimulating interest in the committee's work. Future work was discussed and tentative plans laid for further development of the noise reduction problem.

Metropolitan Section Plays at Pelham Bay

IN SPITE of a wide range of weather conditions, beginning with great heat and ending with deluges of rain, all the members of the Metropolitan Section, A.E.R.A., had a good time on their annual outing at Pelham Bay Park on Aug. 11. Golf, baseball, quoit pitching, tug of war and various other sports occupied the early part of the day. Rain in the afternoon caused an interruption to the baseball game between the railway men and the manufacturers. When the rain came the score was tied, but after the end of the storm the game was resumed, resulting in an overwhelming victory for the railway men. Golf enthusiasts were out early in the morning and played till 2 p.m. A new use for the bus was discovered in connection with the tug of war. After exhaustive pulling the supply men and the railway employees each won a heat. The third and final pull was won by the supply men through excellent co-operation with a near-by bus.

The News of the Industry

Union Organizers Leave Indianapolis

Indications that the International officials of the Amalgamated Association regard the strike of the employees of the Indianapolis Street Railway, Indianapolis, Ind., as lost is seen in the departure of four representatives of the organization from the city. L. D. Bland, national treasurer, and P. J. Shea, member of the general executive board, have returned to their homes in Detroit. Mr. Shea would make no comment on their departure. Mr. Bland, however, said the strikers still had the union's support morally. It was made clear some time before that the International would send no more strike benefits to the Indianapolis strikers. Officers at that time recommended that the strike be called off. Members of the striking local, however, refused to take such action.

John M. Parker and Robert B. Armstrong, vice-presidents of the Amalgamated, were released on bond by Judge Robert C. Baltzell in federal court in Indianapolis following the granting of an appeal of their conviction for contempt of court. Bonds were set at \$10,000 each. Parker and Armstrong, organizers of the Indianapolis local of the union, were found guilty of contempt of court a week prior and were remanded to jail until the appeal was filed. They were charged with violation of an injunction which prohibited them from counseling a strike, encouraging strikers or interfering with the operation of street cars.

Edgar Day, a striker, who appealed his conviction of contempt, also was released on a bond of \$5,000. Parker and Armstrong received sentences of 90 days in jail. It was announced by attorneys for the two men that the organizers would be withdrawn from Indianapolis by the national officers of the union. Jefferson Fade, another of the strikers, was released on his own recognizance after having been convicted of contempt.

Attendance of strikers at the daily meetings has fallen from about 500 to 100.

Wages Advanced in Memphis

An increase of 2½ cents an hour was awarded to Memphis Street Railway union employees by the board of arbitration in its decision announced on Aug. 6. The award is effective as of April 1 this year, and the accumulated wages held in abeyance pending decision of the arbitration will be paid by the company to the men on Aug. 21.

The increase raised the wages of the men from 45, 50 and 55 cents for one, two or three and more years of service to 47½, 52½ and 57½ cents for the respective periods of service.

Judge M. R. Patterson, Attorney

A. B. Galloway and L. P. Miles made the award, the first two voting for it, and Mr. Miles, representing the company, dissenting.

The new contract is effective for two years from April 1.

In an editorial on Aug. 8 the *Commercial Appeal* strongly commended the spirit of the men and the company in arbitrating the issue. It emphasized that public interest is always best served when men are sane and fair.

The editorial said in part:

The most friendly of relations between company and employees were maintained during the period of controversy. There were no criminations and recriminations. The conflict of views was the result of honest opinion, and each company of disputants showed for the other a consideration that was commendable.

Instead of a disrupted service while the questions was under consideration, regular schedules have not only been maintained, but the service has been improved. This improvement could not have been brought about except for the wholehearted co-operation of employers and employees.

Newark, Ohio, Without Railway Service

Unfortunate Situation Forced Upon Management by Activities of City Authorities Acting Against Wishes of People—Public Relations Good and Loyal Co-operation from Employees Gratifying

AS OF midnight, Tuesday, Aug. 10, the city of Newark, Ohio, is an all-bus town, operated by the newly created independents. For years railway operation has failed to pay expenses. Despite this, service has been maintained through two receiverships and after great effort and absorption of heavy losses a new franchise was granted by the city of Newark which became effective on Nov. 22, 1924. This ordinance relieved the company of certain paving, extended the franchise life for 25 years and allowed the company to charge a fare necessary to pay for the service. It fixed the fare for the first year. The franchise also carried a clause allowing the company to withdraw any portion or all of its rail or bus service if any competitive lines should be granted a permit to operate.

The granting of this franchise was one of the elements which enabled the company to reorganize and emerge from the second receivership. This it did as the Southern Ohio Public Service Company, which operates the light, power and railway in Zanesville, the railway in Newark, and the interurban line connecting Zanesville, Newark and Columbus.

As a part of the reorganization plans the company acquired control of all bus operations in Newark and has been giving the city of Newark a co-ordinated service of rail and bus even at a substantial loss after operating expenses for the combined operation. In accordance with the terms of the franchise, the company asked the Council for an increase in fare to 10 cents cash and four tickets for 25 cents. The Council took no action. After a period of three months the company further, in accordance with its franchise, announced that the new fare would become effective as of March 5, 1926, whereupon an injunction against the increase in fare was obtained, and before final disposition of the injunction proceedings the court declared a vacation.

Not satisfied with this, the Council, contrary to the spirit of the past two

years negotiations, has granted a competing franchise for an independent to give service paralleling all the company's rail and bus lines at a 10-cent cash fare and tickets at a reduced rate. Sixty days after this fare permit eight buses appeared on the street.

In view of the lack of faith shown by the Newark City Council and the extensive losses sustained by the company during the past several years the company decided to close down its entire local bus and rail service. On Aug. 9 the company had a meeting with its men and advised them of its intention. The company, however, allowed its men, thus thrown out of work, ten days' wages. On Tuesday night the company ran a full-page advertisement in the local papers outlining the series of events that led to its action and announcing the fact that the service would be discontinued as of that day.

The company's rate has been maintained through the injunction proceedings at a 6-cent cash fare with nine tickets for 50 cents.

The franchise granted by Newark City is similar to that passed by the city of Zanesville at a prior date. The greater faith of Zanesville has resulted in a high-grade co-ordinated bus and rail service in that city at the same fare asked in Newark. Zanesville is pleased with the service and the relations between the public, the Council and the company are excellent.

Council planned a special meeting following the announcement to abandon, but put off action. An indignation meeting of 600 could not be accommodated at the Chamber of Commerce headquarters and moved to the City-Hall. Citizens stormed independent buses. Sentiment is strong against the Council for granting the 5-cent bus franchise.

A notice of the company to the citizens of Newark, headed "What more can we do?" signed by R. Z. Zimmerman, vice-president and general manager, follows:

When the present management took over what is now the Southern Ohio Public

Service Company's property in Newark it set about to provide a modern and adequate transportation service, in order to render good public service.

With this plan in mind, it proceeded to lay the groundwork for what was believed would best suit the needs of the community.

Accordingly, your City Council was implored in order that suitable legislation might be enacted, whereby both the company and the city would be protected, and negotiations were carried on for nearly two years, resulting in the passage of Franchise Ordinance No. 3619.

This franchise contract placed upon the Southern Ohio Public Service Company the obligation of furnishing Newark with transportation facilities for a period of 25 years, and believing that the contract was made in good faith, the company proceeded to put into effect the plans prepared for a satisfactory transportation service.

There are few citizens who are not aware of the efforts made to rehabilitate the rolling stock and provide new buses—buses built in Newark, with Newark labor and materials—on both of which were spent large sums of money. As to whether our efforts in this direction were worth while, they who know must be the judges.

One of the vital clauses in the franchise ordinance provides for a fare regulation—upward or downward—as the circumstances warrant, and when it was found necessary to have an upward revision in order to permit the property to continue its usefulness, the city denied the privilege and court action ensued, which added to the burden under which the system was already staggering. Contrary to the intent of the existing franchise ordinance, the city administration encouraged and created competitive operation, allowing a cash rate of fare of 10 cents, which rate of fare was denied our company upon application. Not content with these actions, a bus regulating ordinance is now being considered by Council, which will enable the city administration further to hamper our operations. These actions naturally prevent the company from carrying out its program, and generally makes the situation untenable.

It is an outstanding fact, that when a utility is regulated in its procedure by a duly authorized governing body a duplication of plant and equipment cannot endure.

No business can survive unless it is self-supporting. Our contract with the city provided for one important item, namely, that we should be permitted to earn operating expenses, taxes, money with which to renew worn out plant and equipment and interest on the money invested.

Is there anything fairer than this?

Every business institution in Newark, and elsewhere, was founded and is being operated with the above principle in mind.

Much as we would wish to believe otherwise, we feel that our rights under the contract with the city have not been given consideration by those in authority, and it is with genuine regret, because of our loyal employees and the thinking citizens that have given us their support, that after four years of conscientious effort to serve the people of Newark we are compelled to announce our decision to abandon all city street railway and bus operations in the city of Newark at midnight of Aug. 10, 1926.

Our action is prompted solely by the unfortunate trend of events, and has been taken only after careful consideration of all the interests involved, and we wish to assure every one that it was our wish not to give up until every effort had been exhausted, and only when faced with the task of doing the impossible and we trust the public will be generous enough to see our point of view.

Our announcement would not be complete without an expression of appreciation for the hearty co-operation received from our employees and the citizens, who realize the seriousness of the situation confronting the city and ourselves.

Transportation Survey in Canton

At a meeting on Monday night, Aug. 9, the City Council of Canton, Ohio, engaged the Beeler Organization, New York, to make a complete survey of the railway, bus and traffic situations and to advise the city concerning the question of the renewal of the franchise of the Northern Ohio Power & Light Company, operating in the city under a grant which expires in February, 1928.

Alderman Approve Home Rule Plan for Chicago

A plan which would strip the Illinois Commerce Commission of substantially all of its control over public utilities in the city of Chicago and delegate such powers as the commission now wields to the local city government was approved on July 30 by Mayor Dever's "Home Rule" committee. The resolution creating this committee was introduced by Alderman J. M. Arvey several weeks ago and was referred to in the *ELECTRIC RAILWAY JOURNAL* for July 17, page 122.

The objective of the committee is to lay plans for submission of the question to a referendum at the Mayoralty election next spring, under the terms of Article 6 of the Illinois Commerce Commission act providing that any municipality may withdraw its utilities from the ruc of the commission.

To call the proposed referendum, the committee's chairman stated, it will be necessary to obtain the signatures of 181,000, or 25 per cent of the city's voters. Circulation of petitions for such a referendum was discussed by the members of the committee at their meeting. Under the terms of the article it is also provided that the proposal must receive a majority of the votes cast in the Mayoralty election. If the referendum is successful the decision of the city would still be subject to appeal.

Corporation Counsel F. X. Busch says the article is replete with jokers and ambiguities and that its promise of home rule at the will of the electorate is illusionary. He believes, however, that the hindering provisions are not insurmountable.

Fare Issue Revived in New York City

Controller Berry of New York City has demanded that the Board of Estimate take some definite action toward formulating a policy of financing subway construction and operation. This has lifted the 5-cent fare into renewed prominence in New York politics. The situation seems to be complicated, rather than simplified, by the recent decision of the city government to the effect that it is mandatory upon them to submit to the voters this November the Craig 5-cent fare referendum bill, passed by the Municipal Assembly last year too late to be put on the ballot at last year's election.

Controller Berry started the fireworks in July. At that time he wrote to each member of the Board of Estimate declaring that it was time for a show-down on the city's financial program. The Controller stated that it really costs approximately 7 cents to carry each person on the present subways, and in consequence the city has been forced to make up the deficit by taxation. It costs the city annually \$13,845,000 in payment of interest on subway bonds, besides the fact that \$300,000,000 of the city's credit is tied up in these bonds. The Controller demanded that it be decided at once whether the deficit should continue to be made up out of the city treasury or

the subways be made to pay for themselves by means of an increased fare.

In the meantime, Mayor Walker has flatly declared that he considers himself pledged to the 5-cent fare, which was such an important plank in the platform upon which he was elected. The situation is a ticklish one for the administration, since an increase in fare is sure to meet with opposition from subway riders, whereas an increase in taxation of benefited property is sure to bring forth lamentations from the taxpayers.

In this dilemma the Craig referendum bill offers the administration a Heaven-sent solution, in the opinion of New York politicians. The bill, if approved by the voters this fall, would make it impossible for the Board of Estimate to raise the subway fare until such a move had been approved by referendum vote, and furthermore, the board could not even submit such a change to the public until requested to do so by petitions signed by 15 per cent of the voters of the city. If this bill is approved by the voters this November, the administration will then be relieved of the embarrassing necessity of deciding definitely whether the 5-cent fare is to go or stay.

Paving Question Up Again at Lincoln

In the face of the fact that the voters at an election held a year or so ago refused to relieve the Lincoln Traction Company, Lincoln, Neb., from its liability for the paving of that portion of the street it occupied, the City Council is indisposed to take such action on its own initiative, even though company officers insist that relief of this kind is essential for the company. The city legal department is now working out the status of the pavement where the cars are to be replaced by buses.

City Attorney Peterson says that the situation seems reasonably clear. After pavement is laid or is ordered laid between the rails and 1 ft. on either side the railway must replace the paving and pay for it if it takes up the track. When the paving is done subsequent to the taking up of a track, the company will not be held for any part of the cost, which must be paid by the abutting property owner.

The city takes the attitude that wherever the bus is substituted, which, for the present, will be only on two long suburban lines, the company must maintain without loss of efficiency the services that are now established. The occupation tax is to be extended to the bus lines or, in lieu of that, a license tax will be imposed that will bring about as much revenue to the city. Mr. Chubb for the railway urged that this be abolished, but the city is not inclined to do this. This amounted to \$3,120 last year.

Mr. Peterson has recommended to the Council that it continue the occupation tax, as the license system applied to each bus would discourage the company from maintaining an adequate reserve of buses for peak load times and would relieve it from the bonding feature of the existing jitney ordinance.

Memphis Editor Comments on Street Car Riding

An editorial in the *Commercial Appeal*, Memphis, Tenn., of June 24 set forth the benefits of street car riding over the various other possibilities of traveling to business. It did this in a way that attracted the attention not only of the newspaper readers but of the railway company itself. The editorial follows:

ON STREET CAR RIDING

Came down town on the street car yesterday morning. Often ride the street cars. There were 25 cash fares on the car and two transfers. Half way down six street car men got aboard. The street car company hauled all of us from Peabody, near Cooper, to Main and Madison for \$1.75 cash and about 6 cents added cash.

If all of us on board the car had owned automobiles it would have taken 31 cars to haul us. If we had ridden down in taxis, say, two to the taxi, our fares would have been about \$17. It would have taken fifteen drivers to bring us down. The fifteen automobiles would have occupied a line in the street of about 20 ft. If we had all ridden down in our own automobiles the investment would have been about \$30,000.

Yet, the street car did the entire job for about \$1.80, besides hauling six extra men for nothing.

The street car did not take up any more room in the track than two automobiles would have taken.

Street car transportation to the user is the cheapest thing we know of. You step on the car and pay 7 cents, then step off and go about your business. You don't have to hunt parking space. You don't have to carry accident insurance.

And yet the street car business is declining. From a point of economy and efficiency, the business should not decline.

We had a nice time in the street car. It was about 11 o'clock and the car was not crowded. We had a set to ourselves. We read the morning paper and enjoyed Mr. Tracy's story about the mass meeting held at the Chamber of Commerce. Then we read of the prospective golf game which was to take place in England. Then, having a few minutes to spare, we read the Busy Man's Corner and thought on it for a few minutes.

If you can get a seat on the street car and you have something to read, you will not waste any time. If you haven't anything to read, you can look out and see the flowers in the suburbs.

You can look at the fine houses, then look at the humble houses. Then you can see some of the big rich, and see some of the very poor. Then if you begin thinking, you will soon find out that there is very little difference between the big rich and the very poor. If there is a difference, it will not be for long, because all of them will be dead in a few years, and all dead people are alike.

When we finished this, one secretary said: "You didn't tell them how long you had to wait to catch the car."

We caught the car on the minute. Another secretary said she knew the schedule on her line and caught cars as they came along.

All of which means that Mr. Tutwiler ought to put some more cars on some lines. More cars cost a great deal more money. If we had our way about it, we would have double the number of cars and put the present conductors on as motormen.

The Memphis Street Railway reprinted the editorial in its booklet "Trolley Items" with the following comment:

Regarding the foregoing editorial we should like to make two observations:

1. Thirty-two new street cars have recently been ordered and are expected to begin arrival by July 15. All of the new cars should be received within four or five weeks after the first shipment comes in. Thus we are meeting the newspaper editor's view for increased service—at least to the extent of about 20 per cent. No one is more pleased at being able to give good service than are the executives and employees of the street railway.

2. We want to offer a slight correction to paragraph six. It was true for about five years following 1920 that street car business declined. However, about nine or ten months ago the business over the country began to "pick up," and today a healthy increase over the depressed condition that obtained for about five years is evident.

In Memphis our increased patronage and revenues began to be evident along about August, 1925. The increase has been sustained throughout the months since that time.

We are hopeful to believe that the hardest days that the street railway has had to suffer are passed, and that from now on business will be better and better.

This condition is true not only in Memphis but throughout the country.

People have come to understand that street railway service is not only the most economical form of transportation but that it is also reasonably convenient, while being the safest means of travel on city streets.

We are happy to observe that editors of newspapers are manifesting the sane and commendable spirit of fairness toward street cars as that manifested by the editor whom we have quoted.

We appreciate very much his excellent statement of our own case.

The economy of street car riding, as he so clearly shows, is its great appeal. But the street car is a very important servant to every individual in the community, and deserves the cordial spirit of patronage which the writer of the editorial manifests.

Seventy-five and Still on the Job

Sixty years in the service of one company is a long time.

That is the record of Joseph W. Hicks, assistant to the president of the New York State Railways, who on Aug. 10 began his 61st year as an employee of that railway.

Back in 1866, when a lad of fifteen, "Joe" Hicks entered the employ of the

No Parking Rules Save Traffic Situation

In an open letter to the New York newspapers, H. J. Sheeran, chairman of the Manhattan Surface Line Operators Traffic Committee, and president of the New York Railways, has called public attention to one common factor in the emergency regulations governing the increased street traffic which followed the subway strike in New York and by the attendance at the Eucharistic Congress in Chicago—that was the "No Parking" order. He says in part:

In order to meet the emergency, Police Commissioner McLaughlin put into effect an order prohibiting parking on the more important longitudinal streets. The effect was immediate. Our thoroughfares seemed to widen overnight. In spite of the greater number of vehicles in the lower part of the city, traffic moved better than usual. There was less confusion and fewer traffic delays.

The no-parking order, according to Deputy Chief Inspector Coleman, resulted, for all practical purposes, in widening the streets 12 ft. It added a new automobile lane on each side of the streets.

Similarly, it was only through the adoption of no-parking regulations that Chicago was able to transport the huge crowds that attended the Eucharistic Congress. In a three-day period the Chicago Surface Lines carried a total of 15,056,000 passengers, or more than 5,000,000 daily. To appreciate the magnitude of this volume of surface travel, it is only necessary to compare it with the number of passengers carried on our own Interborough subway, which in



J. W. Hicks, Driving First Horse Car, Celebrated 60th Anniversary in Service at Rochester on Aug. 10

company, then the Rochester City & Brighton Company, as "a hillboy," driving extra horses on the trolley cars up the inclines of the city. Then he cleaned lamps in the carhouse and finally got a run of his own as "a motorman" on the horse cars.

His advance was steady to his present high post of assistant to James F. Hamilton, the president of the corporation.

"I have had so many anniversaries that they are getting to be an old story," the veteran railway man told an ELECTRIC RAILWAY JOURNAL representative on his anniversary day. And his 60th anniversary found Joe Hicks, an alert, vigorous figure despite his 75 years, right on the job, putting in a full day's work.

His service record is believed to be without a parallel in the East. It was reviewed at length in an article about Mr. Hicks in the ELECTRIC RAILWAY JOURNAL for Sept. 12, 1925, page 420.

the year ended June 30, 1925, averaged 2,018,000 daily.

Thus, street cars in America's second city were able to provide an emergency service which carried nearly two and a half times as many people as are carried daily on our far-famed subway system. They were able to do this solely because of traffic regulations which recognize the fact that mass transportation is more important than private transportation.

The New York correspondent of the Cincinnati *Times-Star* wrote to his paper that a miracle occurred. On the first day of the strike, although street traffic must have increased enormously, it moved more smoothly than it had done for years. The police had a great many other and more drastic changes in traffic rules under consideration, but this one change made traffic move so steadily and swiftly that no other was required. "The inevitable conclusion," he says, "is that one-half the ordinary parking is unnecessary, and that it is the unnecessary parking which makes all the traffic troubles."

Pay Advance Suggested for San Francisco Trackmen

The Board of Supervisors of San Francisco, Cal., has adopted a resolution urging the Mayor to direct the Board of Public Works to increase the wages of trackmen and others employed by San Francisco Municipal Railway who were not given the 40-cent wage increase granted to trainmen last spring.

Secretary John O'Connell of the San Francisco Labor Council said that the men were entitled to the increase, and that it had been promised them. It is said the trackmen are getting the equivalent of the platform men now, and besides have two days off a month.

Suggestions Sought from Baltimore Employees

The United Railways & Electric Company, Baltimore, has just put into operation a plan of payment for ideas suggested by employees of the company. All employees with the exception of department heads are eligible and the company has announced to them that awards of from \$5 to \$100 will be made, according to the value of the suggestions. As the plan is not a contest the employees are permitted to send their suggestions to the committee on efficiency awards at any time. The efficiency committee will place a value on the suggestions and the awards will be made by Charles D. Emmons, the president of the company.

All the suggestions made by the employees must be original. The employees need not confine their suggestions to the work of their own departments and ideas may be developed by two or more employees working together, in which case the award will be divided equally. If the suggestion is one that requires time to present in clear, understandable form, the employee is permitted to present a brief written statement of it at once, entitling him to priority in case the same idea is submitted by another employee.

Key System Living Up to Its Promises

Charging that the Key System Transit Company, Oakland, Cal., has failed to live up to its share of the agreements whereby fare increases on street cars and ferries were granted last January, Mayor John L. Davie has demanded that the fare increases be rescinded.

The ELECTRIC RAILWAY JOURNAL of Feb. 20 recorded the agitation aroused when the street-car fare was raised from 6 cents to 7 cents, and ferry rates from 18 cents to 21 cents.

The Mayor asserts that the company agreed to make certain improvements in the way of ferry and pier facilities, purchasing 120 new street cars and constructing new car lines. He contends that the company is purposely delaying the work so that it will not be ready for the continuance of the original rate hearing, set for Sept. 14.

In answer to the Mayor's assertions, G. H. Harris, general manager of the Key system, states that the company

is fulfilling every obligation; that it is expending \$9,000,000 in carrying out not only the orders of the commission but additional improvements of its own; that two new boats are already under construction; that more than \$2,000,000 has already been spent and a reconstruction plan of \$2,000,000 is under way.

Electric Suburban Service of Illinois Central Formally Opened

With company officials and 2,000 invited guests abroad, including scores of railroad and steamship executives, the first electrically operated suburban train of the Illinois Central Railroad made a triumphant run of 28 miles from Matteson, Ill., to the heart of Chicago in Aug. 7. Although test trains and a few "off-peak" passenger trains have been operating over a portion of the suburban divisions for several weeks, the day marked the official opening of electrified service on a substantial part of the Illinois Central's nearly 40 miles of suburban system.

More than 100 business and civic organizations of Chicago's south side participated in the mammoth "Pageant of Transportation" in Grant Park which followed the arrival of the first through electric train. Every mode of transportation used in Chicago since the day of Father Marquette was depicted in the giant tableau.

When the changeover to electric operation is completed early next month, the Illinois Central expects to have about 12 per cent more suburban trains in operation and 50 per cent more passenger carrying facilities than in the day of steam operation. Train schedules will be speeded up, it is announced, to save anywhere from 7 1/2 to 30 per cent in the time it now takes commuters to get downtown, the relative saving depending on the length of ride and the number of stops. A two-minute headway will be maintained during rush hours.

On Aug. 9, two days after the formal opening, 250 of the 402 week-day suburban trains operated were electrically driven. The South Chicago branch, 5 miles in length, is completely electrified and all local trains on this line and from Randolph to 67th Streets on the main line are now being operated by electric power. The only steam service remaining is on the through trains between Chicago and Matteson and on the Blue Island branch, and this will probably be fully electrified by Sept. 1.

For electrification and parallel betterments the Illinois Central had spent up until June 30, the following amounts:

New cars and equipment	\$11,353,600
Wires, tracks and stations	6,389,000
Elimination of grade crossings ..	8,127,000
Changing track grades	4,026,000
Constructing Markham freight yard	11,711,000
Other improvements	10,771,000
Total	\$52,377,000

Ever since the plans for the improvement were first announced by the Illinois Central the prospective benefits have been reflected in conditions along the entire suburban routes.

Transportation Halted by Severe Storm

One of the severest thunder storms in years was experienced at New York just before the evening rush hour on Aug. 12. The Interborough Rapid Transit lines, both Seventh Avenue and Lexington Avenue routes, were paralyzed by floods at a dozen different points, and in some cases trains were delayed several hours.

The Long Island Railroad was hardest hit, for floods in the East River tunnel completely halted all service, and moreover, prevented the Pennsylvania from keeping up its main line service, since its trains are made up in the company's yards in Long Island City, across the East River. Surface cars managed to keep fairly close to a normal schedule, in spite of the flooded streets.

Re-Electrification of South Shore Completed

With the completion of the re-electrification program of the Chicago, South Shore & South Bend Railroad on July 28, the company's new steel passenger cars began operating over the entire line from South Bend to Kensington.

For a short time South Shore trains will continue to be hauled from Kensington to downtown Chicago, a distance of 15 miles, by Illinois Central Railroad steam locomotives. The Illinois Central, however, will in the near future begin regular operation of its electric suburban trains from Kensington to Randolph Street and then South Shore trains will be run to the downtown terminal under their own power.

While the change-over from alternating to direct current for train operation has been completed, the company's rehabilitation program continues. Improvements are being made in the track, thousands of new ties are being laid, and new siding are being built. Improved service and faster running time are soon to be effected.

Concessions Sought from Railway in Elizabeth

Frank J. Travers and Dennis F. Hennessy have been appointed a special committee to conduct a survey of the transportation service of Elizabeth, N. J., and to recommend a plan for the adoption of a single fare system within the municipality.

The committee intends to confer with officials of the State Board of Public Utility Commissioners and the Public Service Railway in an effort to obtain their consent to the rerouting of certain trolley and bus lines with a view of providing service to permit passengers to travel from the western part of the city to the downtown section for a single fare without being obliged to change cars in Broad Street.

The committee members propose to investigate the situation before deciding the question of employing a transportation expert, as recommended by the Civic Council on Transportation, which was formed recently by representatives of Elizabeth improvement associations and the Chamber of Commerce.

Negotiations for New Franchise for Sandusky

Negotiations are in progress between the Lake Shore Electric Railway, Cleveland, Ohio, and the city of Sandusky for a new franchise. The one under which the company has operated for 25 years expired on July 30.

In its application the company asks the right to charge a 7-cent fare instead of the present 5-cent fare. The city has indicated through the City Commission, that 7 cents is considered too much.

The city, on the other hand, wants the company to stand a share of the expense of elimination of dangerous grade crossings, and the company has let it be known that it does not favor the proposal.

Grand Rapids Rides in New Cars

An account is given in the July booklet published by the Grand Rapids Association of Commerce of the new cars of the Grand Rapids Railway, Grand Rapids, Mich. Much of the credit for installing these new coaches, selected after much experimenting and comparing as regards convenience, comfort and operation, is given to L. J. DeLamar, vice-president and general manager of the railway. The president of the Association of Commerce says that there is a tendency on the part of the residents of Grand Rapids to ride in these new cars in preference to taking their own autos to and from business—a great step forward in reducing traffic congestion in the business section of the town.

New Color Standard in Cincinnati

Decision to standardize on a uniform color for street cars and buses has been made by the Cincinnati Street Railway, Cincinnati, Ohio. This will necessitate changing the color of the bodies of the electric cars operated over the system from yellow to burning brush orange. The buses operated by the company are painted in the latter color, trimmed with cream. Walter A. Draper, president of the company, states that the work will be done gradually in order not to interfere with the transportation service. The yellow color has been the standard for the past five years, prior to which time a light lemon shade had been in vogue for approximately 30 years.

Safety Contests at Rochester

To promote safety on the Rochester lines of the New York State Railways, Leon R. Brown, safety director of the company, has started a contest among the divisions, with the leader receiving a banner at the end of each month. For July the State Lake division won the banner, with a record of only one accident for every 19,000 miles.

The banner was presented by Roy R. Hadsell, general superintendent, at a meeting addressed by a representative of the Safety Council of the Rochester Chamber of Commerce.

Mr. Brown said there were 378 men in the company's service with a perfect record so far this year. Those who

have no accidents for an entire year are given a \$1,000 sick and accident insurance policy as a reward.

The team of ten men with the best safety record for the year receives new uniforms throughout.

By these means, Mr. Brown declared, accidents on the Rochester lines of the New York State Railways have been reduced to a minimum.

Arrangements Made for Milwaukee Traffic Survey

The Common Council of Milwaukee, Wis., has acted favorably upon the recent proposal of S. B. Way, president of the Milwaukee Electric Railway & Light Company, in which he suggested that a thorough traffic survey be made in Milwaukee with the idea of obtaining an impartial insight into street transportation needs. In his letter to the Common Council Mr. Way said the cost of this city-wide survey would be met by the company providing it did not exceed \$50,000.

Direction of this transportation survey will be undertaken by the transportation survey committee of the Common Council. One of the first steps taken by the new committee was the employment of McClellan & Junkersfeld, New York, to compile the data upon which the future transportation needs of Milwaukee will be made.

C. U. Smith, Milwaukee harbor terminal director, has been elected chairman of the committee. An executive committee composed of one member from each of four representative groups was appointed. The members named were William A. Jackson, vice-president of the Milwaukee Electric Railway & Light Company; W. H. Damon, resident engineer of the Wisconsin Railroad Commission; P. A. Koehring, president of the Milwaukee Association of Commerce, and Mr. Smith.

The city's contract with the engineering company provides that the committee shall have full authority over the survey work. The Milwaukee Electric Railway & Light Company will have nothing to do with the actual work

Railway Offers Bridge for Detour in Ohio

Engineers of the Ohio State Highway department estimate that motorists using the National Highway through Springfield, Ohio, will be saved nearly \$30,000 in the next ten weeks as the result of the action of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, offering the state the use of its traction bridge as a short detour while the regular vehicle bridge is being repaired. The state will maintain watchmen to guide traffic and has also agreed to release the company from any liability in case of accident and to see that the company's cars are not delayed. Prior to the offer by the railway the detour used was several miles in length and terribly rough. The traction bridge is planked for the vehicles.

other than to permit the co-operation of its own engineers. Reports will be made direct to the committee.

Records Being Made by Wisconsin Interurban

That business on an interurban line can be increased if proper steps are taken to bring such a system up to a degree of efficiency from the standpoint of service, safety and equipment to enable it to compete successfully with the private automobile and bus is shown in the operation of the Milwaukee Electric Railway & Light Company's new high-speed line connecting Milwaukee, Waukesha and Watertown, and covering a route of about 50 miles.

Since this service was started on June 14 patronage on the interurban line has increased fully 40 per cent.

More than \$1,000,000 was spent for the construction of 5½ miles of new double trackage cutting through sparsely settled sections west of Milwaukee. Frequent service, up-to-date equipment and operation over a private right-of-way through suburban towns were factors which enabled the company to offer a service equal to or better than the time required to reach these cities by automobile or bus.

Winter schedules are now being prepared. The company expects to continue the present half hour service throughout the year. The present running schedule from Milwaukee to Waukesha is only 35 minutes. It is easily maintained and may be reduced to 30 minutes later.

Action on Paving Relief Delayed at St. Paul

Action by the voters of St. Paul, Minn., on a charter amendment to carry out the suggestion of the Minnesota Railroad and Warehouse Commission that the city relieve the St. Paul City Railway of the cost of paving between its tracks has been delayed to the fall election. The charter commission did not act in time to include the proposed amendment in a special charter amendment election on Aug. 24. In making a valuation of the railway in fixing a reasonable rate of fare the state commission noted that the railway was being too heavily burdened by taxes to be able to make its 7½ per cent return on valuation at the proposed rate of fare. This was last year and action is still delayed, after seven months.

Traction Company Athletes Honored

The Beaver Valley Traction Company and Beaver Valley Motor Coach Company, New Brighton, Pa., celebrated the success of their track team in taking second place in the recent Beaver County Industrial athletic field meet by holding a banquet on July 27. C. D. Smith, general manager, distributed medals to those men who won events. The company's team was the dark horse of the contest and surprised the spectators by carrying off second place. The meet was won by the Babcock & Wilcox Tube Company.

Weekly Pass in Madison

Daily users of the Madison Railways, Madison, Wis., were offered a bargain during August when the company decided to adopt the weekly pass system as a means of increasing patronage. Passes will be sold for \$1.25 and will be good for an unlimited number of rides on all lines during the week for which the pass is dated. Passes will not be accepted on the company's bus line.

Slower Speed Suggested for Schenectady-Albany Service

A further conference between members of the Public Service Commission and representatives of the Schenectady Railway and the cities of Albany and Schenectady over operating conditions between Albany and Schenectady took place on Aug. 11. The report of the engineer of the commission recommends a reduction in the speed of cars between the two cities. Express cars now take 50 minutes and locals 55 minutes to make the 17-mile trip. It was suggested on behalf of the railroad that all cars operate on a 30-m.p.h. basis. The conference was closed pending an order to be made by the commission.

Franchise Action in Kansas City Unlikely Now

Action on the proposed franchise for the Kansas City Railways, Kansas City, Mo., appears unlikely before fall, possibly not until after the November election, as several members of the Council will be out of town during August. The franchise must have three full readings by the Council before any action can be taken. The Mayor has suggested that a sub-committee be appointed to work out a franchise plan that will be acceptable to both the city and the railway.

More One-Man Cars for Milwaukee

The application of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for permission to substitute one-man cars for two-man cars on its Wells-Downer line beginning Oct. 1 has been approved in a preliminary order by the Wisconsin Railroad Commission. No one opposed the use of one-man cars on this route. The company was notified promptly of the commission's action in order to allow ample time to remodel cars. When the company advises the commission that it has the equipment ready a formal order will be issued to start the service. The company plans to replace ten two-man cars with twenty one-man cars.

World's Playground Plans Added Facilities

Extensions to Atlantic City's transportation system are being planned by a group of local business men headed by B. George Ulizio to serve sections of the city not now reached by electric railway lines.

Present plans, which are based on

recommendations made in a survey of the city's transportation needs by Fisk & Roberts, New York, call for four bus routes: A longitudinal line on Arctic Avenue, which runs parallel with the ocean front about half a mile inland; a route from the business section of Atlantic City to Pleasantville, northwest of the city, and two crosstown routes connecting the Boardwalk with the center of the city.

The report of Fisk & Roberts shows that of the 4,832 persons who enter the city during the morning rush hour 78 per cent are carried by the electric railways and 22 per cent by the 200 jitneys which operate on Pacific Avenue.



News Notes

Virginia Electric Only Bidder for Blanket Traction Franchise.—The Virginia Electric & Power Company, Richmond, Va., was the only bidder for the new blanket traction franchise before Common Council recently. That company offered \$1,000 for the franchise, and in presenting this bid also filed its certified check for the amount specified, as well as a certified check in the sum of \$10,000 as a bond requiring the company to observe the provisions of the franchise. Without debate, and in accordance with the rules, the paper was referred to the streets committee for recommendations.

One-Man Cars for Ohio Line.—One-man car operation has been installed by the Northern Ohio Traction & Light Company, Akron, Ohio, on its Canton-Massillon interurban line. At the same time a new Nachod signal system which it is believed will be an aid to motorists at the crossings was installed. The signal system is known as the three-position following protective system. Green, yellow and red lights are used.

Rail Removal at Springfield Arranged.—The Springfield Street Railway, Springfield, Mass., has agreed to the decision of City Engineer O. E. Parks, Westfield, Mass., to start immediately to take up the rails of the abandoned lines in Westfield. The rails on Mill and Union Streets will first be removed. Officials of the railway have agreed to pay the city 70 cents a foot for replacing the pavement destroyed in carrying on the work. The work is to be done under the supervision of the city.

Railway Opposes Buses in Massachusetts.—The East Taunton Street Railway, Taunton, Mass., is opposing the petition of John J. O'Connor to operate his Taunton Bus Line on a schedule conflicting with the trolley schedule. At a recent hearing before the Public Utilities Commission Mr. O'Connor said that the bus service did not compete with that of the railway inasmuch as the bus company charged a 10-cent fare and the trolley a 5-cent fare.

Baltimore Boosters Club Has Rail Representative.—Raymond S. Tompkins, assistant to the president of the United Railways & Electric Company,

Baltimore, Md., has been appointed a member of the executive committee of a commission recently named by Mayor Howard W. Jackson to plan ways and means to attract more visitors to the city. Mr. Tompkins represents the various public utilities corporations on the committee.

Missouri Tariff Regulation Extended for Six Months.—The Missouri Public Service Commission at Jefferson City, Mo., on July 29 extended for a period of six months additional, effective Aug. 1, the temporary tariff authorized on Jan. 25 on the Missouri Electric Railroad, St. Louis, Mo. As reported in the *ELECTRIC RAILWAY JOURNAL* of Feb. 6, the January order established fare zones between Wellston and St. Charles, a fare of 7 cents for each zone being permitted. This reduced rate, as was hoped, eliminated the independent competing bus line.

Would Force Company to Pave Between Rails.—In an effort to force the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., to pave between its rails in South Fourteenth Street, the City Council at New-castle, Ind., has passed an ordinance establishing a speed limit of 5 m.p.h., through the city for interurban cars and providing for complete stops at all street intersections. Residents of the street are averse to paying for the paving between the rails. The controversy has existed for more than three years.

Hearing Completed on Abandonment of Utah Line.—The hearing has been completed on the application of the Utah Light & Traction Company, Salt Lake City, Utah, for permission to discontinue service on part of its Third East Street Line and to remove the track. The case was taken under advisement. The company contends that patronage on this route is not sufficient to warrant its continuation and that the territory will be adequately served by other lines. Mention of the company's application to abandon the line was made in the *ELECTRIC RAILWAY JOURNAL* of July 17.

Approves Transfer Charge.—Approval of a transfer charge of 2 cents per passenger, to be collected from passengers of the Birmingham Electric Company, Birmingham, Ala., transferring from the Mountain Terrace car line to other lines, including the Highland Avenue and Lake View lines, has been granted by the Alabama Public Service Commission. Order of the commission was in response to a petition filed by the company asking such approval.

Six Held for East St. Louis Hold-Up.—Five men and a woman are held by the East St. Louis police charged with participation in the \$8,100 hold-up of a car of the East St. Louis & Suburban Railway at Nineteenth and State Streets, East St. Louis, Ill., on July 19 while the car was en route to a downtown bank with fare collections from the previous Saturday and Sunday. The police say they have a written confession from one of the men and an oral confession from another involving all the others held. Some of those accused have denied any connection with the robbery. The money has not been recovered.

Recent Bus Developments

Action Brought Against Competitor of Illinois Interurban

Charging that the Royal Rapid Transit Company, which operates interstate bus service between Madison, Wis., and Chicago, Ill., is carrying passengers between points within Illinois without state authority, the Rockford & Interurban Company, Chicago, Aurora & Elgin, Elgin & Belvidere Railroad, and the Aurora, Elgin & Fox River Electric Railway, all of whose lines are paralleled by the present route of the Royal buses, have started injunction proceedings against the Royal company.

The railways maintain that the bus line is picking up and discharging passengers within Illinois cities in violation of the law which allows bus lines to discharge passengers at Illinois points only when they have boarded buses in Wisconsin.

It is reported that application has already been filed by the Royal company with the Illinois Commerce Commission for permission to discharge passengers within the state. The bus line denies that passengers are being taken on and discharged in Illinois cities.

Railway at Akron Largest Ohio Bus Operator

The Norman bus line, operating independently in Akron, Ohio, has been purchased by the Northern Ohio Power & Light Company for the value of the equipment. Five additional buses for city service were secured. The line will be co-ordinated with the company's Grant Street and Firestone Park lines serving the factory district in the southern end of the city. There now remains only one independent bus line in Akron.

In view of the purchase of this line and the success of the company's Grant Street bus line it is probable that the Grant Street car line, which has not been operated for several weeks, will be permanently abandoned. The company at Akron is operating approximately 250 buses in its city and interurban service. It is the largest operator of buses in Ohio.

Buses to Be Run by Nebraska Interurban

The Omaha, Lincoln & Beatrice Railway, which operates between Lincoln and its two northeastern suburbs of University Place and Bethany, college towns, has applied to the Nebraska State Railway Commission for authority to abandon a shuttle service run for the convenience of University Place riders and substitute a 30-minute bus service between University Place and Lincoln. No abandonment of tracks is contemplated and the service on the main line will remain as at present, with a 6-cent fare. University Place riders will pay 10 cents cash with three

tokens for a quarter for bus riding, instead of a 7-cent fare as on the cars.

No attempt will be made to invade with buses any of the downtown territory of the Lincoln Traction Company. The buses will traverse the same loop in the business section that the interurban has been serving for years, north of the main thoroughfares.

Co-ordinated Service in Lincoln

The Nebraska State Railway Commission has authorized the Lincoln Traction Company Lincoln, Neb., to make its first installation of co-ordinated bus and electric car service. In addition to abandoning the short line car service in North Lincoln adjacent to the University of Nebraska the commission permits the abandonment of track from Marion and Fourteenth Streets to the state penitentiary, a distance of 2 miles. This will relieve the

company of considerable new paving expense. It withholds approval of the removal of tracks to the state hospital for the insane.

The buses will be placed in service on two 5-mile suburban lines, one to the state prison south of the city and the other to the state hospital to the southwest. They will make a loop through the main business streets and use the same south-pointed street for 1½ miles. The buses will operate on the existing car schedule and will transfer and take on passengers from the street cars. They will operate on paved highways all the distance covered.

These cars now operate on South Tenth Street and the same schedule as now will be maintained by adding another car and making the new terminus of all Tenth Street cars six blocks distant from the old. South Fourteenth cars will be made into double-enders and stop at Marion.

The commission says that this may prove to be the solution of the problem of inducing enough persons to ride to produce sufficient revenue to justify continuation of the service.

The fare will be 10 cents cash, with four tokens for 30 cents.

Review of I.C.C. Bus Hearing

Attempt Made to Interpret Testimony Introduced at Chicago by Electric Railways, Steam Roads and the Motor Carriers—Commission Will Have Vast Mass of Facts Upon Which to Draw

THREE hearings have been held by the Interstate Commerce Commission in its inquiry into the motor bus and the motor truck movement. They were conducted at Chicago on July 27, 28 and 29, at St. Paul on July 30 and 31 and at Portland on Aug. 11.

Of course a mass of facts is being collected. Some of them are new, but many are merely reiterative. The record certainly will be complete on which the commissioners will draw in basing their conclusions. Whatever else may go into the record there will be no mistaking the cases of the various interests involved. Each of them—the electric railways, the steam railroads and the motor interests—is taking able care of that. Not only that, but the public has been well represented. As one of its spokesmen expressed it, the public is engaged in choosing the type of transportation it prefers and in fitting the various available means of transportation into their respective fields of greatest utility.

The fact that many of the data are reiterative makes it seem more desirable to interpret the trend of the testimony than to go into the presentations as such. At the outset it is well to bear in mind that the whole series of hearings is an inquiry by the Interstate Commerce Commission based on the cognizance taken by it of the increasing extent to which the motor vehicle is becoming a competition of the regulated carriers. The purpose, of course, is to collect facts to be used in making legislative recommendations to Congress.

It may be jumping at conclusions to say so, but it does appear from the data

so far placed in evidence that those electric railways have suffered least which were the first properly to sense the magnitude of this traffic by bus and by truck and to turn these vehicles quickly to their own advantage. So far as the need for regulation goes, the electric railways appear to be very much of the same opinion as the steam railroads, namely, that there should be federal regulation of motor common carriers engaged in interstate commerce.

The bus operators and the truck operators are opposed in some of their views; at least they were at the hearing at Chicago. They do not disagree on the general question of regulation, but they do disagree on just what is best to be done at this time. Some bus operators favor state control only, while others advocate comprehensive federal regulation. On the other hand, the truck interests appear to feel that any sort of regulation at this time is inadvisable. If there must be regulation, then they want it limited to state authority to issue certificates of convenience and necessity and to require prospective operators to make satisfactory showing of financial responsibility for the protection of customers and the public against loss.

These points of view are not new. They were hammered home at Chicago and will likely continue to be hammered home in each of the subsequent hearings. Still, individuals interpret the same set of facts differently. And this is being done quite freely. One commentator said:

"After the passenger business was once taken from the rails by the auto-

mobile, it was partially recovered by buses but only a small percentage, almost akin to the invisible, was lost directly to the bus.

"When that fact once becomes officially established, it is probable that steam and electric officials will find it convenient and consistent to be pro-rail without being quite so anti-bus, in the same way that the bus industry has always maintained a pro-bus attitude without finding it necessary to adopt an anti-rail policy."

This same man also said:

"The bus only becomes a serious competitor of rails when it bids for the business the rails have already lost."

Railroads, both steam and electric, had their innings on the first day, July 27. Only three spokesmen appeared for the steam railroads, while nine were present representing the electric railroads. B. F. Eustice, general passenger agent of the Chicago, Burlington & Quincy Railway, the first witness called for the railroads, confined his remarks to bus operation by his company and that run in competition with it. He explained his railroad was not actively engaged in bus operation. According to him, competition was purely local, confining itself to paved or well-maintained roads between fair-sized towns. The policy adopted by his railroad was to put on bus service where it is demonstrated that it is a cheaper method of performing a given transportation service, and to abandon service, both rail and bus, where the public patronage has decreased to a point where it is not successful.

For the electric railroads, C. L. Henry, president of the Indianapolis & Cincinnati Traction Company and counsel for the American Electric Railway Association, related the difficulties of the electric railroads in Southern Indiana in combating bus competition up to and after the passage of the regulatory act by the Indiana Legislature. He attributed a drop of approximately 70 per cent in gross income on his own road in the past two years to motor vehicle competition—the majority of this loss to the private automobile. He did not know what percentage could be laid to the bus.

C. K. Jeffries, general superintendent of the Terre Haute, Indianapolis & Eastern Traction Company and president of the Central Electric Railway Association, testified similarly. He stated that his company had purchased an independent competing bus line as a matter of self defense.

F. D. Norviel, general passenger agent of the Union Traction Company of Indiana, explained the scope of bus and truck operation as it affected these lines. He presented several exhibits to be filed with the commission, showing the route of the Union Traction System and those of supplementary and competing bus lines. His exhibit also included a statement of loss in revenue attributable to the motor vehicle, the private automobile being the instrument causing the greatest damage.

Samuel Lipp, Cincinnati, Ohio, bus operator, questioned the statement of Mr. Norviel to the effect that 25 per cent of the gross revenue loss was due to the bus and truck. Charles W.

Chase, vice-president of the Chicago, South Shore & South Bend Railway and president of the Gary Railway and the Shore Line Motor Coach Company, gave details of the operation, stating that his company now ran 300 miles of bus route with a total of 6,000,000 bus-miles a year. According to Mr. Chase, it was impossible for him to estimate the loss to the electric railways and steam railroads in interstate traffic between Chicago and Hammond, Gary, and Indiana Harbor, due to bus competition. However, from his own experience in operating buses, and from estimates he has made from gross revenue of competing bus lines, he would say that \$2,000,000 a year in revenue was lost to the steam and electric railways operating from Chicago and these nearby points. The entire bus operations by the Shore Line Motor Coach Company had been at a loss, but certain lines, particularly the one into Chicago, which is purely interstate, had shown a profit.

Lack of interstate regulation of buses was deplored by G. W. Welsh, vice-president of the East St. Louis & Suburban Railway. He declared this to be the reason for the competition which his company suffered between East St. Louis, Ill., and communities in the south western part of the state. While no difficulty is experienced in intrastate traffic in Illinois, because of the state law in effect, the company has suffered a loss in revenue because the bus operators are permitted to parallel electric lines and operate across the state line into Missouri. Three years ago Mr. Welsh's company established the Blue Goose Bus Line to operate interstate into St. Louis, Mo. Although this company operates under certificates of convenience and necessity in the State of Illinois, it is unregulated in so far as the interstate operation is concerned. Despite this motor carriers took away a large amount of the business which rightfully belonged to the rail line.

C. F. Handehy, special representative of the Illinois Traction System, explained that except for interstate operators between Chicago and St. Louis his property was free from bus competition. However, injunctions obtained against two of the bus companies between Chicago and St. Louis had prevented these companies from doing intrastate business between points along the electric line and St. Louis, Mo.

C. E. Thompson, vice-president of the North Shore Line, declared that inasmuch as the Chicago, North Shore & Milwaukee Railroad had been alert to provide bus service in its territory where such service was needed the company now had no bus competition. Fares on the 47 buses operated over 200 miles of route by his company are 10 per cent higher than those on the electric line for the same mileage. The buses act as feeders to the two main electric rail lines of the system.

This, of course, is the merest skeleton of the testimony as it affects the electric railways, but it does tend to indicate the extent of their participation in the proceedings, particularly at Chicago, and affords some criterion as to the data that are going into the record.

Approval of Binghamton Deal Sought

The Binghamton Railway Bus Line, Inc., Binghamton, N. Y., on Aug. 9 applied to the Public Service Commission for the right to lease the property, assets, rights and franchises of the Triple Cities Bus Lines, owned by Edward J. Dorey, operating between Binghamton and nearby communities. The stock of the petitioner is owned by the Binghamton Railway, which states that it has amended its certificate of incorporation so that it may operate the bus lines in conjunction with the existing service by the trolley line, if the petition is granted. In the purchase there are included eight buses, which will bring the total number of buses owned and operated by the Binghamton Railway up to eleven. Under the plan, this belt line will be combined with the bus line now being operated by the railway so as to cover more territory.

Mr. Dorey still retains his so-called South Side line in Binghamton and his line to Montrose, Pa.

More Bus Lines for St. Paul

The Twin City Motor Bus Company, St. Paul, Minn., subsidiary of the Twin City Rapid Transit Company, has applied for five local lines in Minneapolis, extension of a suburban line from Glen Lake to Excelsior, and changes in headways of intercity and suburban buses out of St. Paul to White Bear, Bald Eagle and South St. Paul. The Minneapolis permits will cover crosstown connecting lines with transfers to and from trolley lines, and a new line from the Great Northern Railroad station to Lakewood Cemetery, about 3 miles, on which the fare will be 10 cents.

Two New Bus Routes in Omaha.

The Omaha & Council Bluffs Street Railway, Omaha, Neb., announces the addition of two more new bus lines to its service. One route will be between 32d and Arbor Streets and 40th and Marinda, the other between 50th Street and Underwood Avenue and 52d and Franklin Streets. The company has ordered three new 21-passenger buses from the Nebraska Auto & Truck Manufacturing Company, which promises delivery in 60 days, for use on these lines. Adverse conditions confronting the company prevent the starting of several other new routes it had hoped to announce.

Company Would Abandon Indianapolis Bus Line.—The Indiana Motor Transit Company, the bus subsidiary of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has filed a petition with the Indiana Public Service Commission asking authority to abandon its bus lines between Frankfort and Monticello, Ind. The petition showed that it cost the company 22 cents a bus for each mile, and that for the period from April 14 to June 13 the loss was \$3,350. The company therefore believes that the patronage is not sufficient to warrant operation.

Financial and Corporate

Maryland Company Seeks Modification of Court's Opinion

A motion seeking modification of an opinion handed down recently by the Court of Appeals of Maryland, under which the valuation case of the United Railways & Electric Company, Baltimore, was remanded to the Maryland Public Service Commission, has been filed by counsel for the company. In remanding the case the Court of Appeals held that the easements, which the commission had valued at \$7,000,000, had been valued in the wrong manner, but should have been based on value in real estate. It was said by the court that the commission having based its valuation upon the assessments which necessarily include earnings, the method was not in accordance with the law.

In the motion filed by the railway it is claimed that the Court of Appeals was mistaken in its opinion that the commission failed to value the easements as value in real estate.

The motion created considerable comment. It was taken by some of the newspapers as a step on the part of the company to increase fares. This brought about a strong denial on the part of the United. Raymond S. Tompkins, assistant to the president of the company, issued the statement on behalf of the company.

Connecticut Interurban Resold

The Hartford & Springfield Street Railway, Warehouse Point, Conn., was sold on Aug. 10 to Arthur L. Linn, Jr., Newport, R. I., for \$190,000. Judge Dickenson of the Superior Court approved the sale and announced that further hearings in the matter would be held for the benefit of bondholders of the Rockville, Broad Brook & East Windsor Street Railway to settle on the amount to be received for the bonds in their possession. A hearing is scheduled for Sept. 17 to arrange this matter.

Payments for the Hartford & Springfield have been arranged in the following manner: \$25,000 goes at once to the bondholders' protective committee, \$50,000 to Receiver Harrison B. Freeman on or before Sept. 1, \$22,000 to the same party by Oct. 1 and \$28,000 to Francis B. Cooley, who bought the property at a mortgage foreclosure sale for \$10,000 subject to the claims of the receiver, and the balance, \$65,000, to be paid Oct. 16.

Expenses and liabilities of the receiver are \$137,000. The amount of money represented by bonds of the property is \$200,000, of which \$181,000 is on deposit at the First National Bank, Hartford. When expenses have been paid it is estimated \$20,000 will be divided among the bondholders, about 700 in number. Expenses of appraisers, receivers' counsel and the reorganization committee will be about \$10,000.

Lucius F. Robinson, counsel for the

bondholders' protective committee, presented the case. Ralph O. Wells was state treasurer's representative for the bonds involved, and Josiah H. Peck appeared for the Windsor Locks Traction Company, a part of the Hartford & Springfield Street Railway.

Immediately after the sale papers were filed with the Secretary of State for the organization of the Hartford & Springfield Coach Company. Arthur L. Linn, Jr., Newport, R. I., president of the Newport Electric Company and vice-president of the Utilities Light & Power Company, was named president of the new bus company. Other officers are: Vice-president and manager, Arthur C. Marshall, Orlando, Florida; secretary, Arthur L. Shipman, Hartford, Conn., and treasurer, Dwight A. Pierce, Hartford.

About a month ago all railway service of the Hartford & Springfield Street Railway was discontinued and bus operation substituted. With the organization of the coach company will come further development and extensions to the bus service.

10-Mile Indiana Road to Be Sold Aug. 27

The Lebanon-Thorntown Traction Company, Lebanon, Ind., will discontinue operation shortly and offer the railway for sale as a whole or by parts. Mention of the company's application to abandon the line was made in the *ELECTRIC RAILWAY JOURNAL* of July 17. The bids will be received at the office of Rogers & Smith, Lawyers, Lebanon, Ind., by Robert P. Woods, president, at 10 o'clock a.m., Aug. 27. Right is reserved to reject any or all bids.

The property consists of an electric interurban railway operating between the center of the city of Lebanon, and the center of the town of Thorntown, distance of approximately 10 miles. The railway is adjacent to and parallel with the Chicago-Indianapolis Division of the Big Four Railroad.

The railway was opened for service July 4, 1905, at which time the track was fully ballasted with clean gravel. It is a single track with two single-end turnouts. The maximum grade is 1 per cent.

The company owns a right-of-way varying in width from 40 ft. to 50 ft. throughout the length except where operated over streets in the two municipalities mentioned. It owns all of the track, poles and wires throughout, except that of about two-thirds of a mile on the street in Lebanon. The single-track length of the Lebanon-Thorntown Traction Company is about 9½ miles.

The company owns the two passenger cars, but only one is required in the regular service. The two combination passenger and baggage cars were made by Cincinnati Car Company. Power is purchased.

Mr. Woods may be addressed at 530 Railway Exchange Building, Kansas City, Mo.

Conditional Sale of Morgantown Properties Arranged

Conditional sale of the property of the Union Traction Company, Morgantown, W. Va., to the West Virginia Utilities Company has been announced by R. P. Stacy, vice-president and general manager of the utilities company.

The conditions under which the sale was concluded are that the City Council shall grant a new franchise to the utilities company for the operation of the Greenmont-South Morgantown street car line and that this franchise be approved by the Public Service Commission. Mr. Stacy states that there is little doubt that a new franchise will be granted, since a gentlemen's agreement has been entered into before the negotiations were concluded. He declines to state the purchase price, further than to say "it was considerably higher than we anticipated and more than we felt we could afford to pay."

The transfer includes the 17-acre tract known as the Traction Park, the railway and the carhouse on the southern end of University Avenue. The transfer of the properties will not take place until Council has adopted a new franchise and it has been approved by the Public Service Commission.

Mr. Stacy states that while the details of the operation of the line remained to be worked out, his present intention is to operate the south Morgantown line and the Sabraton line as one.

The new franchise would lighten the present paving obligation.

Directors of Narragansett Company Oppose Merger Deal

No director of the Narragansett Electric Lighting Company, Providence, R. I., although each one is an owner of stock of the company in his own right, has seen fit to deposit his stock under the terms offered by the Rhode Island Public Service underwriters, according to a statement made by the N.E.L. board of directors in advising stockholders of the corporation not to deposit their stock under the merger offer.

The directors declare that the stock has an intrinsic value greater than that offered and they emphasize the point that the offer contemplates a deposit of stock without assurance of the deal going through. They point out that Narragansett stockholders lose their rights as stockholders upon deposit of their stock whether or not the transaction is completed.

The statement points out that although stockholders who deposit their stock under the plan give a control of their voting rights to the Service company underwriters, the plan may be altered in any respect the underwriters desired except as to the price of \$86 and may be carried through only as to the Narragansett and not with regard to the United Electric Railways or may be abandoned, and the stockholders have no voice in what is done whatsoever. Not even a definite date is fixed for the return of the stock to stockholders who deposit if the plan is abandoned, it is said.

Good Showing by Boston Elevated

At the close of the month of June and the eighth year of public trusteeship of the Boston Elevated Railway, Boston, Mass., the system not only emerges virtually without a deficit, but makes a further payment of \$22,304 to the cities and towns in the commonwealth that were placed under contribution by the Legislature to meet a deficit of \$3,980,151 in 1919.

In exact figures, the excess cost of service above receipts for the twelve months was \$10,054, against \$31,284 for the twelve months ended June 30, 1925.

The remitting of a check by General Manager Edward Dana on July 23 to the state treasurer makes the total repayments to the municipalities \$1,674,640 since the first one of \$517,196 in July, 1922. The repayment at this time last year was \$20,581, while the largest repayment was of \$1,114,557 in 1923.

Practically 70 per cent of the repayment goes to the city of Boston. The remainder is distributed among Cambridge, Somerville, Brookline, Medford, Malden, Everett, Watertown, Arlington, Chelsea, Newton and Belmont and to the commonwealth, which assumed the assessments of Quincy and Stoneham in 1919.

The total number of revenue passengers carried during the year was 368,932,079, almost 2,000,000 fewer than the preceding twelve months, but the total of passengers paying the full 10-cent fare was 303,148,232 in the year just ended, which was about 12,000,000 more than in the previous year. The total revenue from fares during the year that closed the end of last June was \$34,165,255, against \$33,444,502 during the year closing June 30, 1925.

In giving out the figures showing the financial results of operation during June and also during the twelve months including June, General Manager Edward Dana explained that but for an

item of snow-fighting last winter of almost \$500,000, the repayments to the cities and towns would have been very much increased. Last winter was exceptional. During a normal winter the cost of snow removal is usually somewhat less than \$100,000.

A graphic chart showing the allocation of the cost of service was prepared by General Auditor J. H. Moran for the twelvemonth. It showed that the average receipts from each revenue paying passenger were 9.511 cents. Almost exactly half of this, 4.753 cents, went for labor. The costs per passenger were divided thus: Labor, 4.753 cents; interest on bonds and notes, 0.687; rent of subways and tunnels, 0.600; rent of leased roads, 0.838; coal, 0.305; depreciation, 0.687; damages, 0.206; material and other items, 0.924; taxes, 0.439.

The largest item of expense in the

Three Miles of Westchester Line Abandoned

The Public Service Commission by order on Aug. 2 approved a declaration of abandonment by the Westchester Electric Railroad of that part of its line on the White Plains Road in the towns of Eastchester and Tuckahoe. The abandonment was occasioned by the fact that Main Street and Midland Avenue in Tuckahoe are to be paved, and due to the narrow streets and traffic congestion it was considered advisable to remove the tracks and substitute bus service. The estimated cost of the paving to the railway was \$8,000.

The company also granted a certificate to the Eastchester Transportation Company to operate a bus line in the territory which is now served by the railway. It will operate two 21-passen-

CHANGES IN THE BOSTON ELEVATED RESERVE FUND

Fiscal Year 1924-25			Fiscal Year 1925-26				
July 1, 1924, \$1,000,000			July 1, 1925, \$1,000,000				
July.....	\$353,245.79*	Jan.....	\$269,649.08†	July.....	\$249,477.93*	Jan.....	\$223,301.09†
Aug.....	445,820.47*	Feb.....	118,183.05†	Aug.....	367,593.94*	Feb.....	185,989.63*
Sept.....	207,334.30*	Mar.....	211,955.71†	Sept.....	176,763.97*	Mar.....	161,772.65†
Oct.....	36,155.55*	April.....	130,636.68†	Oct.....	117,703.96†	April.....	77,031.69†
Nov.....	15,031.47†	May.....	139,081.44†	Nov.....	45,265.00†	May.....	57,010.06†
Dec.....	152,527.52†	June.....	25,792.94*	Dec.....	289,347.71†	June.....	1,662.18*
Profit and loss credit.....			\$51,865.43	Profit and loss credit.....			\$32,359.07

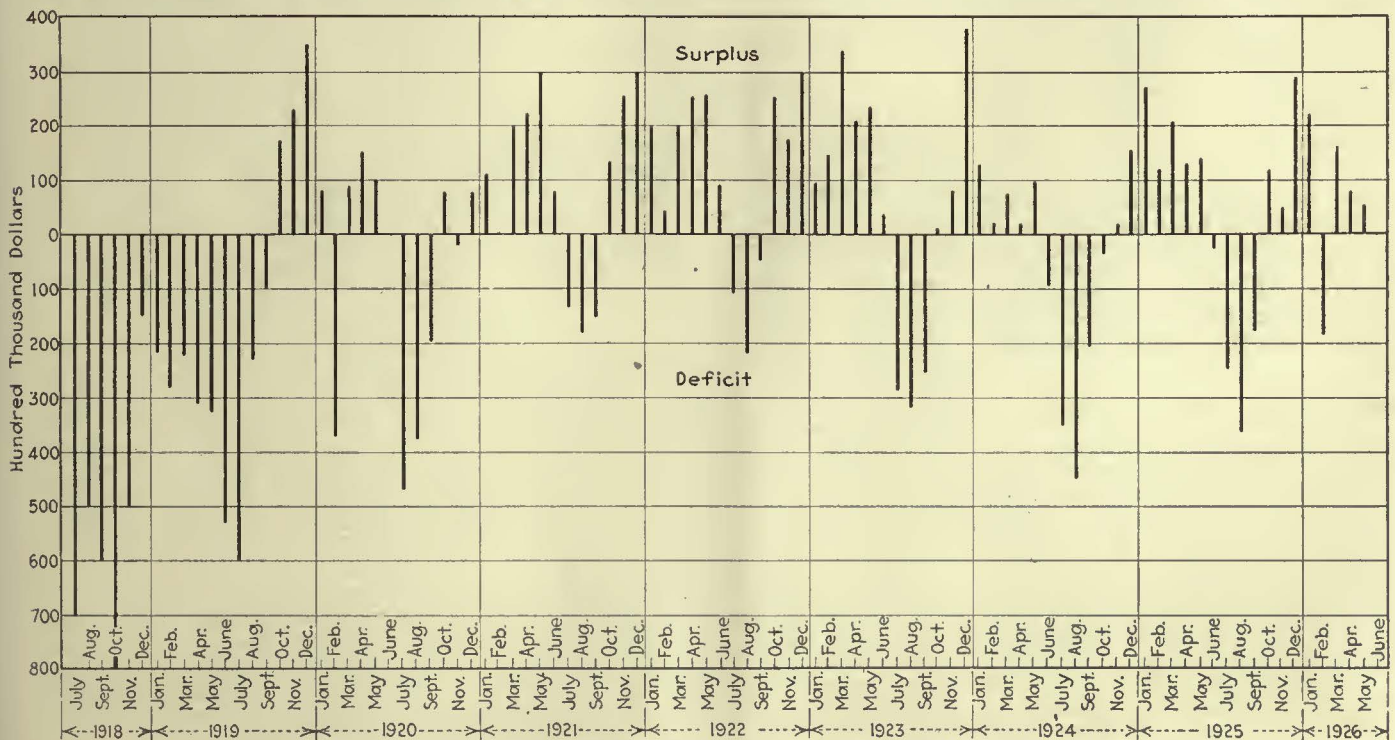
* Excess of cost of service over revenue. † Excess of revenue over cost of service.

cost of service was \$11,777,399 for transportation expenses, which included wages of car service men. This was about \$17,000 more than the previous twelvemonth. There was no increase in the basic wage during the last year, merely a small increase in the differential paid to operators of one-man cars.

The total cost of service for the 12-month period was \$35,097,900, against total receipts of \$35,087,845. There were certain profit and loss credits which came to \$32,359 which enabled the repayment to the commonwealth and towns and left the sinking fund of \$1,000,000 intact.

ger buses on a fifteen-minute headway with a 10-cent fare and transfer privileges to the cars operated by the Westchester Electric Railroad and New York, Westchester & Connecticut Traction Company over their lines. The new company is a subsidiary of the Third Avenue Railroad, which operates other bus lines.

Before Commissioner Van Namee the company submitted figures covering yearly operations of its various properties since 1921. The loss in 1925 on the system was \$136,017 and for the first three months in 1926 the loss was \$30,924.



Financial Story of Boston Elevated Railway Under Public Control Told in Graphical Form

Suit to Foreclose Brought Against Massachusetts Road

The American Trust Company, Boston, Mass., has filed a bill in equity against the Milford & Uxbridge Street Railway, Milford, Mass., to foreclose a mortgage made by the Milford, Holliston & Framingham Street Railway in January, 1898, to secure a bond issue of \$180,000. The bill also asks for the appointment of a receiver to take over the property of the Milford & Uxbridge Railway. The Milford & Uxbridge company was organized and took control of the Milford, Holliston & Framingham Street Railway on July 10, 1902. The bond issue referred to in the petition was payable on Jan. 1, 1923.

Walter L. Adams, Milford, Mass., has since been appointed receiver for the Milford & Uxbridge company. He has been superintendent of road for many years. The appointment is the result of a bill in equity filed by the American Trust Company.

Balance in Fort Wayne Higher

For the year ended Dec. 31, 1925, the Indiana Service Corporation, Fort Wayne, Ind., reports a balance to surplus of \$179,940, against \$154,623 for the year 1924. Passengers carried on the company's transportation lines totaled 25,648,155, compared with 25,327,227 in 1924. Expenditures totaling \$1,814,766 were made during the year for additional plant and property needed to meet the development of the company's business. Approximately 6

INCOME ACCOUNT OF THE INDIANA SERVICE CORPORATION		
	1925	1924
Operating revenue.....	\$3,855,888	\$3,639,423
Operating expenses.....	2,537,961	2,577,996
Net operating revenue.....	\$1,317,927	\$1,061,427
Other charges, including taxes.....	263,587	245,659
Net operating income.....	\$1,054,339	\$815,767
Other income.....	13,844
Total income.....	\$1,068,183	\$815,767
Interest on funded debt.....	719,799	661,145
Net income.....	\$348,383	\$154,622
Dividends declared.....	168,443
Balance to surplus.....	\$179,940	\$154,622

miles of new track was laid, bringing the total length of track operated up to 242 miles. Fifteen new passenger cars were purchased, which gives the company a total of 176. The company sold \$1,229,110 of its preferred stock during the year under the customer-ownership plan.

Seattle Passes Railway Budget

Indicating possible net revenues of \$9,914, for next year's operation of the Seattle Municipal Railway the City Council has passed the railway budget, which had been reduced to \$5,733,805, against estimated receipts of \$5,752,725, leaving an estimated profit of \$18,919. City Treasurer Terry ordered the addition of \$9,000 to meet assessments against railway property.

D. W. Henderson, superintendent of railway, said that while the reduction in budget was heavy, the department would be able to proceed without cur-

tailing service. The total reduction was \$884,600, brought about by drastic cuts in expenditures for operating and maintenance. The budget as it now stands does not make allowance for any increase in wages, although increases which would total \$150,000 a year are being asked by trainmen, shopmen and track employees. The City Council took the stand that the budget must be kept within the estimated earnings for the coming year, even if it was necessary to curtail service.

Commission Asked to Approve Kansas City Transfer

Approval of the Public Service Commission for the formal transfer of the properties, franchises and other assets of the Kansas City Railways, now in the hands of receivers, to the Kansas City Public Service Company, is sought in an application filed on Aug. 6.

Bennett C. Clark, attorney for William G. Woolfolk, president of the Kansas City Public Service Company, filed the application.

The commission has not yet set a date for hearing of the proposal.

Securities for New Buses at Toledo Authorized

The Community Traction Company, Toledo, Ohio, has been authorized by the Ohio Public Utilities Commission to issue notes for \$99,952 to finance the purchase of new bus equipment for the Front Street line. No securities will be sold on the market. The buses are purchased under a lease-purchase plan. Twenty-four new buses are being purchased. Half are Mack chassis and half White chassis, both types fitted with Kuhlman bodies.

The new vehicles will go into operation within a few days to replace street cars.

Preferred Stock Called for Redemption

The first step in the proposed reorganization of the North American Light & Power Company, Chicago, Ill., in order to simplify its corporate structure was announced on July 30 with the calling for redemption on Oct. 1 of all of the company's \$4,307,800 of 7 per cent cumulative preferred stock at \$105 and accrued dividends.

Details of the proposed readjustment plan have since been revealed. This plan includes the issuance of \$15,000,000 of 30-year 5½ per cent debentures, and a block of new preferred stock. In this connection the North American Company and the Middle West Utilities Company will acquire a large portion of the common stock of the North American Light & Power Company.

Lines of the North American Light & Power Company's subsidiaries, including the Illinois Power & Light Corporation, will be interconnected with power lines of subsidiaries of the Middle West Utilities Company, with the possibility of certain interconnections with the North American Company's lines.

First Report of Engineers Public Service Company

A balance of \$2,528,971 available for reserves and for 777,979 common shares of stock was realized by the Engineers Public Service Company, New York, for the twelve-month period ended Feb. 28, 1926. This company recently acquired the Virginia Electric & Power Company, the Key West Electric, Eastern Texas Electric, El Paso Electric Company, and the Savannah Electric & Power Company.

The operations of the company's subsidiaries are supervised by Stone &

CONSOLIDATED INCOME STATEMENT OF THE ENGINEERS PUBLIC SERVICE COMPANY AND SUBSIDIARY COMPANIES

(Twelve Months Ended Feb. 28, 1926.)

Gross earnings.....	\$23,108,937
Expenses:	
Operation.....	\$10,377,083
Maintenance.....	2,186,596
Taxes.....	1,734,455
Total operating expenses and taxes.....	\$14,298,134
Net earnings.....	\$8,810,803
Interest, amortization and lease rentals.....	2,944,324
Balance.....	\$5,866,479
Dividends on preferred stock subsidiary companies.....	1,293,254
Balance for reserves and common stock.....	\$4,573,225
Deduct proportion of balance applicable to common stock of subsidiaries in hands of public.....	188,057
Balance applicable to reserves and to Engineers Public Service Company.....	\$4,385,168
Dividends on preferred stock of Engineers Public Service Company.....	1,856,197
Balance available for reserves and for 777,979 common shares of Engineers Public Service Company.....	\$2,528,971

Webster, Inc., as executive manager. It is the policy of the company to have its subsidiaries maintain adequate reserves for retirements and replacements and for other purposes. The combined reserves and surplus of the subsidiaries as of Feb. 28, 1926, amounted to 80 per cent of the annual gross earnings and 16 per cent of the book value of the properties. These statements were made in the first annual report of the company, which contains a record of activities for a portion of 1926 as well as for the six months of 1925, during which the company was in operation.

The accompanying income statement includes the operation of the five previously mentioned subsidiaries combined with the Engineers Public Service Company on the basis of its ownership or control of common stock as of April 12, 1926. It includes a full year's dividend on the preferred stock of the Engineers Public Service Company used in the acquisition of these subsidiaries' stocks, and also estimated operating expenses of the Engineers Public Service Company for a full twelve months.

No Par Value Stock Plan.—The Ninth Avenue Railroad, New York, N. Y., has filed a certificate in the office of the Secretary of State changing its capital stock from 8,000 shares \$100 par value to 8,000 shares of no par value.

Book Reviews

The A.B.C. of the Electric Car

By J. S. Dean, Westinghouse Technical Night School Press, 83 pages. Price 50 cents.

This is a neatly bound booklet setting forth in easily understandable language the elementary facts of electric railway operation. The text was first published as a series of articles in *Aera*, the official publication of the American Electric Railway Association. There appears to be real justification for the assertion of the publisher that the book contains just the information needed by many in the employ of electric railways who are either directly or indirectly concerned with the operation or maintenance of the electric car, but who have not had the advantage of a technical education and do not understand the fundamental principles of the electric motor or its operation. Numerous simple illustrations and the use of a water analogy successfully explain and make the subject clear.

Facts and Figures of the Automobile Industry

National Automobile Chamber of Commerce, New York, N. Y. 96 pages.

This annual review presents, in ready reference form, essential data on the development and present standing of motor transportation. Comparisons of production and registration between the United States and the rest of the world are shown graphically. Nearly five-sixths of the cars registered in the world are owned in the United States, and tables of this registration are given in detail. Much space is devoted to highway and traffic conditions, with maps and diagrams to illustrate regulations to avoid congestion. Statistics show the growth of the use of motor trucks and buses by both the steam railroads and the electric railways to supplement their service. The booklet uses 22 charts to make comparisons and analyses more striking, as well as numerous cartoons. Those interested in concise facts concerning the status of the automobile industry in 1925 will find information on every point from the raw material used in manufacturing to the licensing and registering of private motor cars.

Effect of Surface Materials on Steel Welding Rods

Prepared by the Research Bureau of the Chicago Steel & Wire Company, Bulletin No. 2.

A concise and accurate account of the manner in which steel welding rods are affected by materials adhering to their surfaces is given in this bulletin. The technical information contained therein on the subject of gas welding and metallic arc welding is sufficiently complete to meet the needs of practically any industrial welder and it is presented in a manner which is easy of comprehension.

After making a thorough investigation as to the effect of surface materials, it is the contention of the

Research Bureau that these substances, chiefly lime, iron oxide and copper, play a very important rôle in determining the quality of both gas and electric filler rods. For gas rods a clean metallic surface seems essential, while for metallic arc welding the presence of non-metallic materials on the surface is required. The statement is made that surface materials constitute the real difference between gas and electric filler rods.

In publishing its series of bulletins on fusion welding the Research Bureau of the Chicago Steel & Wire Company takes a broad general position with regard to the subject as a whole and no attempts to advertise the particular products of the company are made. Believing that the properties of welding rods are a considerable mystery to those concerned with welding and that much interest is centered around this subject, the Research Bureau publishes its findings as a contribution to the industry. It is undoubtedly true that lack of exact scientific knowledge regarding welding rods is probably holding back the expansion of welding in practically all cases of metal joinery. Booklet No. 2 deals in large part with figures and facts rather than theory.

Bothering Business

By H. A. Toulmin, Jr. B. C. Forbes Publishing Company, New York, N. Y. 57 pages.

Most men, according to Mr. Toulmin, who have had experience with the Federal Trade Commission are convinced that that body should be done away with entirely and at once. He, however, does not recommend a course so drastic, but, after listing the alleged chief faults of the commission, suggests a procedure that would make that body effective. The five chief faults of the commission are:

1. Giving widespread publicity to complaints before sufficient testimony has been taken.
2. Persisting in activities that the courts have already held to be illegal, and in prosecuting concerns for doing things that the courts have held to be legal.
3. Complicating the procedure unnecessarily.
4. Carrying on work that is properly the activity of some already existing government department.
5. Prosecuting and hearing cases that should be handled by the courts.

To do away with these evils, Mr. Toulmin advises that the commission cease making economic and statistical investigations, that it leave to other government departments and to the courts all cases that do not involve whole industries and broad principles of public welfare. In short, that it do only the work for which it was originally intended.

According to the author, conditions in the patent office do more to discourage invention than to help it. Such long delays are frequently met on application for a patent that a concern may starve to death while waiting to manufacture some article that would have saved its life. On the other hand, patents are at times granted without suf-

ficient investigation having been made so that a manufacturer may find he is violating the rights of a previous holder of a patent after he has made a considerable expenditure of time and expense. To combat these conditions Mr. Toulmin would, in the first place, have Congress appropriate considerably more money for the patent office, to give it better quarters, increase the number of employees and increase their salaries; then the methods within the department should be improved and simplified so that engineers and lawyers could use the files for investigation and study, and thereby guard against duplication.

Can We Compete Abroad?

By C. C. Martin. National Foreign Trade Council. New York, N. Y. 155 pages.

Actual experience and practice are narrated in this book, which answers the title question by quoting the opinions of the traders of other countries. It does not attempt to discuss the technical or economic problems of foreign trade. The stories and comments are taken from foreign consular reports; and foreign trade journals, from speeches, interviews, confidential reports and the debates of foreign parliaments. They indicate that the American trader makes a greater effort to study the conditions and requirements of the country in which he wishes to sell his goods than do his competitors.

Analyses made of trade reports indicate fuller co-operation between the manufacturing plant and the American salesman, so that where speed in filling an order is a determining factor he has an advantage. Just as advertising is carried on much more extensively and elaborately in the United States than in any other country, the American manufacturer has advertised his goods more widely in foreign countries than others; he makes a greater effort to create a demand. Not so many years ago the American manufacturer believed that it would be impossible for him to compete with the lower wages and cost of production abroad, but now American products are known throughout the world, American business methods are approved and adopted on every hand and American capital is invested in every country.

In conclusion, Mr. Martin says: "Though we wish and shall have our fair share of world trade, we do not wish a share that will deprive others of what they need and should have. Our trade flourishes as much by selling to countries which are our competitors as by selling those who do not compete with us; England is our chief competitor and our largest overseas customer. These countries need foreign trade as much as we. A monopoly of world trade for us would be an unmixed disaster."

Mr. Martin is well known as a writer and speaker on foreign trade. He has been actively engaged in business in every country of western Europe and has traveled extensively in Latin America and elsewhere. He has contributed widely in United States and Europe to economic and financial publications, and his book on "Packing for Export" is a standard work on the subject.

Personal Items

G. D. Nicoll, General Superintendent Ohio Interurban

G. D. Nicoll, recently appointed general superintendent of the Indiana, Columbus & Eastern Traction Company, with headquarters in Springfield, Ohio, has been engaged in electric transportation work since his school-days were completed. Since his latest traction advancement, he has also been named general superintendent of the Dayton & Columbus Transportation Company, the bus subsidiary of the railway.

Mr. Nicoll was born in Iowa and spent his early boyhood in that state. After leaving school, he entered the transportation field in a minor capacity in Illinois. He was quick to seize opportunity and his progress was rapid. He engaged in railway work in New York, Indiana and Pennsylvania suc-



G. D. Nicoll © Redmon

cessively and entered similar work in Ohio for the first time in 1911, when he was appointed superintendent at Zanesville of the former Ohio Electric Railway. Six years later he was transferred by the company to Dayton. There he served as superintendent until 1918, when he removed to Springfield to become assistant chief engineer. A few years later the Ohio Electric Railway system was dissolved, but Mr. Nicoll remained with the Indiana, Columbus & Eastern Company as assistant chief engineer, the latter having been a part of the Ohio Electric system.

He was promoted to chief engineer by the company in 1922 and retained this post until he was named general superintendent of the company on July 1 of the present year.

Brooklyn Official Advanced

James C. Hunter, who was acting division superintendent at the East New York depot of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., since last December, has been appointed division superintendent in charge of that depot by William Siebert, superintendent of surface transportation. He

succeeds the late Charles V. Hogberg. Mr. Hunter was appointed a conductor on Feb. 21, 1905, at the Canarsie depot. Three years later he was transferred to night transfer clerk, but after five months returned to his run as a conductor. A short time later he was appointed extra inspector and from that time advanced steadily through the various grades in the operating department to his present one. Before going to East New York during the absence of Mr. Hogberg because of illness, Mr. Hunter was supervisor of revenue inspectors for five years. He is 42 years old.

F. L. Blanchard Heads Utilities Advertising Association

Frank Leroy Blanchard is the new president of the Public Utilities Advertising Association. He is often spoken of as "the dean" of American advertising, owing to his long service and experience in this field. After graduating from Bates College, Mr. Blanchard received his first assignment as a reporter on the New York *Tribune*. He soon progressed to the city editor's desk on the New York *Morning Telegraph*, and then for two years was assistant editor of the *Evening Telegram*. The *Evening World* then received the benefit of his abilities, and for three years he remained on the editorial staff of this newspaper, nearly a world's endurance record, as reporters' jobs went in those days.

It was after his connection with the *World* that Mr. Blanchard launched the *Editor and Publisher* for J. B. Shale, then president of the Publishers' Press Association. Mr. Blanchard was its first editor, a position he held until the advertising field attracted his attention.

Mr. Blanchard's entrance into advertising was through the Hampton and Seaman agencies. He early became a student of advertising as well as a practical advertising man and his thoughtful articles in advertising periodicals attracted wide attention among business men. He soon accepted an offer to become managing editor of *Printers' Ink*.

Probably Mr. Blanchard's greatest single contribution to the cause of advertising was his inauguration, in 1904, of the first oral course in advertising to be established anywhere in the world. This course was held, and continues to be held, at the Twenty-third Street Y. M. C. A. For twenty years Mr. Blanchard actively directed its destinies.

Mr. Blanchard's standing in the advertising field brought him to the attention of Henry L. Doherty, who invited him to enter the Doherty organization in 1922 as director of public relations for the utility and oil properties of the Cities Service Company. At that time, too, he became one of the charter members of the Public Utilities Advertising Association.

Since his connection with Mr.

Doherty, Mr. Blanchard has been active in all branches of public utility advertising work. He is a member of the Advertising Commission of the International Advertising Association, chairman of the publicity and advertising section of the American Gas Association, and is a member of similar committees in the American Electric Railway Association, the National Electric Light Association, and the Society for Electrical Development.

G. W. Kalweit, Milwaukee Auditor, with Holding Company

George W. Kalweit has resigned as general auditor of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to join forces with W. N. Albertson as vice-president and treasurer of the newly organized Central West Public Service Company. He is especially well fitted to perform the duties required in his new work by his long and broad experience in the field of accounting, to which end of the business practically his entire business career has been devoted.

Mr. Kalweit was born in Germany in



G. W. Kalweit

1880 and came to the United States with his parents as an immigrant at the age of six years, settling in Milwaukee. Upon completion of his education in the schools of Milwaukee his first position was that of office boy with the Milwaukee Electric Railway & Light Company, the service of which he entered Jan. 31, 1898. By January, 1904, he had worked his way up to the title of assistant bookkeeper. On March 26, 1906, he was advanced to the post of acting auditor and then to auditor on Jan. 1, 1907. He continued as auditor until March 1, 1916, when he was appointed general auditor of the Milwaukee Electric Railway & Light Company, which office he filled until he resigned to take over his new duties with the Milwaukee holding company.

In addition to his other duties, Mr. Kalweit figured prominently in the organization of the Employees' Mutual Benefit Association of the Milwaukee Electric Railway & Light Company, formed in 1912 for the purpose of amicably adjusting differences which arose from time to time between company and employee. He was director and general auditor of this association until 1921.

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

Brake Shoe Does Well During First Six Months

American Brake Shoe & Foundry Company has enjoyed a half year of considerable prosperity, according to the *Wall Street Journal*. There seem to be good possibilities that the net for the year will considerably surpass the \$13.57 share earned on the 156,093 common shares of the company stock in 1925. The paper goes on to state:

Brake Shoe has a consistent and excellent earning record. In 1923 the net per common share was \$13.35, in 1924 it was \$11.36 and the average for the past three years is \$12.79.

In view of this steady earning power if 1926 earnings come up to present indications it is likely the directors will declare something special in the way of dividends at the December meeting. The company could easily pay a 50 per cent stock dividend and maintain the present rate of \$6 on the new stock. The 156,093 common shares are carried at \$7,880,650, or \$50 a share, and the surplus at the close of last year stood at \$3,119,314. However, the question of dividends has not yet been considered by the board and any suggestions at present as to the December possibilities must be somewhat in the nature of conjecture.

Standardization Movement Shows Healthy Growth

Representative trends toward standardization of industrial products have been considerably extended during the past year and savings from standardization work are constantly growing in magnitude, according to the Year Book of the American Engineering Standards Committee, just issued. More than 200 definite standardization projects are in process or completed under the auspices of the A.E.S.C., and 365 national trade associations, technical societies and government bureaus are co-operating in the work.

The standardization of drafting room practice and of methods of graphically presenting facts are two projects of interest which will be undertaken by a committee of experts that will shortly be organized. Much work has been done during the past year in establishing a comprehensive system of limit

gaging, which, if generally adopted, can produce savings for American industry approaching a billion dollars a year, it was stated.

U. S. Steel Tells About Its Personnel Work

A comprehensive picture of the work which has been done by the United States Steel Corporation in furthering

the welfare of its employees is given in a profusely illustrated booklet just issued to commemorate the 25th anniversary of the founding of the corporation.

All manner of subjects relating to employee problems are pictured and many ideas may be obtained, in looking over this book, for personnel work in other types of industry. A few pages of historical information is given on the astonishing progress which has been made by the United States Steel Corporation since its inception, and there is also included a letter from James J. Davis, Secretary of the Department of Labor, complimenting Judge E. H. Gary upon the excellent records which have been made in the matter of accident prevention and safety work in the intensive campaign carried on by the company.

Comprehensive Tests Being Given Two-Car Trains in Twin Cities

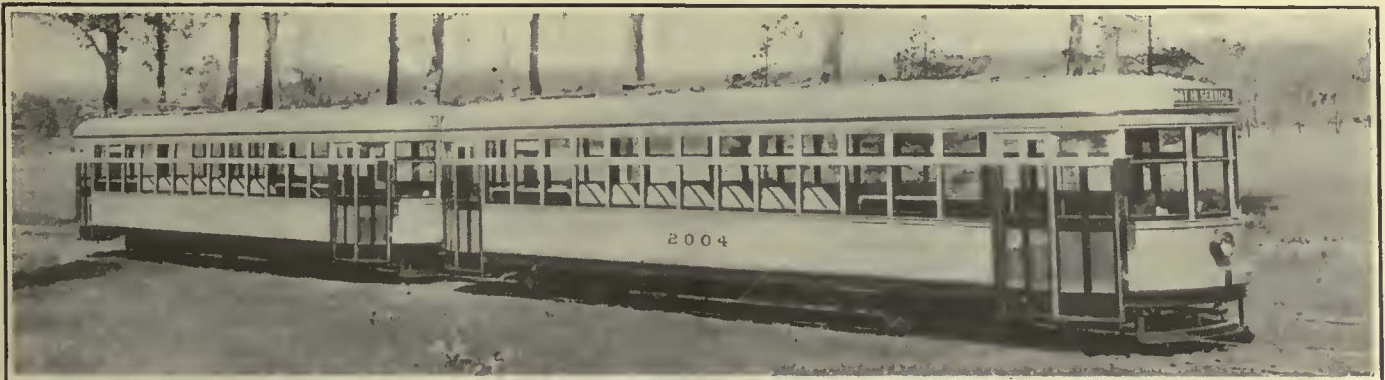


Interior of the New Twin City Car, Showing Type of Lighting Fixtures Used

As was briefly stated in the issue of *ELECTRIC RAILWAY JOURNAL* for Aug. 7, the streets of Minneapolis and St. Paul, Minn., are being used as laboratories for the testing of a two-car train unit recently constructed by the Twin City Rapid Transit Company. It is desired by the company to know how effectively the double unit may be employed in handling the peculiar rush-

hour traffic problems which are encountered in the communities which it serves.

A number of unusual features are embodied in the construction of the trial cars. The lighting fixtures shown in the accompanying interior view provide an exceptionally good illumination and the extra window space also adds to the brightness of the cars.



Two-Car Train Now Being Operated by the Twin City Company to Determine Its Feasibility for Permanent Adoption

Bus Business Normal, Mack Official Declares

Bus production, delivery and demand are equal to last year, indicating that the business has become stabilized and settled down to a normal basis, according to Roy A. Hauer, manager of the general bus department, Mack Trucks, Inc., New York City. This assertion was based on business statistics compiled in the several divisions of the Mack organization. Mr. Hauer declared that the Mack company has added nineteen traction companies and sixteen railroads to its business list since last year, indicating that traction and steam railroad companies are realizing more fully today than ever before the economic status of the bus in transportation systems, not only as an auxiliary service, but for complete co-ordination with fixed lines of transit.

Rolling Stock

Indiana Service Corporation, Fort Wayne, Ind., recently received five interurban motor passenger cars and two combination buffet and parlor cars, also for interurban service, from the St. Louis Car Company, St. Louis, Mo. The order for these units was placed in September, 1925. The seating capacity of the straight passenger cars is 50, while the parlor-buffet will accommodate 29 passengers.

Specifications on the passenger cars are given herewith:

Weight:	
Car body	59,000 lb.
Trucks	27,000 lb.
Equipment	14,000 lb.
Total	100,000 lb.
Bolster centers	38 ft. 6 in.
Length over all	61 ft. 6 in.
Truck wheelbase	7 ft. 0 in.
Width over all	8 ft. 9 in.
Height, rail to trolley base	12 ft. 10 in.
Body	All steel
Interior trim	Steel, mahogany finish
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Sleeve type
Axles	Standard Steel Co., heat treated
Bumpers	12-in. channel with Hedley anti-climbers
Car signal system	Consolidated
Car trimmings	St. Louis Car
Center and side bearings	Stucki-Roller side and Baldwin center
Compressors	General Electric
Conduits and junction boxes	Crouse-Hinds
Control	Westinghouse HL
Couplers	Tomlinson No. 13
Curtain fixtures	Railway Supply & Curtain Co.
Curtain material	Pantasote
Destination signs	Hunter
Fenders	Steel pilots
Finish	Pratt & Lambert vitralite enamel
Gears and pinions	Nuttall, grade B, helical
Heater equipment	Peter Smith hot water No. QC2 and Railway Utility electric
Headlights	Golden Glow
Journal bearings	Standard M-C-B
Journal boxes	Symington
Lightning arresters	Westinghouse, condenser type
Motors	Four Westinghouse 333 VV6, inside hung
Sanders	Knight pneumatic
Sash fixtures	O. M. Edwards
Seats	St. Louis Car Co.
Seating material	Mohair, striped plush and leather
Springs	Standard Steel Works
Step treads	Feralun
Trolley retrievers	No. 5 Knutson
Trolley base	U. S. No. 13
Trucks	Baldwin 5 1/2-in. x 10-in. journal
Ventilators	Railway Utility
Wheels	Standard Steel 37 in.

Special devices, etc. 1.5 kw. motor-generator set with 200 amp.-hr. battery for 32-volt lighting system
Energy-saving device.....Economy meters

Data on the parlor-buffet cars is also appended:

Weight:	
Car body	57,000 lb.
Trucks	27,000 lb.
Equipment	7,000 lb.
Total	91,000 lb.
Bolster centers, length	38 ft. 6 in.
Length over all	61 ft. 6 in.
Truck wheelbase	7 ft. 0 in.
Width over all	8 ft. 9 in.
Height, rail to trolley base	12 ft. 10 in.
Body	All steel
Interior trim	Steel, enamel finish
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Sleeve type
Axles	Standard Steel Co., heat treated
Bumpers	12-in. channel with Hedley anti-climbers
Car signal system	Consolidated
Car trimmings	St. Louis Car
Center and side bearings	Stucki-Roller, side and Baldwin, center
Compressors	General Electric
Conduits and junction boxes	Crouse-Hinds
Control	Westinghouse HL
Couplers	Tomlinson No. 13
Curtain fixtures	Railway Supply & Curtain Co.
Curtain material	Pantasote
Finish	Pratt & Lambert vitralite enamel
Gears and pinions	Helical
Hand brakes	None
Heater equipment	No. 5-H Arcoila hot water and Railway Utility electric
Headlights	Golden Glow
Journal bearings	Standard M-C-B
Journal boxes	Symington
Lightning arresters	Westinghouse, condenser type
Motors	Two Westinghouse 333 VV6, inside hung
Sanders	Knight pneumatic
Sash fixtures	O. M. Edwards
Seats	Club chairs
Seating material	Spanish crush gray leather
Springs	Standard Steel Works
Step treads	Feralun
Trolley retrievers	No. 5 Knutson
Trolley base	U. S. No. 13
Trucks	Baldwin 5 1/2-in. x 10-in. journal
Ventilators	Railway Utility
Wheels	Standard Steel 37 in.
Special devices, etc.	1.5 kw. motor-generator set with 200 amp.-hr. battery for 32-volt lighting system
Energy-saving device	Economy meters

Iowa Public Utilities Company, Centerville, Iowa, operating the Ottumwa Street Railway, Ottumwa, Iowa, has purchased three 25-passenger Mack city type buses, to replace street cars operating in that community.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has ordered ten two-section articulated motor trains of the de luxe type. These will be operated on the route between Baltimore and Washington. The order has been placed with the J. G. Brill

Metal, Coal and Material Prices

Metals—New York		Aug. 10, 1926
Copper, electrolytic, cents per lb.		14.45
Copper wire, cents per lb.		16.25
Lead, cents per lb.		8.925
Zinc, cents per lb.		7.65
Tin, Straits, cents per lb.		65.875
Bituminous Coal f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons		\$5.075
Somerset mine run, Boston, net tons		1.875
Pittsburgh mine run, Pittsburgh, net tons		1.75
Franklin, Ill., screenings, Chicago, net tons		1.825
Central, Ill., screenings, Chicago, net tons		1.50
Kansas screening, Kansas City, net tons		2.50
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.		\$6.25
Weatherproof wire base, N. Y., cents per lb		18.00
Cement, Chicago net prices, without bags		2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.		12.3
White lead oil (100-lb. keg), N. Y., cents per lb.		15.50
Turpentine (bbl. lots), N. Y., per gal.		\$1.04

Company. The Maryland Public Service Commission has approved an application made by the company to enter into the contract for the new equipment, which is to cost about \$400,000. Authority also has been granted by the commission for the railroad to issue 120 lease warrants with a total face value of \$468,900.

Butte Electric Railway, Butte, Mont., has ordered a street car type Fageol bus, equipped with air brakes, for city operation.

Union Traction Company of Indiana, Anderson, Ind., has filed a petition through its receivers for authority to buy 20 freight cars at a cost of \$3,000 each. Authority to proceed with the purchase was given by the court. A report on freight traffic showed that receipts from that source in 1925 were \$681,288, and in the first four months of 1926 the freight traffic income was \$207,161. It was stated that the Union Traction Company could increase its freight receipts if it had more cars. The terms of purchase on the freight cars, which will be of the standardized design adopted some time ago by the Central Electric Railway Master Mechanics' Association, are one-third payment on delivery and the balance in monthly installments.

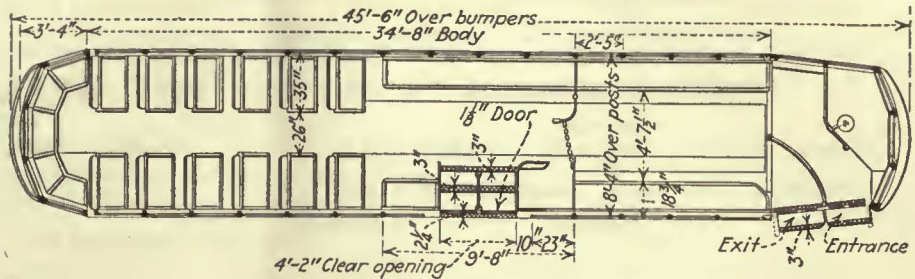
Scranton Railway, Scranton, Pa., will spend approximately \$250,000 for the purchase of twelve new cars and the rebuilding of ten others. Each new car will cost \$17,000 and the improvements to the old cars will amount to about \$45,000. The new equipment, which will be ready by December, will make it possible to operate one-man cars on all urban routes.

Trade Notes

American Brown Boveri Corporation, New York, N. Y., has opened a district sales office in Philadelphia, Pa., at 922 Witherspoon Building. Louis T. Peck will be in charge of this office.

Graybar Electric Company, Inc., New York, N. Y., announces the consolidation of its three New York City offices, to be located in the largest office building above ground in the world. The structure will be known as the Graybar Building and is being erected at Lexington Avenue and 43d Street. The fifteenth floor will be devoted almost exclusively to private offices for executives of the company.

State Law Reporting Company, 233 Broadway, New York City, has twenty field offices, from each of which shorthand reporters are sent out to cover hearings of the Interstate Commerce Commission. It furnishes the only official report of the commission proceedings under terms fixed by the commission. The official minutes of the present bus investigation, therefore, are available to those who wish to secure them. These hearings, to which reference has been made before in the ELECTRIC RAILWAY JOURNAL, are scheduled to take place at thirteen different points in the United States, with the concluding hearing at Washington, D. C., on Sept. 29.



Fifty more modern cars for P.R.T. —equipped with Peacock Staffless

In order to handle the greatly increased traffic due to the Sesqui-Centennial Exposition, the Philadelphia Rapid Transit Company recently received fifty more modern cars.

And of course they're equipped with modern hand brakes—Peacock Staffless Brakes!

Their almost unlimited chain-winding capacity, high-braking power, light weight and space-saving dimensions make these brakes adaptable for all types of service.

Ask for installation estimates on your requirements.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada



Peacock Staffless Brakes

Bankers and Engineers

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When writing the advertiser for information or
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ACME Window Curtain Fixtures

Noiseless — direct acting — enlarged friction
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A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill
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every coil or segment that we can make, as well as to every
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rely absolutely on our name.

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"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.

CAR AXLES J. R. JOHNSON AND CO., INC. FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or
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WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

Your Name

in this space in all issues where larger
display space is not used backs up your
advertising campaign and keeps your
name in the alphabetical index.



Be Sure of Customer Confidence

The average man who rides on a street car has never entirely forgotten that famous and unfortunate "The public be damned."

It is true that unfailing service at low cost, public spirited policies, and immense contributions to comfort and convenience on the part of electric light and other utility companies have pushed the recollection farther and farther back into his memory. But it is there to crop out when any controversy with the public arises.

Whether this controversy arises from rate adjustments, merger, purchase or sale, reorganization, extensions or what not, the goodwill and fair judgment of the public can be won by a full presentation of the facts—by laying all the cards on the table.

One of the most important of these cards can be a valuation and rate study by The American Appraisal Company. It can be proved correct. It is known to be disinterested. It will find many of your important citizens welcoming it in the light of their own experience with our appraisals.

In gaining and maintaining cordial public relations, An American Appraisal is a strategic asset at a critical moment.

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Flexibility

Satisfactory service requires smaller coaches in larger numbers, rather than fewer units of the more cumbersome type.

A flexible fleet capable of meeting traffic fluctuations lowers costs and increases earnings. The 21-passenger coach offers flexibility.

In addition Graham Brothers Coaches, by their attractive appearance, invite patronage and operate at minimum cost.

21 Passenger Street Car Type Motor Coach Complete

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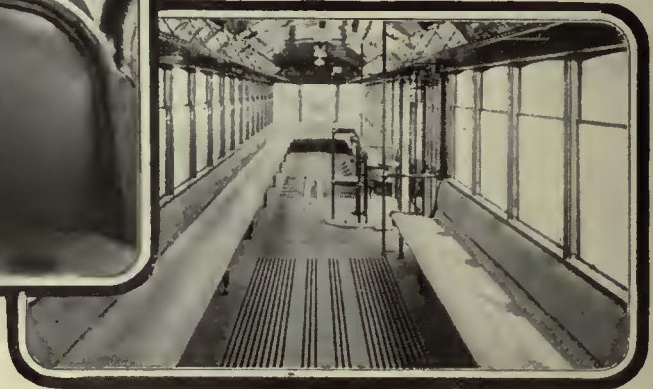
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Bucket type Leather-Upholstered Seats Being tried by Cleveland Railway.

Nothing takes the place of
LEATHER



Seating arrangement of a Standard Trailer car used in Cleveland.

Which do you prefer?

On a recent experiment by the Cleveland Railway of running a new type of car equipped with leather-upholstered seats, people let the old type of cars pass them up and waited for the car with the comfortable seats.

There is nothing like comfortable seats for selling rides and nothing can take the place of leather covering for durability, maintenance and comfort.

We offer complete hides or will cut them to pattern if you submit paper templets. Samples gladly sent upon request.

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Initial investment in the Reo Chair Coach is moderate.

Dependability is assured by quality materials, rigid inspection, extra hardy vital parts and a careful consideration of all important factors necessary to superior bus performance.

Service is available in nearly 2000 cities and Reo parts are reasonably priced.

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Lansing, Michigan

No other bus combines these features of the Reo Model "W"

Six Cylinder Engine
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Standard Tread
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Standardized Bodies
Service in nearly 2000 cities
Low-Priced Repair Parts
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Smooth Braking Helps Create and Conserve Bus Revenues

People would rather ride on buses that stop smoothly and comfortably, and drivers would rather operate them.

Such buses last longer. So do their tires. Jerky, "grabby" stops are rough on a bus chassis, they rack the body and unduly wear and strain the tires.

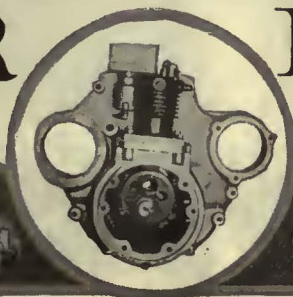
These are some of our reasons for strongly recommending hard fibre liners with Christensen Air Brakes. The shortest possible stop is made comfortably and with less strain upon the vehicle.

In the end the operator profits from more patronage and less maintenance cost.

The liner and drum combination that our extensive road tests have led us to recommend, together with the self-equalizing feature of Christensen Air Brakes, give attention-free brake mileage that every operator of buses could profitably use. The information is yours upon request.

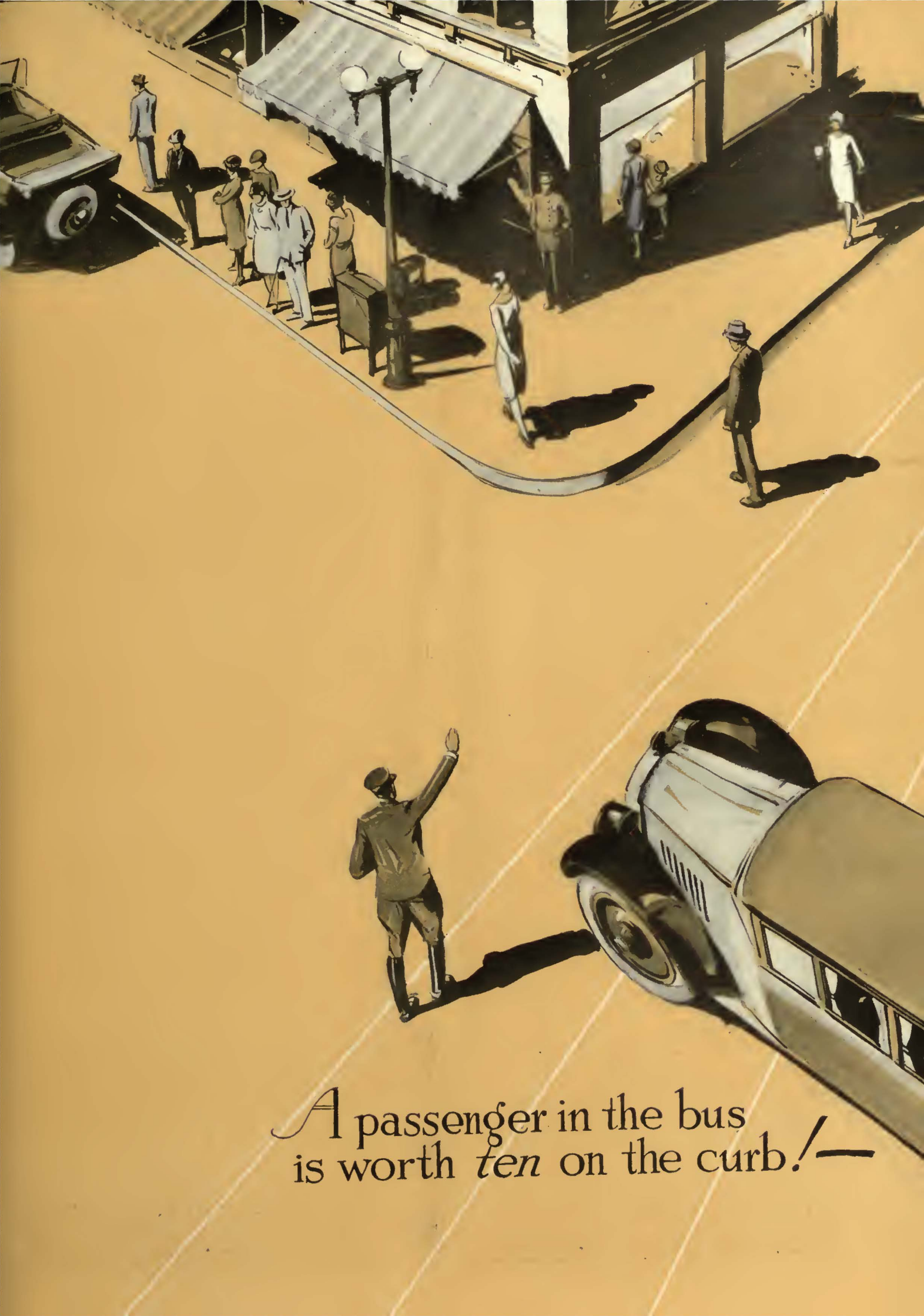
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CHRISTENSEN
6513 Cedar Ave.



AIR BRAKE CO.,
Cleveland, Ohio





A passenger in the bus
is worth *ten* on the curb!—



The inviting entrance of a Lang Body helps secure a quick load. Sightseers are drawn toward the open roof which distinguishes this model. For every type of service, Lang engineering skill creates an atmosphere of comfort and luxury which helps build revenue.

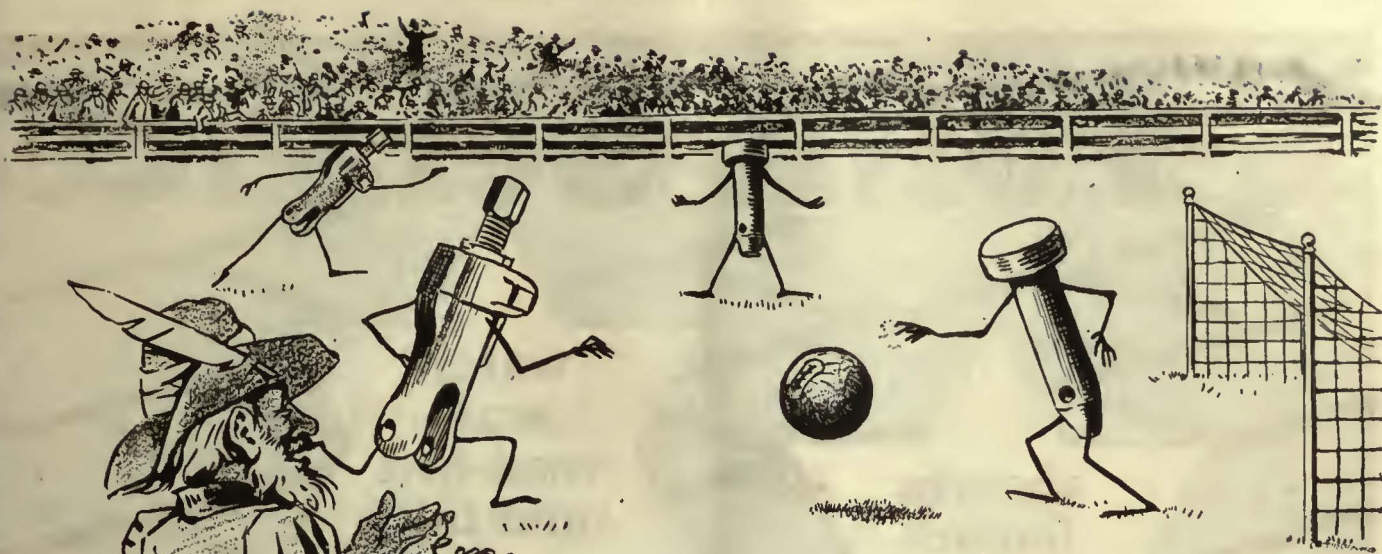
THE LANG BODY COMPANY · CLEVELAND, OHIO

LANG BODIES

create new passengers



*"After all—
it's the Setting
that counts!"*



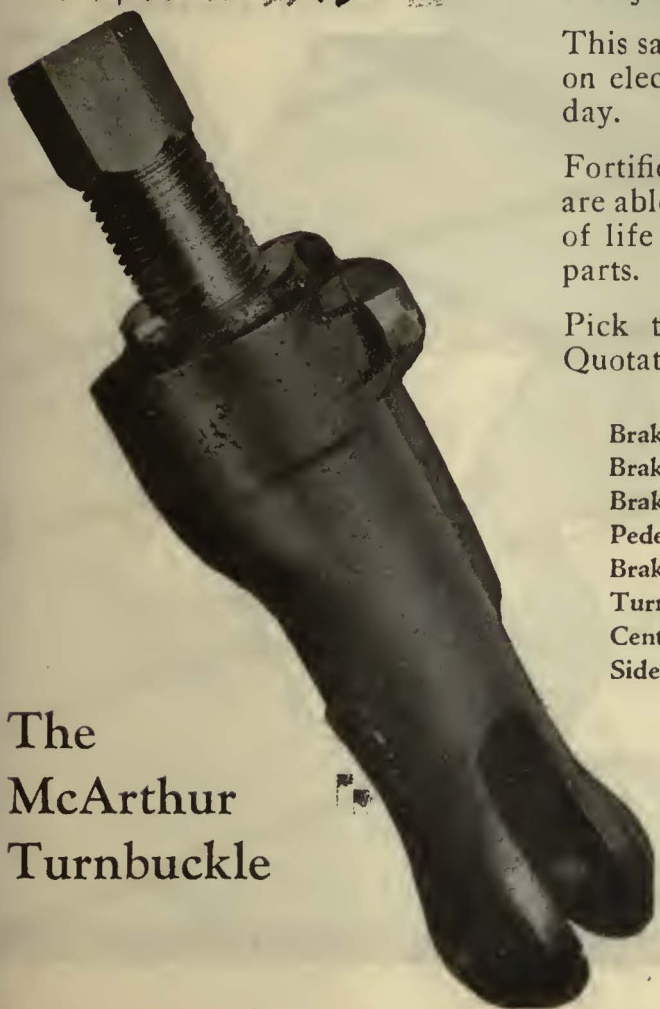
A real test of endurance from start to finish—

From the opening whistle to the closing one there's no time to rest in a fast game of soccer. Following the ball up and down, back and forth is a severe test of endurance. Sudden starts, stops and hard knocks are part of the game—which means that the players must always be in first class condition.

This same test of endurance applies to brake equipment on electric cars—where hard usage is the order of the day.

Fortified by the Boyerizing Process, Boyerized Parts are able to stand the most rigorous service—their length of life being three to four times that of ordinary steel parts.

Pick the parts you need from those given below. Quotations on request.



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Electric Railway Supplies
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road-bed
and ties**

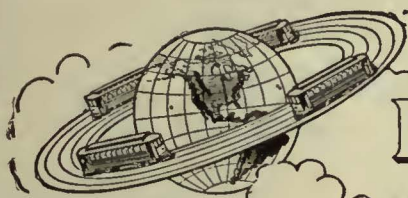
**allows for
expansion
and
contraction**

**practically
100%
salvage
value**

**resists
heaviest
traffic**

**is easily
removable
for track
repairs**

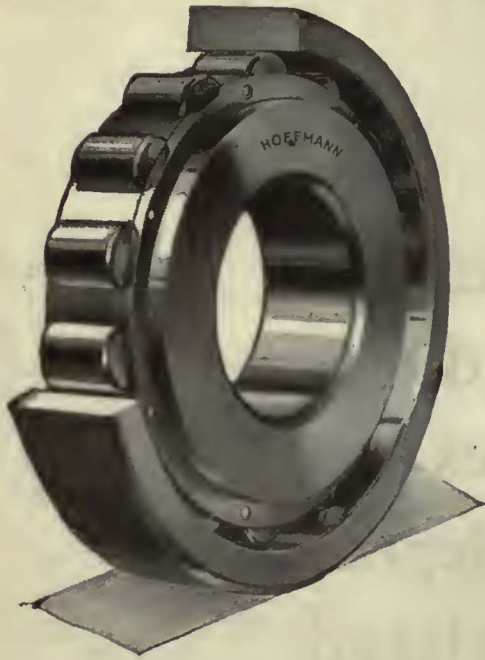
The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK

DEPEND-ABILITY



A steady load capacity at least twice that of any ball bearing of the same size; a temporary overload capacity of at least 50 per cent; a tremendous ability to resist shock, jar and vibration; solid cylindrical rollers of hardened alloy steel; balanced, self-supporting roller cage; precision of dimension and finish carried to the extreme of refinement; these are the factors which give the "Hoffmann" its unequalled depend-ability at all speeds.—Write for Catalog 904.

**NORMA-HOFFMANN
BEARINGS CORPORATION**

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"

What Nuttall BP Gears can do for you!



Nuttall Helical
Gear Set

The BP Treatment Triples Impact Resistance

Sudden shocks that will break untreated gears will not break BP gears because the BP Treatment toughens the steel and triples its impact resistance.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA



All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

PIN TERMINAL RAIL BONDS



View of 20th Century rounding bend at Marblehead. The New York Central is always among the leaders in modern equipment. Insert shows our type CPO1 Bond used on all main line tracks

BECAUSE of the ease of installation, Pin Terminal Rail Bonds are used on many of the larger railway systems. They are accessible for inspection, show low maintenance cost, insure strong contact and low resistance.

The American Steel and Wire Company has a rail bond for every requirement. Our engineers will be glad to assist you in selecting the best bond for your needs.



American Steel & Wire Company

Sales Offices:

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURGH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY

EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK
 PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.

FOR SAFETY
FROM FIRE

INSTALL THE

IMPROVED
Pyrene
EXTINGUISHER

Safety demands that every car or bus be equipped with Pyrene. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.



The slight outlay involved by having rolling stock equipped with an improved Pyrene one quart extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene extinguishers—they know a burning car or bus need not be abandoned if PYRENE is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms PYRENE 1½ quart extinguishers are dependable in every emergency.

THE PYRENE MANUFACTURING CO.
NEWARK, N. J.

"Fortify for Fire Fighting"



Cold Dinners

for your passengers?

Not if you use

AJAX
BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

the PANTASOTE COMPANY Inc.

At 46th, 250 Park Avenue Street
NEW YORK



The 1926 Edition McGRAW Electric Railway Directory

The time your salesmen can
save would pay for it
many times

"Who are the men I should talk to in the
Blank Railway Company?"

You'll find the answer quickly in the
1926 Edition McGraw Electric Railway
Directory. Keep a copy handy—in your
desk, in your brief case. You'll need it.
Call on the right men—the men who
specify or buy. If your salesmen cover
wide territories, they can't be expected
to know all the changes in personnel of
the roads they call on.

Our records showed 65% in changes since
our 1925 Edition was published.

And your mailing list. Why not *know*
in advance that you are reaching the men
you *need* to reach. Build and check
your mailing lists from the McGraw
Electric Railway Directory.

Don't waste valuable time and effort in
a \$300,000,000 market by misdirecting
your sales program. Save both by re-
turning the attached coupon.

Here are the inside facts

- 1—Complete list of every recorded electric railway company in the United States, Canada, Mexico and the West Indies.
- 2—Names and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of report.
- 3—Addresses of companies operating buses.
- 4—Addresses of repair shops.
- 5—Mileage of track and bus routes.
- 6—Number and kinds of cars used.
- 7—Rates of fare.
- 8—Amusement parks owned or reached.

Price \$7.50 a Copy

10% discount for five or more

DIRECTORY DEPARTMENT, ELECTRIC RAILWAY JOURNAL,
10th Ave. and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw Electric Railway Directory, check
for \$.....enclosed.

.....More complete information concerning contents.

Name

Company

Street

City State.....

ERJ 8-7-26

The Facts About Superpower

The methods, aims, developments and
prospects of this great plan

This new book—just published, is the work of the man
who first conceived the idea of SUPERPOWER and who
was Chairman of the United States Government's Super-
power Survey.

Mr. Murray starts with the conditions and methods of
today and carries them forward to their ultimate and
logical conclusion.

Superpower

Its Genesis and Future

By William Spencer Murray, of Murray and Floor,
Engineers

237 pages, 6x9, 25 diagrams, \$3.00

Here is the complete book on superpower—an interesting,
authoritative account of the whole program from the
start, the ideas behind it, its advantages, obstacles, pos-
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of the movement gives you a clear, unbiased description
of SUPERPOWER, as practiced and planned, and shows
clearly what it means to the country, to industry and to
YOU.

The book explains what has been done thus far. It
describes results in five great divisional zones which have
already applied the principles of superpower. The record
of accomplishment is startling yet indicative of what may
be expected from the further extension of a program
basically sound in its every phase, fundamentally desir-
able from every point of view.

A few of the facts explained

- Mr. Murray discusses clearly such questions as:
- why SUPERPOWER can guarantee adequate power and transportation for the nation's industrial growth?
 - how SUPERPOWER will affect railroad growth?
 - how SUPERPOWER will be distributed?
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 - how SUPERPOWER will affect and be affected by inter-state relations and the Interstate Commerce Commission?
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Examine the book for 10 days FREE

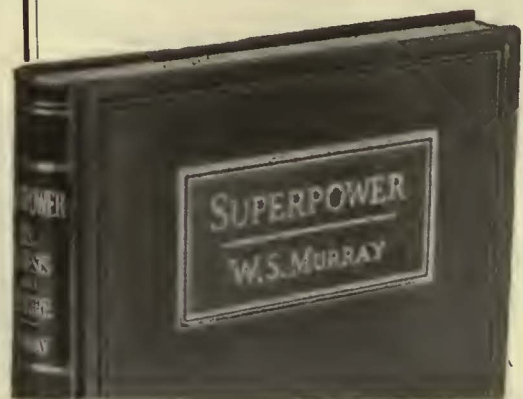
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it in ten days. It's a book you will want to know—Mail
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and
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You may send me on 10 days' approval Murray's Superpower,
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postpaid within ten days of receipt.

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Home Address

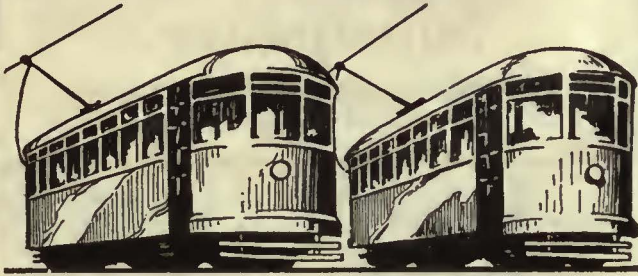
City..... State.....

Position

Name of Company.....

(Books sent on approval to retail purchasers in U. S. and Canada
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M-J Armature Babbitt



No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
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Griffin Wheel Company

410 North Michigan Ave.
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



KERITE

in a half-century of
continuous production,
has spun out a record
of performance
that is
unequalled in the
history of insulated
wires and cables

THE KERITE INSULATED COMPANY INC
WIRE & CABLE
NEW YORK CHICAGO

← from Wintry
Canada →



Regardless of Climate, Dayton Mechanical Ties Reduce Track Repairs

THE weather—the destructive action of King Frost—is blamed for a great deal in track repairs. But is King Frost as bad as he is painted?

Experience with Dayton Mechanical Ties indicates otherwise. We have sold them to be installed everywhere from wintry Canada to semi-tropical Texas. Daytons in service are subject to every kind of climate between the two extremes—including the alternate frost and thaw of the middle latitudes. There is no perceptible difference in the durability under these varying conditions.

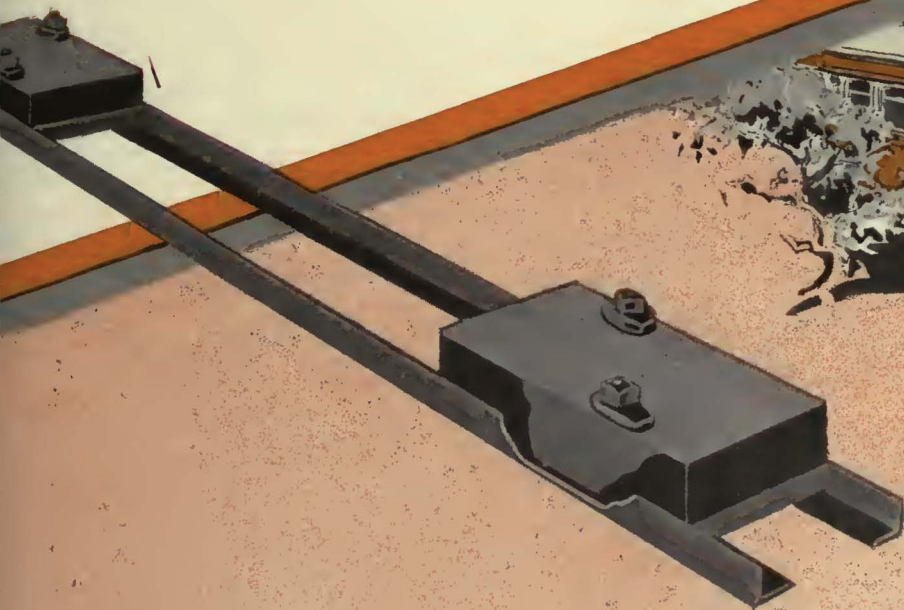
We are forced to the belief that it is not the frost, but the uncushioned vibration which occurs in ordinary

track construction which disintegrates the concrete ballast. Concrete will bear heavy constant loads, but fails under vibration. Dayton Mechanical Ties, by providing just enough resilience, absorbs the vibration, and preserves the concrete.

We cannot tell you how long Dayton-laid track will last. 10-12 years of heavy traffic leaves it unimpaired—apparently ready for 10 or 12 years more. Maintenance is insignificant. The resilience also cuts rolling stock repairs, and makes easier, more quiet riding.

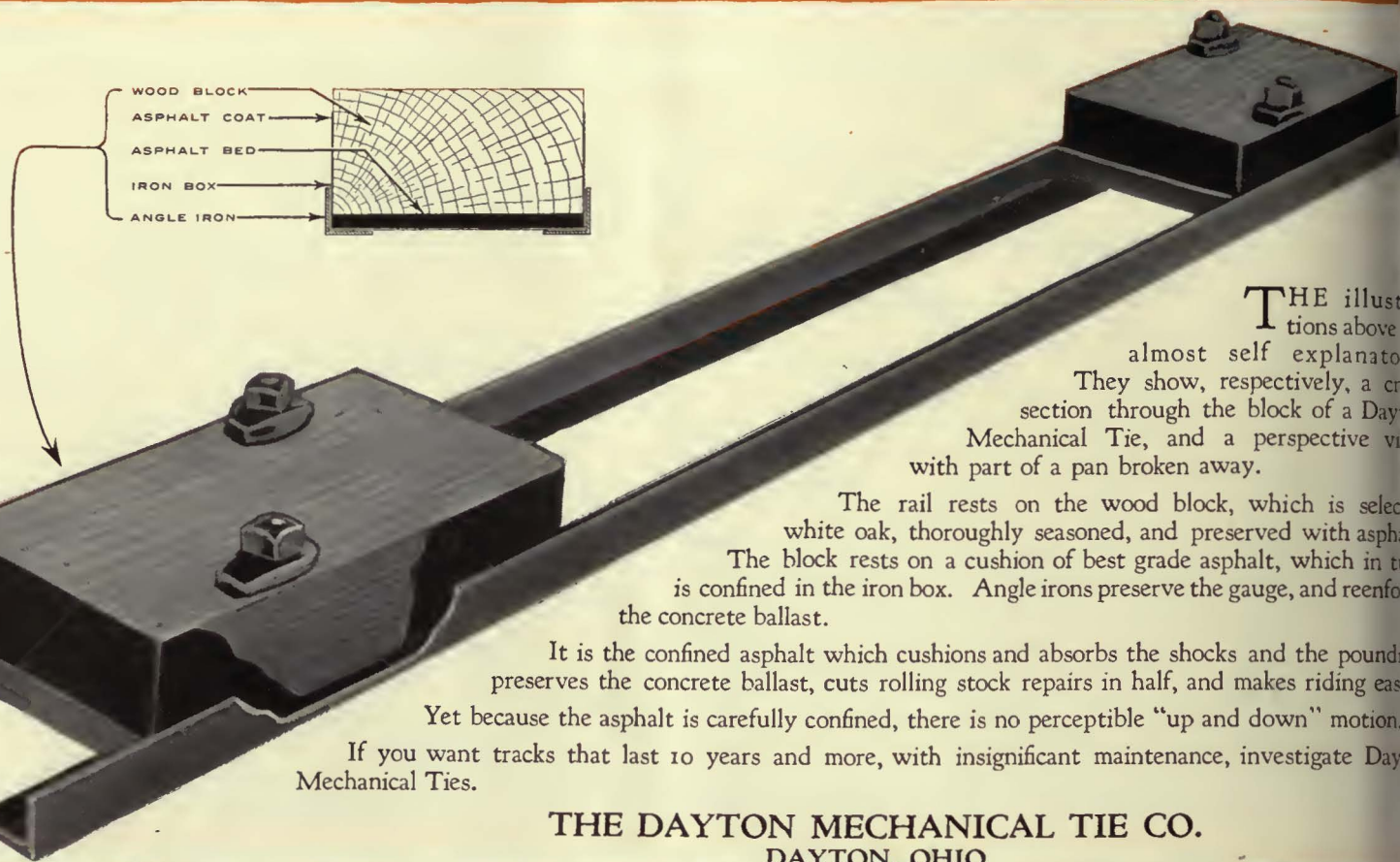
Investigate Dayton Mechanical Ties. They cost less than wood ties and last far longer. Write for complete data.

THE DAYTON MECHANICAL TIE CO.
DAYTON, OHIO



to
Sunny Texas

Explaining why Dayton Mechanical Ties are Resilient.



THE illustrations above almost self explanatory. They show, respectively, a cross section through the block of a Dayton Mechanical Tie, and a perspective view with part of a pan broken away.

The rail rests on the wood block, which is selected white oak, thoroughly seasoned, and preserved with asphalt. The block rests on a cushion of best grade asphalt, which in turn is confined in the iron box. Angle irons preserve the gauge, and reinforce the concrete ballast.

It is the confined asphalt which cushions and absorbs the shocks and the pounding, preserves the concrete ballast, cuts rolling stock repairs in half, and makes riding easy. Yet because the asphalt is carefully confined, there is no perceptible "up and down" motion. If you want tracks that last 10 years and more, with insignificant maintenance, investigate Dayton Mechanical Ties.

THE DAYTON MECHANICAL TIE CO.
DAYTON, OHIO

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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



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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, TrACTION Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

BRANCH OFFICES

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NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Agular 104
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WORKS
Bayonne, N. J.
Barberton, Ohio

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representatives:

Los Angeles United States Steel Products Company
Portland San Francisco Seattle

Export Representatives:

United States Steel Products Company, New York, N. Y.

-Carnegie-

the name
to look for
on Steel

CARNEGIE STEEL COMPANY
PITTSBURGH - PENNA.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

WM. **WHARTON** JR. & INC. CO.
TISCO MANGANESE STEEL
TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.



Special Track Work of every
description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

SPECIALISTS

in the

Design and Manufacture

of

*Standard—Insulated—and
Compromise Rail Joints*

The Rail Joint Company

61 Broadway, New York City

H. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
 F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

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 Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

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National Hand Holders	Anderson Slack Adjusters
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Dunham Hopper Door Device	Yellow Coach Mfg. Company— Single and Double-deck Buses
Garland Ventilators	
Walter Tractor Snow Plows	
Feasible Drop Brake Staffs	

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities



We make a specialty of
**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company,
Strauss Bldg.

FARE BOXES for BUSES



Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.

Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

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

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—36 inches—to a page.

ERJ

POSITIONS VACANT

YOUNG man for superintendent of 14 mile trolley line in tropical city, of 75,000 people. Healthful climate. Give with first letter full statement of experience, salaries past and expected, references, age and personal habits. P-920, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

SUPERINTENDENT with twenty years' experience in operation and maintenance of railway rolling stock and track; an outstanding success as a railway operator and as operator of co-ordinated railway and bus services desires for personal reason to make change. Fully capable of taking complete charge as manager or superintendent. PW-917, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

SERVICE TO THE INDUSTRY

THE LANG BODY COMPANY maintains a complete Service Department on repairing and refinishing of bus bodies. This special department is of ample size so that a complete bus can be driven to our plant and completely refinished. We will repair everything except the mechanical parts of the chassis. Speedy and accurate work is assured. For further information and estimates write

Service Department,
The Lang Body Company,
 Cleveland, Ohio

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built
 West. 508 or G.E. 264 Motors
 Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
 Commonwealth Bldg., Philadelphia, Pa.

TO HELP YOU

LOCATE BUSINESS OPPORTUNITIES
"Searchlight" Advertising

G-1

Rails and Equipment

of the

K. & U. T. CO.

FOR SALE

- 3,000 Gross tons 70 lb. A.S.C.E., 33-ft. rails; continuous rail joints.
- 1—NEW, 32,000 pound one-man Passenger Interurban Car, West. 510-A motors, Safety devices.
- 1—Express Locomotive, 80,000 pounds, West. 317 motors.
- 2—Interurban Passenger Cars, West. 304 motors, HL control, Multiple unit control switch group, weight 64,000 pounds.
- 1—Interurban Passenger Car, West. 112 motor, M control switch group, weight 80,000 pounds.
- 1—Rotary converter, Portable, West. 300 KVA. 500 amp. 33,000-440 AC. Transformer, 600 DC., 60 cycle.
- 1—Rotary converter, Stationary, West. 300 KVA. 500 amp. 33,000-370 AC. Transformers, 600 DC., 25 cycle.

Address

John H. Thornburn
 Urbana, Illinois

Over 6000 other men in the Electric Railway Field will see this page-

Then isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, Etc., Etc., Etc.

"Opportunity" Advertising:

Think "SEARCHLIGHT" First!

—to help you get what you want

—to help you sell what you no longer need

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 Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles (Front & Rear), Motor
Truck & Passenger Car
Timken-Detroit Axle Co., The

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co., The

Babbit Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass and Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Bankers
Hornblower & Weeks

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass and Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Ball
Norma-Hoffman Bearing Co.

Bearings, Center and Roller
Side
Struck Co., A.

Bearings, Roller
Norma-Hoffman Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
Graybar Electric Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummins Car & Coach Co.
Lang Body Co.

Body Material, Haskellite and Plymet
Haskellite Mfg. Corp.

Bollers
Babcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Banding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.

Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
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McGraw-Hill Book Co.

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(See also Poles, Ties, Posts, Etc.)
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Elec. Service Supplies Co.
Graybar Electric Co.
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National Ry. Appliance Co.
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Brill Co., The J. G.
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Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
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St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

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Brick, Vitrified
National Paving Brick Mfrs. Assn.

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St. Louis Car Co.
Yellow Truck & Coach Mfg. Co.

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Cables (See Wire and Cables)
Cambrie Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)
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Car Panel Safety Switches
Consolidated Car Heat. Co.
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Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummins Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

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Ajax Metal Co.
More-Jones Brass & Metal Co.

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American Steel Foundries
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St. Louis Car Co.
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St. Louis Car Co.

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Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.
Graybar Electric Co.

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Haskellite Mfg. Corp.
Pantasote Co., Inc.

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Haskellite Mfg. Corp.

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General Electric Co.
Westinghouse E. & M. Co.

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Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
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Westinghouse E. & M. Co.

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Ohio Brass Co.
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General Electric Co.

Coil Handling and Winding Machines
Elec. Service Supplies Co.
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Colls, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Klinking
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General Electric Co.
Westinghouse E. & M. Co.

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Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Wood Co., Chas. N.
Commutator Truing Devices
General Electric Co.

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General Electric Co.
Westinghouse E. & M. Co.

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Graybar Electric Co.
Westinghouse Tr. Br. Co.

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Westinghouse E. & M. Co.

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Ohio Brass Co.

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Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
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Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri
Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

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American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

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Electric Service Supplies Co.
Cross Arms (See brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

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Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

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Elec. Equipment Co.
Lang Body Co.
John H. Thornburn

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.

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Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

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Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

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Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
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Nat'l Pneumatic Co., Inc.
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Ohio Brass Co.

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Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Ohio Brass Co.
Westinghouse E. & M. Co.

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Graybar Electric Co.
Railway Trackwork Co.
Electric Locomotives
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Amer. Steel & Wire Co.
Graybar Electric Co.
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Railway Trackwork Co.
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Electrodes, Steel
Railway Trackwork Co.
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Bibbins, J. Rowland
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St. Louis Car Co.
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Wood Co., Chas. N.

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Flaxlinum Insulators
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Carnegie Steel Co.

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Bethlehem Steel Co.
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Ohio Brass Co.
Westinghouse E. & M. Co.

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Melting
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Elec. Corp.

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General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.

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Westinghouse Tr. Br. Co.

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Westinghouse E. & M. Co.

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St. Louis Car Co.

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Carnegie Steel Co.

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General Electric Co.

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Elec. Corp.
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Westinghouse E. & M. Co.

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Greasers (See Lubricants)

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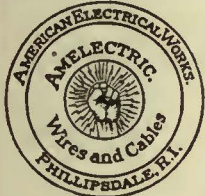
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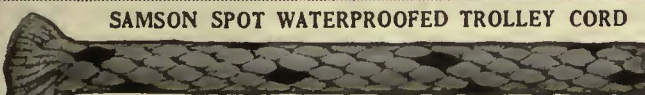
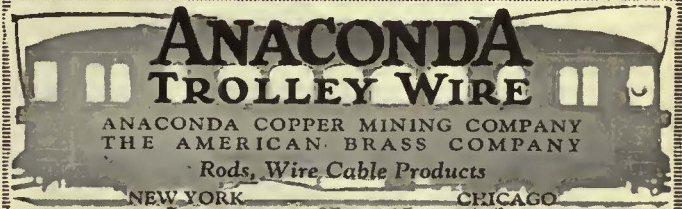
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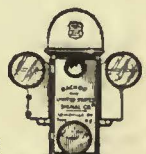
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Bethlehem Steel Co.
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Apparatus, Oxy-Acetylene)

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Brill Co., The J. G.
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Center and Side)

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Electric Service Supplies Co.
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway
Crossing
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.

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Adjusters)

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Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal
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Nuttall Co., R. D.

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Cummings Car & Coach Co.
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Co.

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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

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Cummings Car & Coach Co.
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Morton Mfg. Co.

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Ohio Brass Co.
Westinghouse E. & M. Co.

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Babcock & Wilcox Co.

Sweepers, Snow (See Snow
Plows, Sweepers and
Brooms)

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Elec. Corp.
Consolidated Car Heating Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

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Ramapo Ajax Corp.

Switches, Track (See Track
Special Work)

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insu-
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Tape)

Tee Rail Special Track Work
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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Graybar Electric Co.

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Gold Car Heating & Light-
ing Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and De-
stroyers
Electric Service Supplies Co.
Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties, Wood Cross (See Poles,
Ties, Posts, etc.)

Tongue Switches
Wm. Wharton, Jr. & Co.,

Tool Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Tools, Track & Miscella-
neous
American Steel & Wire Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See
Cutting Apparatus)

Towers and Transmission
Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.

Track Expansion Joints
Wm. Wharton, Jr. & Co.,

Track Grinders
Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo Ajax Corp.

Track, Special Work,
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.,

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transformers
American Brown Boveri
Elec. Corp.
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Trucks, Safety, Stair, Car
Step
Morton Mfg. Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal
Co.
National Railway Appliance
Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance
Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Electric Service Supplies Co.
More-Jones Brass & Metal
Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
More-Jones Brass & Metal
Co.

Star Brass Works
Trolley Wheels & Harns
Electric Service Supplies Co.
More-Jones Brass & Metal
Co.

Star Brass Works
Trolley Wheels (See Wheels,
Trolley)

Trolley Wires
Amer. Electrical Works
Amer. Steel & Wire Co.
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Ansconda Copper Min. Co.
Graybar Electric Co.
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Brill Co., The J. G.
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Cummings Car & Coach Co.
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Trucks, Motor
Graham Bros.
International Motor Co.
Mack Trucks, Inc.

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Tubing, Yellow & Black
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Irvington Varnish & Ins
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Turbines, Steam
General Electric Co.
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Another ad will appear next week.

HASKELITE MANUFACTURING CORPORATION
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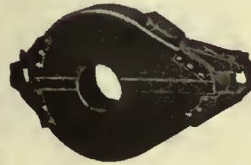
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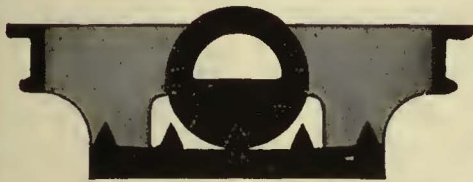


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From 13 to 65 Per Cent

Report of A. E. R. A. Committee on Essential Features of Modern Cars reveals remarkable returns on modern light-weight car investments

Apparently many electric railways have already recognized the fact that their equipment has passed that point after which it is really profitable to purchase new cars. An investment which will net such a substantial return, 13 to 65 per cent, as shown by the figures included in the Report of the A. E. R. A. Committee on Essential Features of

Modern Cars can hardly be overlooked.

With such convincing proof available and with such convenient financial arrangements at their disposal, electric railways are quickly taking advantage of the economical operation and increased revenue producing facilities obtained with light-weight modern cars.

Light-weight cars, built by Brill, modernly designed and equipped, are proving profitable investments to many electric railways.



THE J. G. BRILL COMPANY



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SPRINGFIELD, MASS.

Bus facts from Philadelphia

No. 1

"The best evidence of our faith in the gas-electric bus is that we ordered 202 buses in January, 1925, and in January, this year, we found it advisable to place an additional order for 160 more of the same type."

No. 2

"The maximum mileage we have accumulated on any one vehicle (gas-electric) is 47,351 miles. This bus has been pulled-in twice, once for a broken starter and again for a burnt-out ignition coil."

No. 3

"Our average schedule speed, being the result of dividing the miles operated by the actual running time between terminals, is 12.02 miles per hour. In this calculation the interurban buses have been eliminated.

"... a factor which affects speed to the extent of 10 per cent affects costs to the extent of about 1½¢ for wages alone, and furthermore affects the fixed charges in the same ratio because as speed increases it is possible to give the same service with less equipment."

No. 4

"We find the mechanical-drive buses are averaging during a month about 24 miles per quart of oil, while our gas-electric buses show an average of about 38 miles."

From a paper by R. H. Horton, President, Philadelphia Rural Transit Company. His comments were based on 8 months operation of gas-electrics.



Nothing compares with the Gas-Electric

That the Gas-Electric bus has advantages, both from operating and maintenance standpoints, has been verified on every property where electric drive has been introduced.

Think of operation so quiet that residents who had complained of the noise of buses climbing a near-by hill in second gear registered no objections after motor-driven gas-electric buses were placed in service.

The driver, having no clutch to operate and no gears to shift, can keep his eyes on the road and the traffic, regulating his speed entirely by pressing the accelerator. This fact has a bearing on the two most costly phases of operation—wages per bus-mile and accidents.

Gas-electric bus operators are only beginning to realize the possibilities offered by this type of equipment for accurate testing with electrical instruments to determine definitely the results of overhauling the engine. Electrical measurements also furnish a means of knowing whenever any bus is not operating at maximum efficiency, whether the trouble be in the engine, the motive power, or with the driver.



Like other new General Electric products, gas-electric bus equipment was put on the market only after extensive engineering and practical tests had demonstrated the soundness of the principle and certainty of its success. G-E engineers have since gained added experience with equipments in service of varied character. Learn from them the importance of having electric drive.

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