

# ELECTRIC RAILWAY JOURNAL

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**Electric  
Railways  
operating 4270  
Busses & Trucks are  
building patronage  
cutting maintenance  
costs and maintain-  
ing schedules with  
Cleco Twins**



**GRÜSS**  
Sleeve Type  
**AIR SPRING**



**WESTINGHOUSE**  
Piston Type  
**AIR SPRING**

**THE SHOCK ELIMINATORS FOR TRUCKS-BUSSES-PASSENGER CARS**



# For Railway Motors—

*More than "Save-the-Surface"  
Varnish is needed*

**T**HE severe service conditions under which railway motors operate make the ordinary "save-the-surface" varnish inadequate for insulation. Extreme vibration, added to heat and moisture, is effectually resisted only when the insulating varnish has the proper characteristics. Westinghouse varnish No. 335 has these characteristics. The performance of Westinghouse motors is convincing evidence.

To enable you to perpetuate that performance—through perfected insulation—Westinghouse has made available to you this specially developed varnish No. 335.

*Using Westinghouse Insulating  
Materials Is Like Having  
A Million Dollar Laboratory*

Westinghouse Electric & Manufacturing Company  
East Pittsburgh Pennsylvania  
Sales Offices in all Principal Cities of  
the United States and Foreign Countries

TOUGHER THAN  
RHINOCEROS HIDE



# Westinghouse

INSULATING **Varnish**



1927

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# ELECTRIC RAILWAY JOURNAL

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No. 18

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## "Stuck by Floods"

IN THIS ISSUE is a report of the Southwestern Public Service Association meeting at New Orleans—and thereby hangs a tale.

An editor of the JOURNAL's staff left Chicago for an extended trip through the Southwest. On his itinerary was the meeting of the Southwestern Association at New Orleans, which opened on April 26. But in the territory through which he traveled—the Great Mississippi Valley—the "Father of Waters" impatiently threw aside the puny restraining hand of man and ran rampant over rail lines and highways. "Stuck by floods" flashed a cryptic message to New York. "Changing itinerary; can't make New Orleans in time for meeting."

But the meeting was covered and the report is in this issue. A hasty shift in plans, a ticket purchased, a bag packed and an editor was on his way from New York. A flood of the Mississippi is only and incident in the job of reporting a meeting to JOURNAL readers—while it's still news!

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Successful Construction Methods  
Electrical West



SAVING THE RAIL SAVES THE RAILWAY

# Making a little go a long way

That's good railway operation. The Concord (N. H.) Electric Railways did it. Eight years ago the road was in a bad way. Now conditions are vastly improved. Largely responsible for the improvement was Mr. John B. Crawford's able, active drive for improved maintenance first. He sold surplus equipment to buy needed maintenance equipment.

The track was badly run down. We quote from an article in this paper:

“The relative needs of track and rolling stock were weighed and it was decided that the track was so far gone that immediate and drastic steps would have to be taken to repair some of the worst stretches. Money was not available for giving necessary attention to both of these items and since even new cars operating over impossible track would be of little avail the latter was given priority. . . . ”

Business is better now for this road. How is it on yours?

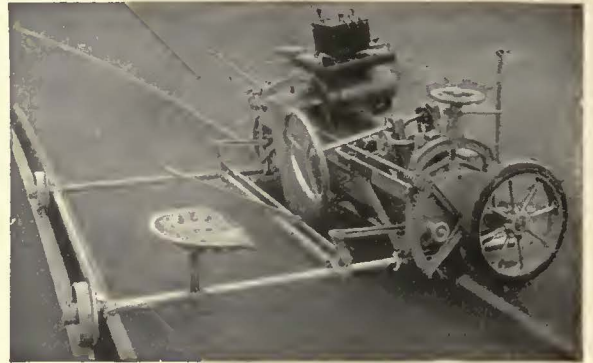
## Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

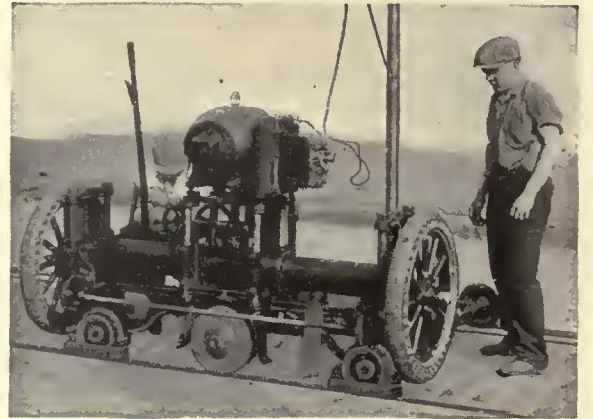
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Ⓢ 1438



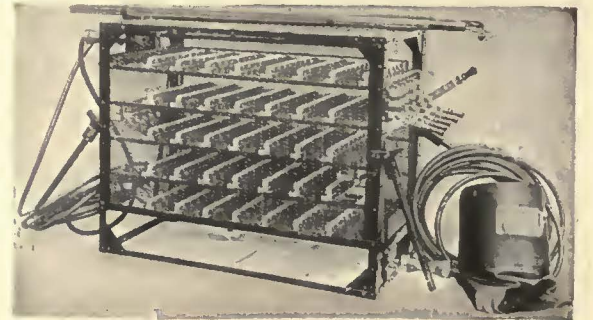
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



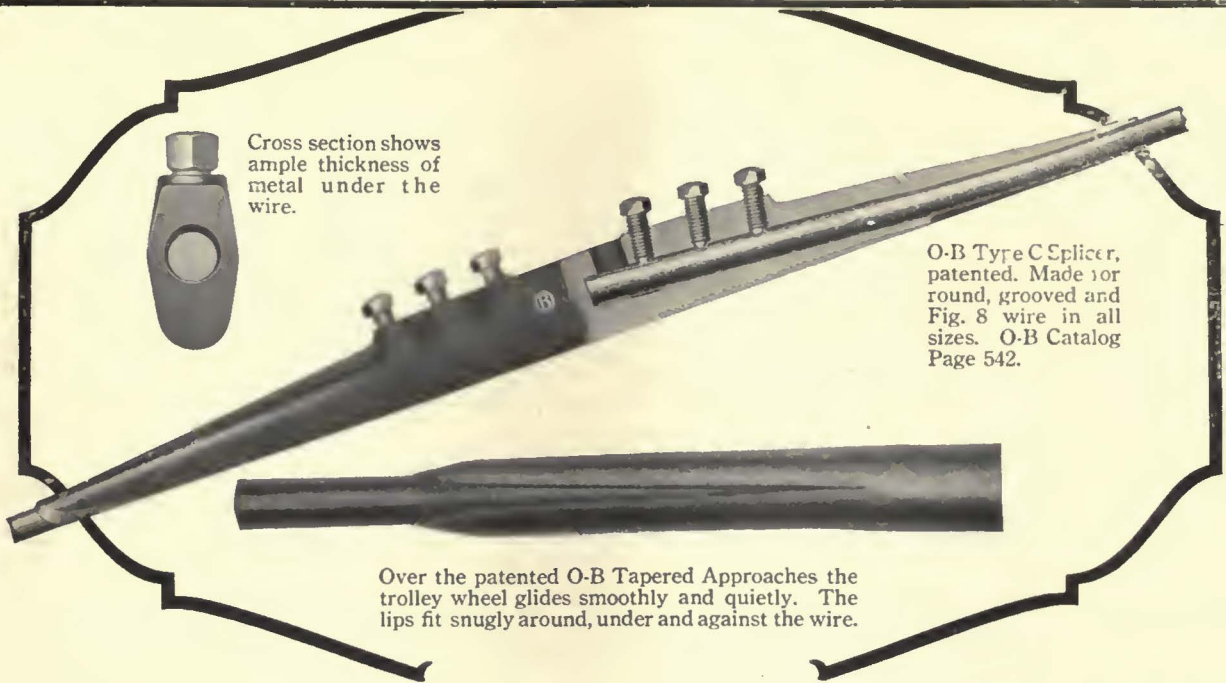
Reciprocating Track Grinder



"Ajax" Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY

O-B ENDURANCE IS SERVICE INSURANCE



Cross section shows ample thickness of metal under the wire.

O-B Type C Splicer, patented. Made for round, grooved and Fig. 8 wire in all sizes. O-B Catalog Page 542.

Over the patented O-B Tapered Approaches the trolley wheel glides smoothly and quietly. The lips fit snugly around, under and against the wire.

# Its Holding Power Exceeds the Strength of New Wire

FROM an operating standpoint, the results given by the Type C Splicer are practically as good as with continuous brand new trolley wire. In holding power the C Splicer is actually stronger than the trolley wire. And due to its patented O-B Tapered Approaches, very narrow cross section and flat, smooth underrun, there is the minimum of disturbance to a passing trolley wheel.

Electro-galvanized chrome steel set screws, especially designed for this splicer provide a most effective means of holding the wire. Ample thickness of metal under these set screws maintains the normal breaking tension of the wire even after wear on the ends of the splicer has made replacement necessary.

The lips are ground to a knife edge at the end and left thicker at the center. This shaping gives an exceptionally smooth approach and leave when the lips are peened into place. The trolley wheel rolls onto the splicer and off again almost as smoothly as on an unbroken wire.

Ohio Brass Company, Mansfield, Ohio  
 Dominion Insulator & Mfg. Co., Limited  
 Niagara Falls, Canada  
 3838

# Ohio Brass Co.



SALES OFFICES: NEW YORK CHICAGO

PHILADELPHIA PITTSBURGH CLEVELAND  
 SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS  
 LINE MATERIALS  
 RAIL BONDS  
 CAR EQUIPMENT  
 MINING MATERIALS  
 VALVES

# IT'S ALL IN THE METAL



**I**F the metal of which a steel wheel is made resists wear well enough there is no need of frequent re-turning to preserve contour.

Special composition steel plus special heat-treating develops the unusual wear resistance that makes the Davis the only economical "One-Wear" Steel Wheel.

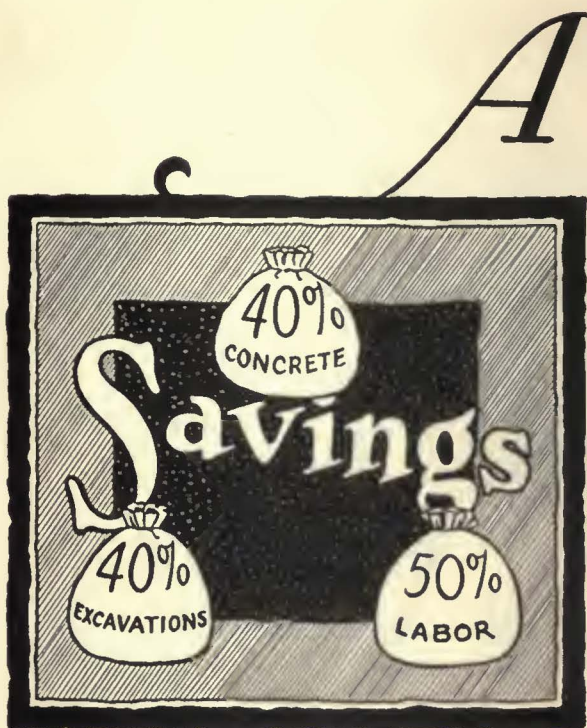
It never needs re-turning.

## AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



A **40%** *reduction*  
 in concrete and excavation items  
*has a radical effect*  
 on the  
*completed track costs*

And when you consider that these two items usually make up 82 per cent of the total cost of track—you can readily appreciate the fact that Twin Tie track construction means better track with low first cost.

With the increasing attention to modernization of equipment—it behooves every engineer and electric railway executive to examine his track costs as insurance to new equipment.

The same logic that proves that new equipment pays for itself will also prove that Twin Tie track construction will pay for itself—and *make a profit.*

The 880 Twin Ties required per mile only weigh one-third as much as 2640 wood ties required. Only 800 cubic yards of excavation and 790 cubic yards of concrete are required per mile of Steel Twin Tie track construction.

This data is given in detail in our new Paved Track Notebook. So be sure that you give it your careful attention before you plan too far ahead for 1927.

A comparative estimate against your present construction may show a substantial saving—We repeat “a 40% reduction in concrete and excavation items has a radical effect on the completed track costs.”

**International Steel Tie Co.**  
 Cleveland, Ohio



*Look it up in your "Paved Track Note Book"*

**Steel Twin Tie Track**

**A New Line**

**Westinghouse—National  
Air Compressors**

are now available in a new series called the 2V Type, which is adaptable to a wide range of service—for intermittent or continuous operation—against pressure up to 135 pounds—and on all standard commercial electric circuits. They come in three sizes—75, 100, and 150 cu. ft. displacement, either single or two stage, and are air-cooled or water-cooled, as the service may require.

These compressors are built to insure the well-known “family trait” of efficient and lasting service. They are compact, self-contained units, having automatic control, positive and efficient unloader, forced feed lubrication, flexible fly-wheel coupling between compressor and motor—and other noteworthy features outlined in Descriptive Catalog T-2047.

May we send you a copy of this publication?

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

Westinghouse - National Air Compressors, built in sizes ranging from 3 to 700 cubic feet displacement, are ideal for use in power houses, car barns and shops.

# WESTINGHOUSE—NATIONAL *Air Compressors*

“QUALITY MACHINES FOR QUALITY SERVICE”





KEYSTONE TROLLEY CATCHERS

KEYSTONE GEAR CASES

KEYSTONE ROTARY GONGS

LIGHTING FIXTURES

FARADAY CAR SIGNALS

GOLDEN GLOW HEADLIGHTS

HUNTER KEYSTONE SIGNS

### Faraday Car Signals



To increase patronage, add attractiveness and efficiency to your cars by selecting your equipment from the broad line of Keystone Car Specialties.

### Faraday Car Signals



The installation of these reliable and convenient passenger signal systems enables passengers to signal the operator without commotion and distraction of his attention. Made for every requirement—high or low voltage systems, buzzers, vibrating bells or single-stroke bells, resistance panels, flush or surface type push buttons. A convenience your passengers appreciate.

*Catalog No. 7 describes and illustrates the complete line of Keystone Equipment. Sent on request.*



**ELECTRIC SERVICE SUPPLIES Co.**

PHILADELPHIA  
17th and Cambria Sts.

PITTSBURGH  
1123 Bessemer Building

BOSTON  
88 Broad Street

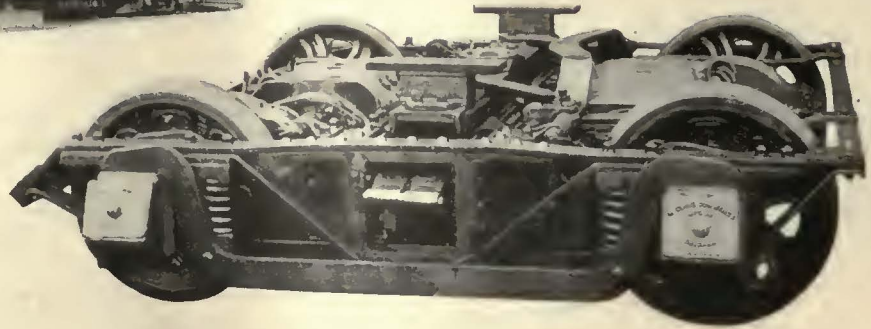
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General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver



Cummings No. 62 Truck for light weight city and interurban cars.

# Modern Car Design *includes a smooth riding* Truck

Cars recently built by this company for several properties have brought forth much favorable comment from the public in the various localities. The riding comfort has been especially noted. This is a feature of the modern car that goes far to increase good will and build patronage. Cummings No. 62 Truck, shown above, has contributed largely to the riding comfort of our cars.

**CUMMINGS CAR AND COACH COMPANY**

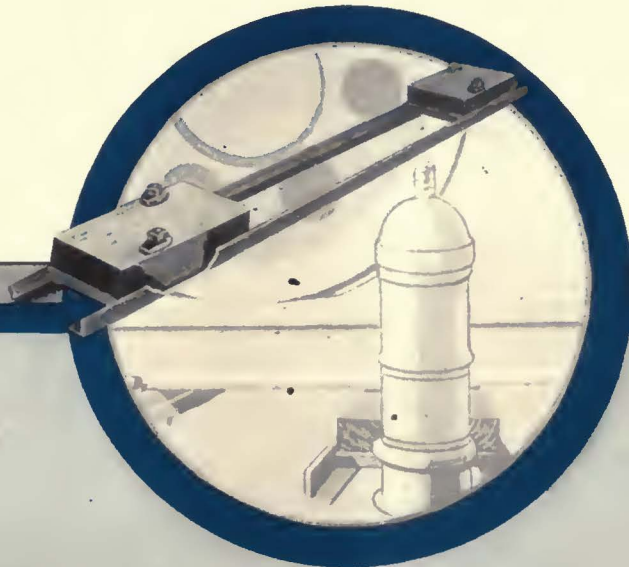
*Successors to McGuire-Cummings Mfg. Co.*

111 W. Monroe Street, Chicago, Ill.



# Put the Track Repair Crew on Productive Work

**The Dayton Mechanical Tie Co.,  
Dayton, Ohio**



# Dayton Tie Track doesn't need a repair crew

**I**F YOU install Dayton Tie Track throughout your property, your track repair crew will have nothing to do but clean out switches; they can be given revenue producing work.

Dayton Mechanical Ties, which give you "Shock Absorber" Tracks, are the cure not only for track maintenance costs, but, through enduring track smoothness, also reduce rolling stock repair costs.

Since the inception of Dayton Tie Track, 15 years ago, none of it has ever failed or cost a penny of maintenance. It has stood up under the heaviest traffic street railways have to offer.

In virtually every state in the Union—in Canada—in foreign countries, Dayton Track is reducing street railway costs by figures that in many cases mean the difference between profit and loss.

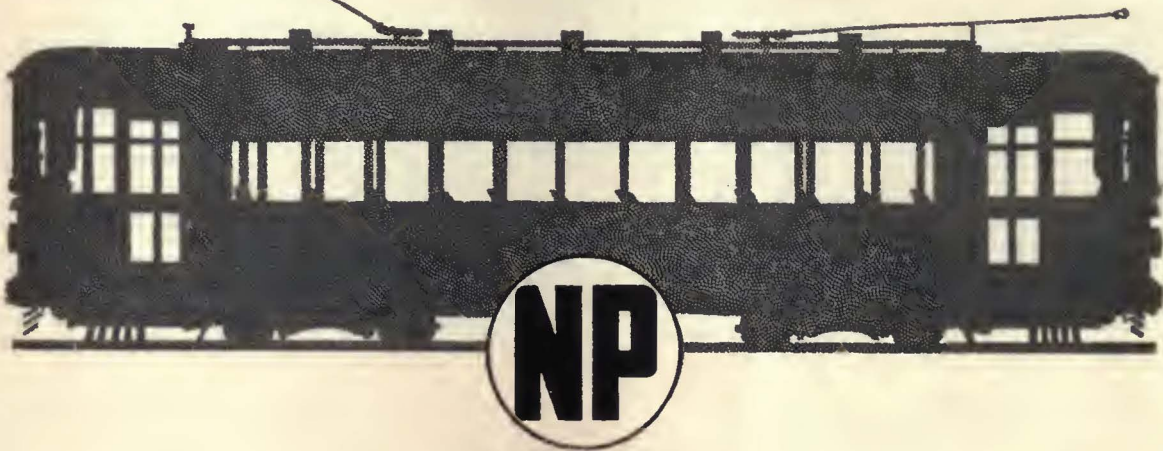
#### SEE FOR YOURSELF

Doubtless there is an installation near you—a note from you will bring information as to where it is, and you can see for yourself.

**The Dayton Mechanical Tie Co.,  
Dayton, Ohio.**

# THE MODERN CAR

A modern car is a car that is completely equipped with every practical device essential to *safety, speed, comfort and economy in operation.*



N. P. Door and Step Equipment is not only an essential in each of these respects but, by cutting down standing time and reducing aisle friction and other peak load problems to a minimum, it makes it possible to utilize the full efficiency of all other mechanisms and devices on the car.

## NATIONAL PNEUMATIC COMPANY

*Executive Office:* Graybar Building, New York

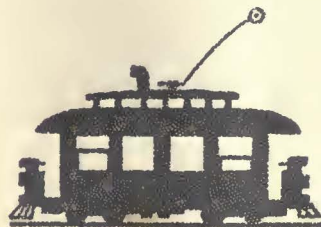
*General Works:* Rahway, New Jersey

CHICAGO  
518 McCormick Building

MANUFACTURED IN  
TORONTO, CANADA, BY

PHILADELPHIA  
1010 Colonial Trust Building

Railway & Power Engineering Corp., Ltd.



# “Absolutely sold on



# Cincinnati New Cars"

So says Mr. Kington of the Knoxville Power & Light Company, Knoxville, Tennessee. This company operates 30 Cincinnati Lightweight NEW cars—23 of the single truck type and 7 of the double truck type. Mr. Kington emphasized especially the comfort of these cars, and their quick acceleration and deceleration.

Again, from a successful operator, comes appreciation of the practical results of **BALANCED DESIGN**—better service more easily maintained; public appreciation of greater comfort and convenience; substantial savings in power and maintenance.

It has taken ten years of consistent effort on our part to achieve this standard of

modern car-building. But now that it is established it means that the results which have followed the use of Cincinnati Lightweight NEW Cars on successfully modernized roads throughout the country can be duplicated with every reasonable certainty on **YOUR** property.

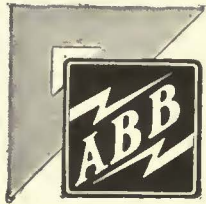
Let us sit down with you and discuss the subject in detail.

CINCINNATI CAR COMPANY

Cincinnati, Ohio

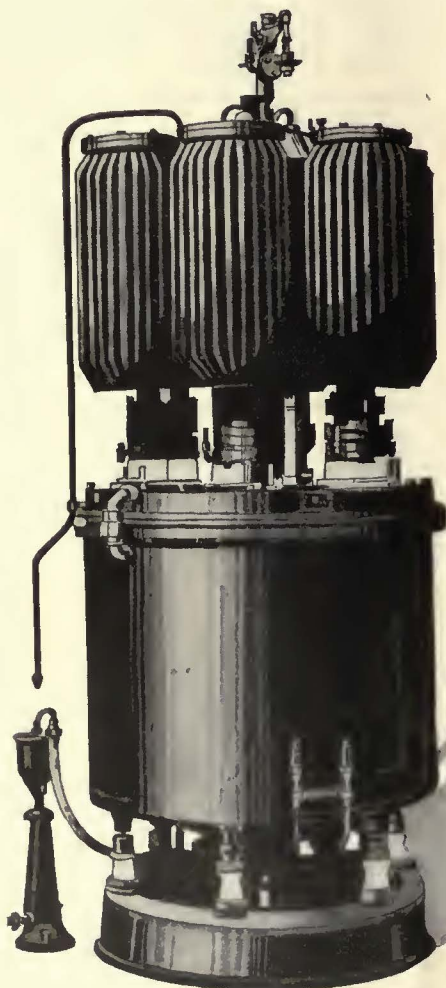
CINCINNATI  
New  
CARS

*A step ahead of the modern trend*



# American BROWN BOVERI

## 4.24 per cent



### Chief Advantages

- (1) Efficiency high over the whole working range.
- (2) Simple operation and minimum attention.
- (3) No synchronizing.
- (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 substations 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.

### Principal Products

Mercury-Arc Power Rectifiers (steel enclosed)  
Electric Locomotives—for any system of current, high or low tensions  
Complete equipment for railway electrification  
Rotary Converters  
Motor Generators  
Complete equipment for outdoor and indoor substations

Diesel-Electric Locomotives  
Automatic Regulators  
Steam Turbo-Generators for normal or high pressures and superheats  
Oil Switches and Circuit Breakers

Transformers  
Turbo-Compressors and Blowers  
Ships  
Diesel Driven  
Turbine Driven  
Electrical Driven  
Dredges and Harbor Equipment

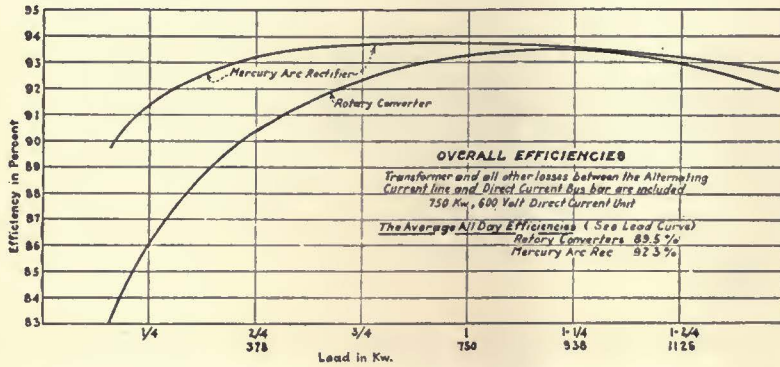




# Mercury-Arc Power Rectifiers



## Higher Efficiency



Compare the average over-all efficiencies on the above chart, taken from the daily performance of a 750 kw.-hr., 600 volt substation.

Rotary converters—89.5%.

Mercury-Arc Power Rectifier—92.3%

An increase in efficiency averaging 4.24% for this Rectifier, or a direct saving of \$730 per year on a 20-hour day basis at 1 cent per kw-hr.

Estimate the attention charge at half that of rotary converters and you will appreciate what economy factors alone mean from the standpoint of a return on the investment.

These are some of the reasons for the rapidly growing acceptance of A-B-B Mercury-Arc Power Rectifiers for electric railway substation service throughout the United States.

*Descriptive Circular No. 301 describes A-B-B Mercury-Arc Power Rectifiers.*

**American Brown Boveri Electric Corporation**

165 Broadway, New York, N. Y.

Camden, New Jersey

922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago



1927

# AMERICAN BROWN BOVERI



**LAST  
← WEEK**

The public *today* is no different than it ever has been. The demand for rides is greater than ever.

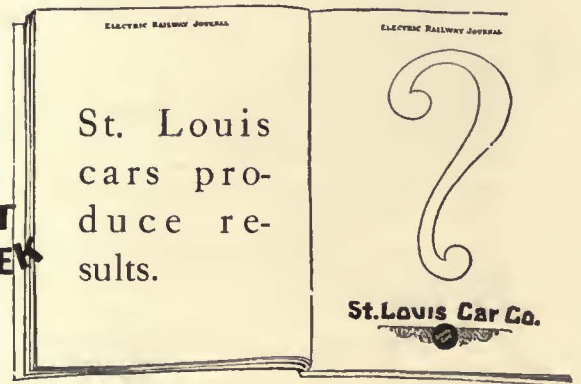
But the public has been educated to greater riding comfort—and demands better transportation.

It's up to the car builder and the operator to supply cars that attract the public. It's business suicide not to do so.

- And by the same token, it's good business judgment to give the public what they demand—new, light-weight modern cars.

That's why the "Quality Shops" is boosting modernization programs.

**NEXT  
WEEK**

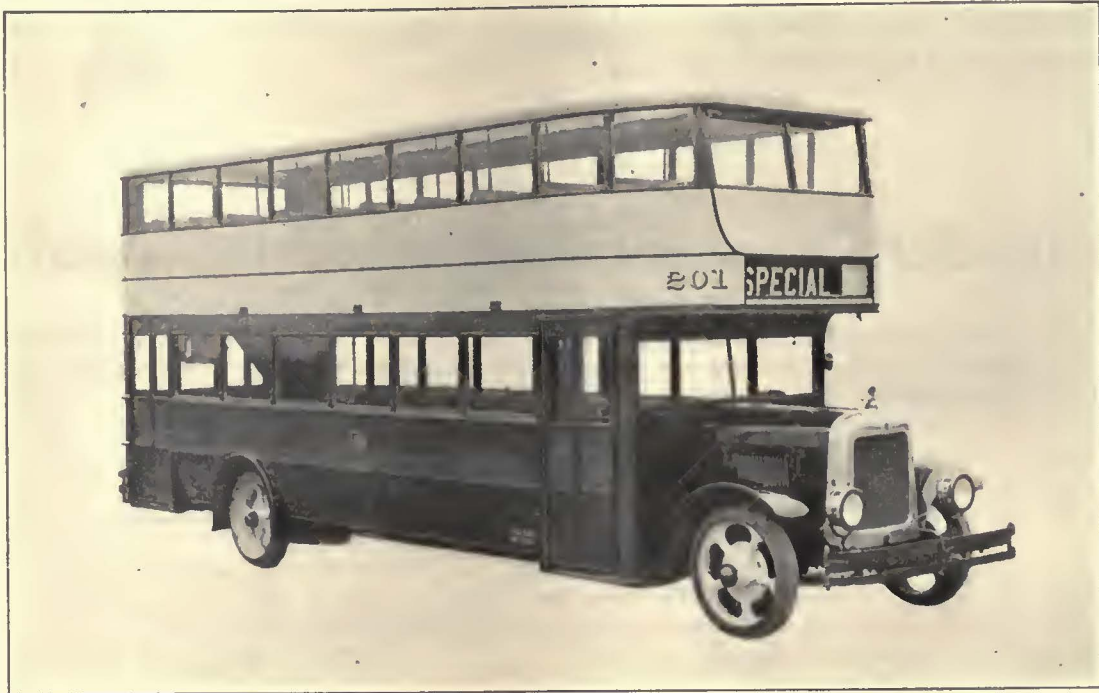


# St. Louis Car Co.



# PHILADELPHIA RURAL TRANSIT CO.

orders **202** more  
**ECONOMY METERS**



## FOR NEW GAS- ELECTRIC BUSES

This repeat order is the result of a year's experience with 375 Economy Meters installed on all of the Gas-Electric Buses now being operated by the Philadelphia Rural Transit Co.

These meters have an excellent accuracy curve even under the greatly varying voltage and current conditions typical of the gas-electric drive. They are connected to measure the output of the gas engine driven generator and will thereby afford definite means for

comparing the relative efficiencies of the bus drivers and also for comparing operating efficiencies of the gas-electric power plants.

In addition, the Kw.h. Inspection Dial feature of these meters serves the bus shop forces in determining the proper time for inspection and lubrication of equipment, in exactly the same way that they have served to such good advantage on more than 2,500 street cars of the Philadelphia Rapid Transit Company during the last five years.

## ECONOMY ELECTRIC DEVICES CO.

37 West Van Buren St., Chicago, Ill.

SANGAMO ECONOMY METERS  
PETER SMITH HEATERS

BEMIS BOYERIZED TRUCK SPECIALTIES

WOODS FAREBOXES  
HASKELITE—PLYMETL

Of all the phases of modernization, increased schedule speed has the most far-reaching effect on earnings. It boosts your "production" per man-hour, and thereby reduces operating cost per car-mile. Most important of all, it sells more service.



## Do modern cars increase schedule speed?

*Here are reports from six roads. Each has improved its schedules during recent years. In each case modern cars were necessary. General Electric car equipment is used on every road.*

"New equipment was necessary to maintain the increased schedule speeds in most cases."

LEVIS (P. Q.) TRAMWAYS CO.

"New light-weight cars, weight 32,000 pounds using GE-258 Motors, have been purchased and these accelerate much faster than the older, heavy type of car."

MORRIS COUNTY (N. J.) TRACTION CO.

"Schedule speeds increased by a gradual cut in running time; also through new equipment affording better acceleration."

NEW ORLEANS (LA.) PUBLIC SERVICE, INC.

"Schedule speeds slightly increased. By reducing stand time; also by the use of new equipment."

BIRMINGHAM (ALA.) ELECTRIC CO.

"Our schedule speed has been increased. Made possible by better track conditions; improvements in equipment such as light-weight all-steel construction and improvements in the motor design which give the car a faster acceleration and running speed; giving more attention to schedule maintenance and construction; a more thorough study of traffic conditions."

SAN ANTONIO (TEX.) PUBLIC SERVICE COMPANY



The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and to build appropriate equipment.

"Schedule speed increased from 8 miles to 9.2 miles an hour. This was accomplished by making a survey and finding every possible place where the speed could be increased, and also by using new equipment in the form of safety cars with a quick pick up and by eliminating all unnecessary lagging."

WISCONSIN POWER & LIGHT CO.

# 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 69

New York, Saturday, April 30, 1927

Number 18

## The Four Horsemen Ride Again

THEY are riding again!—those apocalyptic horsemen of destruction. This time their diabolical forms are reflected in the swishing, sucking torrent of the Mississippi. They cackle with glee each time a levee breaks! They rock crazily in their saddles as home after home topples and then goes careening down the flood.

From Missouri to the Gulf these enemies of mankind are being fought with heroic effort and undaunted courage. While most of us sit in safety on the highlands, history grim and glorious is being made. Among its makers are hundreds of public utility men and women. That they have gone and will go beyond the call of duty is assured. That their heroic deeds will be set down is not so certain unless those who could only stand and wait will write what the actors were too modest to record. A flood of the present magnitude is bound to develop engineering and operating problems never before experienced. Each situation will add to the storehouse of knowledge. Each problem conquered will doubly arm the nation against the time the Four Horsemen ride again!

## A Little Book with a Big Message

VERY often much more attention than it really deserves is attached in business to the value of appearances as reflected in the clothes a man wears. It is appalling to think of how much business has been lost through officials, secretaries and office boys turning down the poorly dressed visitor, or what intellect and acumen have been steered toward poorhouses, jails and cemeteries by reason of the same false evaluation. For this reason one is elated to note that in a recently published brochure, "Our Part in Public Service," the Nashville Railway & Light Company is telling its employees that "clothes don't make the man."

Furthermore, it is backing up the action with a true story which is prefaced with these remarks: "Deal just as promptly, as willingly and just as courteously with the person of poor appearance as you would with one dressed in finery. Appearance means nothing in our business. The humblest citizen is entitled to and must receive the same courteous attention as the person with social standing or prosperous appearance."

But such a sound principle as this is only a tithe of what this vest pocket compendium of good manners contains. Among other paragraphs that make it stand out from the ordinary run of courtesy creeds is the one devoted to the subject of how to say "hello" without keeping the "hell" in it. In this particular, much has been written about telephone courtesy, but the JOURNAL does not recall any text so far that has so skillfully or

convincingly pointed out what a vital part voice inflection plays in this phase of public relations.

Those responsible for the little book do not hesitate to attack quite seriously one of the great curses of big business, i.e., departmental jealousy. On this subject, and one captioned "The Public Is Fair When Fully Informed," there are rare expressions of good, hard common sense. Thirteen hundred of the booklets have been distributed among employees of the company, and it is no exaggeration to state that this distribution could be multiplied by a hundred to the ultimate benefit of all those who in our field are striving to bring about a deeper and keener understanding of the public relations problem. Had "Our Part in Public Service" been published in the era of the Latins they would undoubtedly have pronounced it *multum in parvo*.

## Wanted—

### A Maintenance Exhibit

EVEN though the Cleveland convention is still more than five months away, it is none too early to get exhibit plans under way. All signs indicate that this will be the greatest convention ever held by the industry. It is significant that several operating companies have already notified Director of Exhibits F. C. J. Dell that they are planning to show new cars and equipment developed on their properties. Likewise, progressive and wide-awake manufacturers are making preparations to show the most recent improvements in their apparatus so as to be identified with the march of progress in the industry.

That this year's car exhibit will exceed in size the record-breaking showing of last year seems more than probable, as the result of the energy and enthusiasm which J. H. Alexander, chairman of the exhibit committee, is putting behind this phase of the convention. That it will far exceed last year's exhibit in the showing of radical developments in car body and truck design is already assured by the several construction experiments which are under way.

There is, however, one important phase of an electric railway exhibit which has in the past been obviously deficient in comparison with its importance as a major item in successful operation. That is the showing of tools and equipment which decrease maintenance costs and improve workmanship. Electric railway shops are notoriously lacking in modern tools and machines. This is in part, at least, attributable to neglect of the field by the manufacturers of such equipment. True, electric railways have been poor buyers of tools and machines. They have in the past worried along with old machines as best they could and have overlooked the savings which modern shop equipment make possible. Part of this situation is attributable to their depleted finances,

but another important factor has been neglect of the market by the tool manufacturers. There is a feeling among them that one large automobile manufacturer is a better prospect for machinery sales than is the electric railway field. In a measure, there was in the past some basis for this viewpoint, because the progressive motor manufacturer does not hesitate to throw out old machines to make even a small reduction in his manufacturing costs.

Today, however, the electric railway situation is changing rapidly. There is a growing interest in all phases of modernization. There is under way an active campaign for better methods, increased efficiency and improved performance. In addition, the bus has become an important part of the transportation industry, and with its introduction efficient maintenance machinery takes on increased importance. Wide-awake maintenance equipment manufacturers may well afford to interest themselves in the opportunity for showing their products under the favorable conditions that will exist at Cleveland.

### Figures for 1926 Very Encouraging

**S**IGNIFICANT, indeed, is the interpretation of the facts contained in the association's statistical study of the earnings of the electric railways for 1926, abstracted elsewhere in this issue. It is apparent, for instance, that companies other than the large ones are beginning to share in the improved conditions of the industry. The affairs of the very small companies, however, are still bad, but it should be borne in mind that these companies constitute only a fraction of the total. In fact, their influence on any statement reflecting the operations of the whole industry is practically negligible.

While the electric railways are increasing their bus services they are not curtailing their rail lines, but are giving more rail service measured in car-miles than they ever did. And they are doing this even though on the whole fares are not what they should be. The average fare per passenger in 1926 was 7.10 cents. In order to produce the same net today as in 1912 the average fare should have increased 56 per cent instead of 35 per cent; in other words, the average fare should be 8.22 cents instead of 7.10 cents. Since the railways have shown their confidence in the public's integrity by expending the money necessary to provide additional service, the obligation of the public, as the JOURNAL has repeatedly pointed out, is of course to pay for that service so that the railways may receive a fair return on the money they are investing.

The author of the article commenting on the figures makes no bones of the fact that many electric railway managements have neglected to take advantage of improved methods and equipment which might have helped them to better their conditions. It is his idea that they have been especially derelict in the field of public relations. On the other hand, the more progressive managements among both the larger and the smaller properties, with operating conditions identical with those of the rest of the industry, have by their skill and their readiness to adopt new ideas succeeded in holding or increasing their traffic and enlisting the co-operation of their patrons, so that as a result they have been able to secure more equitable consideration from the public

authorities. This is very encouraging. Despite all the seeming cross-currents the conclusion is inescapable that the companies comprising the great bulk of the industry, while by no means prosperous, are nevertheless confidently going forward with plans for the future and that there is every reason to take heart.

### Another Year of Legislative Debate at Boston

**F**INALLY all the thunder on Beacon Hill with its promise of legislation for the Boston Elevated Railway has proved to be nothing but a dud. The Legislature has come to the end of its session, has wasted a great deal of time with matters affecting the Boston Elevated, rejected one proposition after another, and at last discarded everything. Nothing suited the lawmakers. Never in the history of Boston railway legislation has a case been more thoroughly prepared than was the Elevated situation this year, with most comprehensive plans from commissions and individuals of recognized merit.

Gov. Alvan T. Fuller was insistent upon some action, but the only thing that has come out of it all is a request to the Department of Public Utilities to value the road. Even that was a hurried afterthought. There were all the extremes, from a 50-year extension of public control of the Elevated to an immediate return of the property to the stockholders, and between these extremes came numerous compromises, resulting in bitter clashes among factions in the Senate and the House. It was earnestly argued that even if no legislation could be agreed upon regarding the control and financing of the company there must be no failure to provide for the physical extension of the rapid transit system. Even this has gone by default.

### Montreal Takes a Step Ahead in Power Conversion Equipment

**D**URING the past decade, in the power supply for electric railway service, changes have taken place from the manual substation to the automatic synchronous converter station, which has become almost standard for a large number of railways. Much more recent is the development of the mercury-arc rectifier for this class of service. The installation of rectifiers made by the Montreal Tramways represents what is probably the first fully automatic substation in America using rectifiers. Certainly it is the first automatic rectifier station in Canada.

While it is not to be assumed that the rectifier is a fully perfected piece of apparatus, it has gone a long way from the small glass bulb device. Save the principle, the latter has little in common with the steel enclosed rectifiers that have been developed for conversion of hundreds of kilowatts. Perfection of rectifiers such as these used in Montreal may be regarded as another triumph of engineering.

It is yet too early to know the results from the use of the Montreal rectifiers over long periods of time in heavy service. Similar equipment has been used in Europe for several years with satisfactory results, and the operating problems are well on the way to solution. It is to be hoped that the experience in Montreal will go far toward determining the applicability of the device

in electric railway power circuits. The simplicity from an operating standpoint and the ease of providing full automatic control make it ideal for railway service.

### Two Small Railways Come Into Their Own

BEFORE the calamity howlers of the daily press again draw the diapason of disaster and begin the final fugue of the funeral march over the electric railways in small communities they should ponder well the cases of the companies in Williamsport, Pa., and Fitchburg, Mass., reported in the JOURNAL for April 23. True, peace and plenty are not likely to flow forth in these places for the railways as they did from Ceres' cornucopia, but these two instances do show what railway men of leonine heart, aided and abetted by their communities, have done to restore to these roads the prestige they deserve. In the past things were not what they might have been in these towns from the standpoint of transportation, but all this has changed, changed because, unlike Trilby, the local people were not tone-deaf.

It is a different scene now to which "Williamsport Welcomes You" and upon which Fitchburg felicitates itself, different because responsible local people were unwilling that their railways, like those in some other communities, should be permitted to slip into the slough of innocuous desuetude. All the electric railway in the small community asks is a square deal. It is entitled to that and nothing less. It doesn't want pity and it doesn't need it. Far too many railways in cities the size of Williamsport and Fitchburg have, however, been permitted to go from bad to worse, not because of any unwillingness of the responsible railway managers to do their part, but because local people of power and influence have been as destitute of backbone as a banana.

### Track Developments Keep Pace With Rolling Stock Improvement

NOT to be outdone by the equipment engineers who recently have made notable innovations in rolling stock design, way engineers are busily occupied trying out new methods of track construction. An outstanding instance of this kind is the development of a base plate joint by the Eastern Massachusetts Street Railway. Details of its construction and a summary of the results obtained are given in this issue by Frank B. Walker, chief engineer.

Use of a welded base plate in addition to a pair of fish plates is not new. In these experiments, however, the fish plates have been omitted and only the base plate is used. Theoretically this scheme places the metal where it will do the most good. With a suspended joint the rail heads in contact carry any compression stresses and the welded base plate takes the tension.

Bending tests made at the Massachusetts Institute of Technology indicate that this type of joint is at least as strong as the ordinary welded fish plate joints, which have given satisfactory service for a number of years on this railway. Its strength appears greater than that of the rail itself, as numerous failures in the tests occurred by fracture of the rail rather than yielding of the joint.

It is too soon to draw conclusions as to the ultimate effect of these experiments on design of the track structure. If the base plate joint proves to be an acceptable substitute for other types now in use, it will mean a substantial saving for the railways. Developments of this kind are perhaps less spectacular than the recent ones made in car design, but they too play an important part in keeping the electric railway industry abreast of the times.

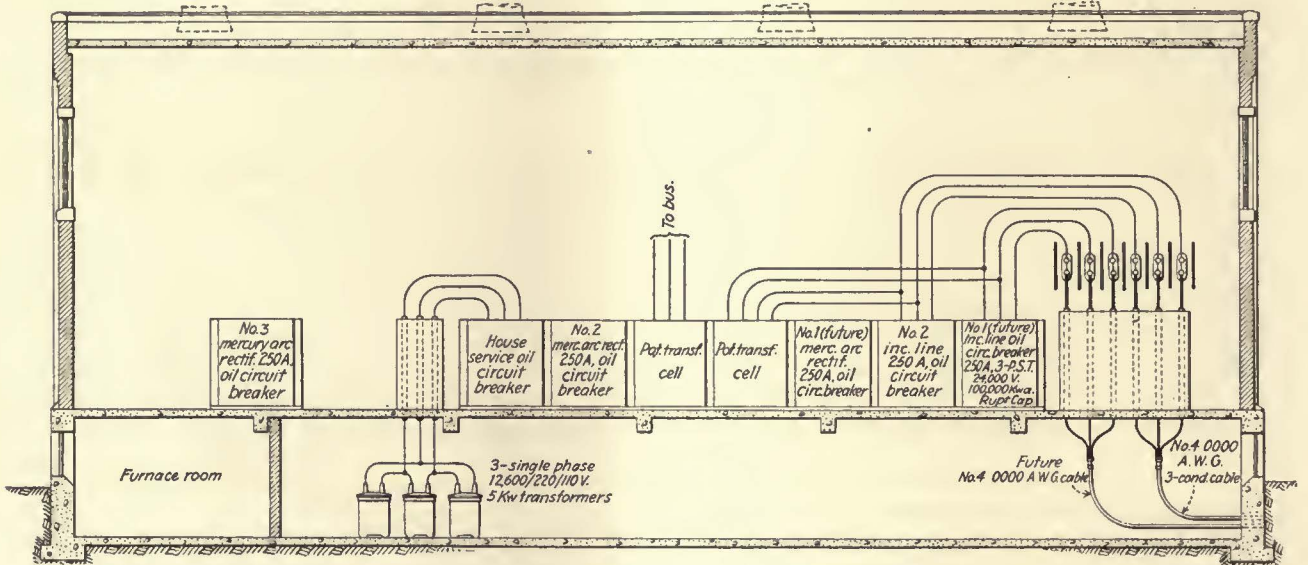
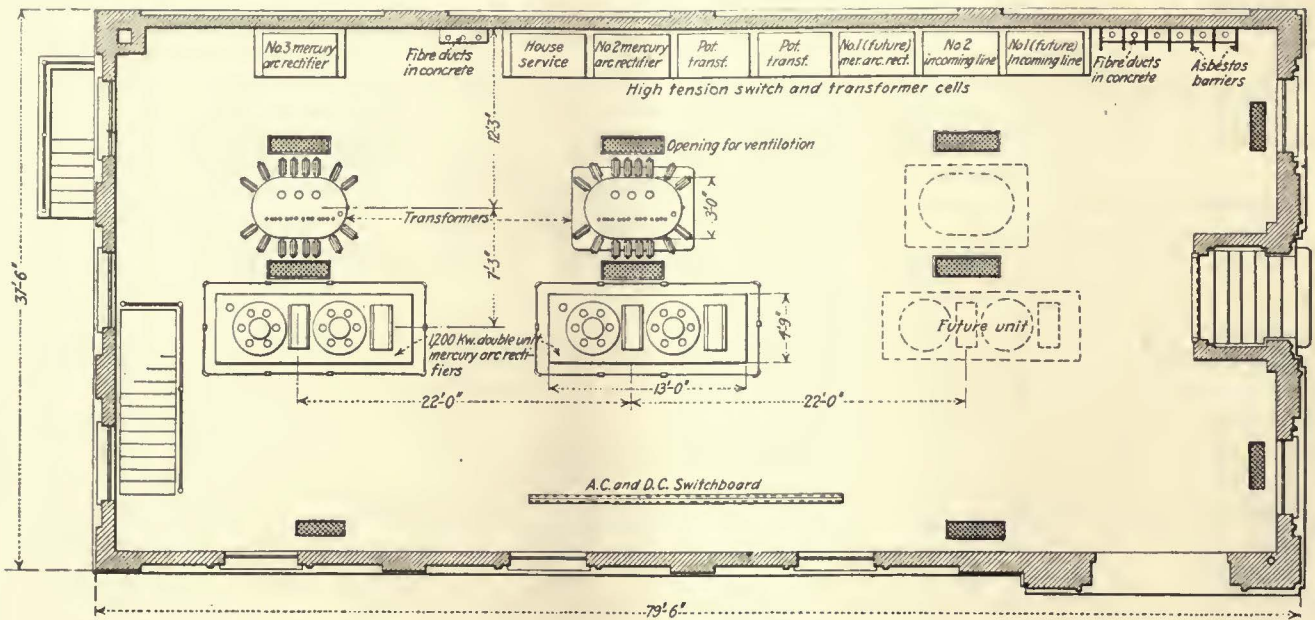
### Detroit Takes a Step Backward

GLEE is a great thing—when it isn't misdirected. In gloating over the defeat of the paving relief measure in favor of the municipal railway in Detroit, the *Free Press* appears to have started off with the wrong foot. It is not the first time this paper has done that very thing. There is no need for ELECTRIC RAILWAY JOURNAL to reiterate that it holds no brief for municipal ownership, but while the *Free Press* does the same thing it leans over backward in its effort to stand up straight. The same paper says that in turning down the paving relief measure the electors rose above specious arguments and showed that they understood the significance of the question at issue. They are said to have displayed "discrimination and discretion." According to the *Free Press* "the cost of paving between tracks is a natural and legitimate charge against the railway system, and by retaining it as such the voters insist that municipal transit facilities be operated and financed according to the methods and principles that would be adhered to if the lines were privately owned."

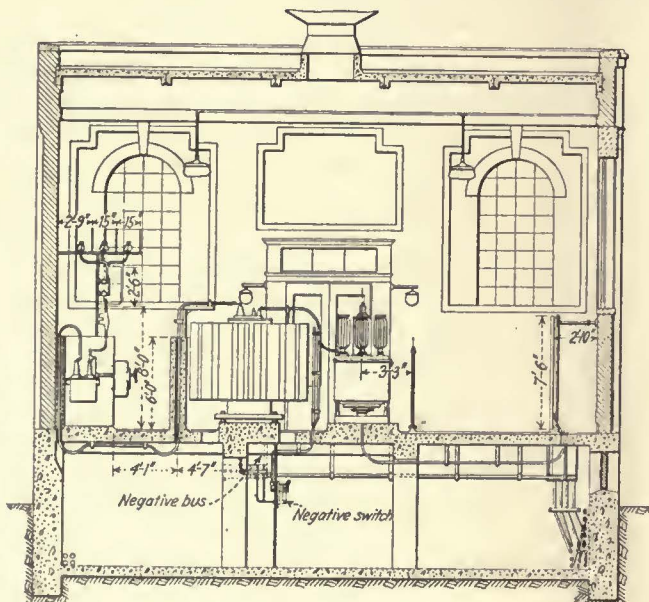
Indeed, and who told the *Free Press* that? It sounds like ancient of days. Doesn't that paper know that the thing the municipal railway sought is the very form of relief five states and more than 50 municipalities have already granted to private companies? If it did know it and did not say so, it was unfair, to say the least. If it did not say so because it did not know it, then that paper was ignorant.

The arguments in favor of paving relief are so well known to JOURNAL readers that there is no need to reiterate them. Paving burdens imposed upon the railways, if they ever were justified, are an anachronism in the present day and generation. The measure of relief extended to the railways proves that they are being increasingly so accepted. And if they are an anachronism as applied to private companies, surely they are no less an unwise exaction in the case of a municipal railway. They are a charge that the rider must meet, and to the very extent that such payments are exacted they are a factor in increasing fares.

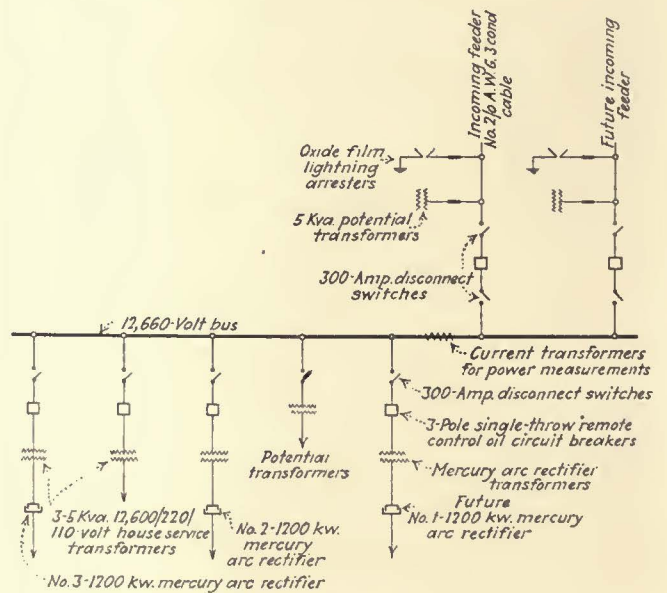
No, in defeating the relief measure at Detroit, the voters there did not show they really understood the significance of the question at issue. They showed discrimination but not discretion. Their discrimination was not only against the municipal railway but against themselves. As for the *Free Press*, it wrote itself down as either ill-informed or prejudiced. It is one thing to be against municipal ownership. But it is quite another not to be willing to concede to the municipal railway relief from onerous exactions properly but gradually being lifted from the backs of the privately operated companies. That is all there is to it. But that is quite enough.



Ample room is provided in the Verdun substation of the Montreal Tramways for three 1,200-kw. mercury rectifier units. Two are now installed and in service



The arrangement of the Verdun substation is simple. Note absence of special foundations beneath the rectifiers



Simplified connection diagram for the mercury rectifier substation





The mercury rectifier substation is located on one of the main streets of Verdun. On account of the absolute quietness of the equipment no objection was raised, and no precautions were necessary to inclose the doors and windows

## First Canadian Automatic Rectifier Substation Installed by Montreal Tramways

Two 1,200-kw. mercury arc rectifier units supply power for operation of a section of the Montreal system at 600 volts d.c. Power from a 12,000-volt, three-phase circuit is converted without use of rotating equipment

CANADA'S first automatic mercury-arc rectifier substation has been placed in operation in the city of Verdun by the Montreal Tramways. During the past year the loads on this portion of the railway system have been increasing, and trouble was experienced on account of low voltage in Verdun and the wards of St. Ann, St. Gabriel and St. Paul in the city of Montreal.

Equipment of various kinds is used in the power system, so that any new substation would have to work in parallel with all of the existing apparatus. The major portion of the power for the operation of the Montreal Tramways is taken from the system of the Montreal Light, Heat & Power Company, being supplied in bulk at the Hochelaga power house, as shown on the map of the system. Here the power company has an outdoor station for changing from 66,000 volts to 12,600 volts for local distribution in Montreal and vicinity. The distribution for the tramway system is all at the lower potential, and except for a small distance is all carried in underground conduits owned by the tramway.

The Montreal Tramways maintains a power station at Hochelaga, which contains two 12,500-kw. turbo-generators, supplying three-phase alternating current at 12,600 volts, 60 cycles, and also a direct-current standby plant, containing two 1,000-kw. and one 2,000-kw., 600-volt direct-driven units. This power station is not used

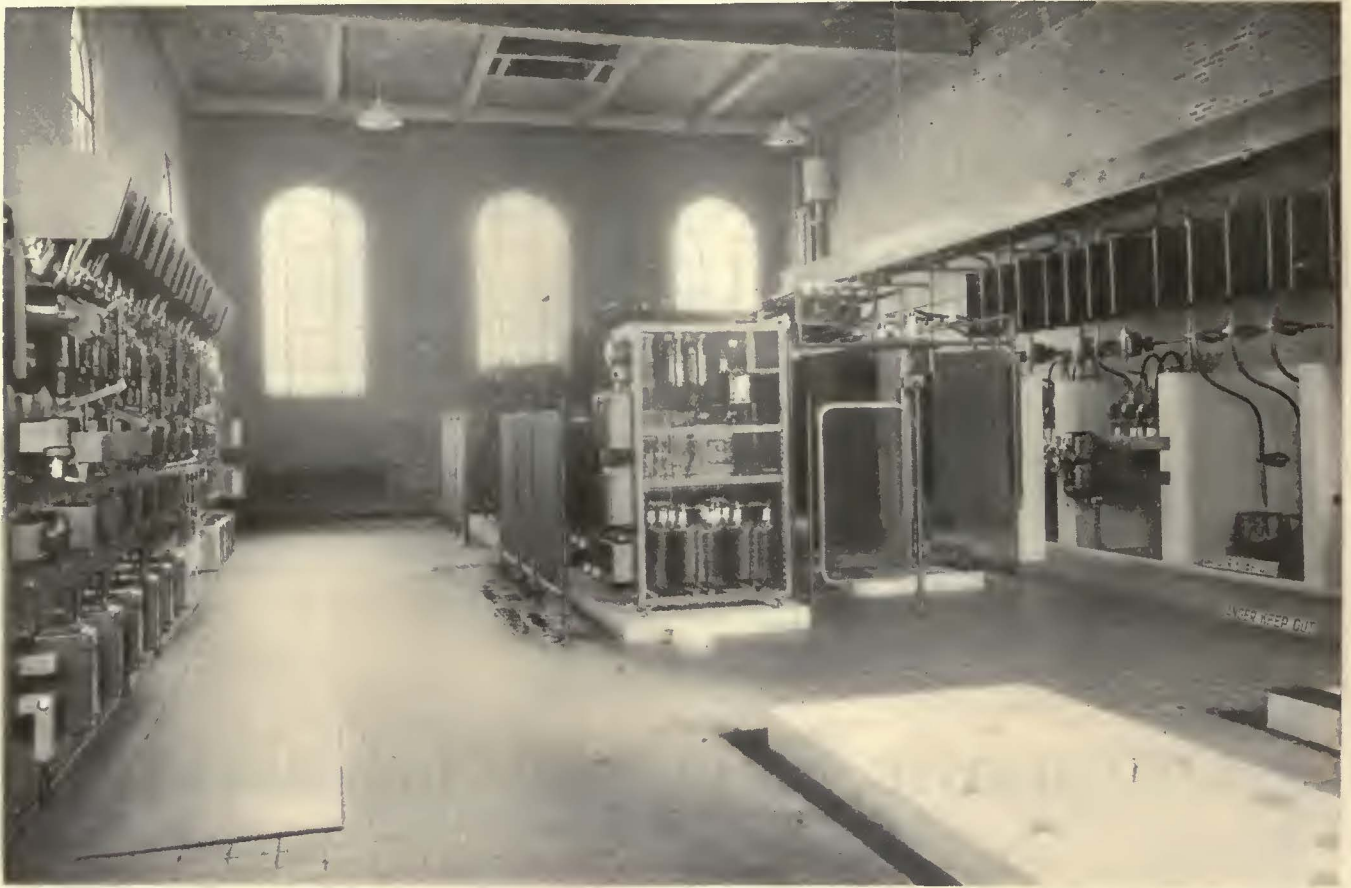
in regular service, the boilers being banked during the winter. They are called on only occasionally. In summer purchased power is used exclusively.

Synchronous converters, synchronous motor-generators and induction motor-generators are all used for conversion of the power to direct current, in addition to the new rectifier units. Rating of equipment in the various substations is given in the accompanying table.

The new substation is situated at 3980 Wellington Street, in the center of the business district of Verdun. The engineers of the tramway decided that on account of the location it would be imperative to install equipment free from the ordinary noise and vibration usually associated with power stations. It was also considered desirable to provide full automatic operation, in line with the policy of the company for utilizing this class of apparatus wherever possible.

The station has been constructed and was placed in service on Feb. 10, the control switches being closed by Mayor J. P. Dupuis of Verdun in the presence of a large number of prominent civic representatives and tramway officials. The effect of placing the station in operation has been to improve materially the power distribution system of the company in this section.

The equipment is housed in an attractive brick building, 34 ft. 3 in. x 75 ft. 8 in., inside measurements. As shown in the interior views, the high-tension switching



All the equipment in the Verdun substation of the Montreal Tramways is seen leads at the right and passes out as direct

compartments are ranged along one wall, while the main switchboard is near the opposite wall. In the center are the rectifiers and the transformers supplying them.

REASONS FOR SELECTING RECTIFIERS

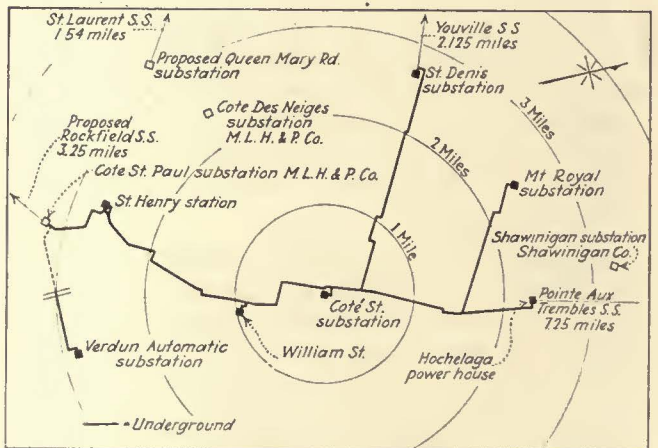
In the selection of equipment for the new substation a number of considerations were taken into account, which led to the choice of mercury arc rectifiers for the con-

version units. The reasons for the choice may be stated as follows:

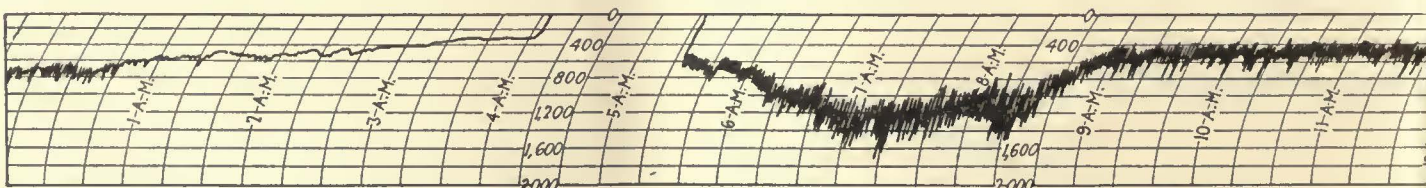
1. Higher average over-all efficiency under all load conditions.
2. Cheaper building owing to absence of heavy foundations or equipment.

SUBSTATION EQUIPMENT OF THE MONTREAL TRAMWAYS

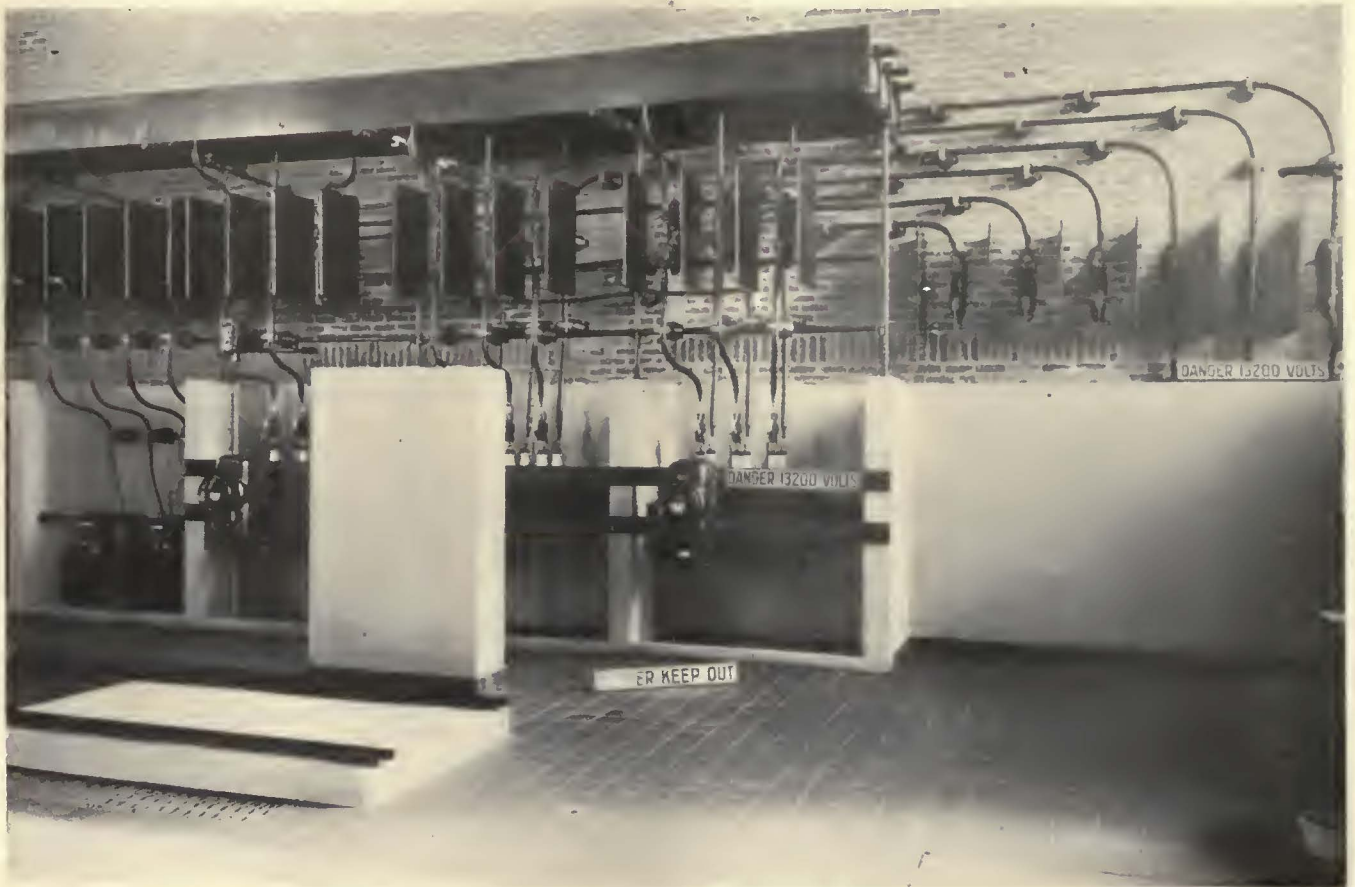
Station	Number of Units	Rating Each, Kilowatts	Type of Machines
Coté Street (Central distributing station)	4	2,000	Synchronous converters
Mount Royal	2	2,000	Synchronous converters
St. Denis	1*	2,000	Synchronous converter
St. Denis	2	1,500	Syn. motor-generators
Youville	2	500	Induc. motor-generator
William Street	2	500	Induc. motor-generators
William Street	3	1,500	Syn. motor-generators
William Street	6	500	Ind. motor-gen. (2-phase)
St. Henry	1	500	Syn. motor-gen. (2-phase)
St. Henry	2	1,500	Syn. motor-generators
St. Henry	1	500	Ind. motor-generators
Cote St. Paul	1	1,200	Syn. motor-generator
St. Laurent	2	500	Synchronous converters
Cote des Neiges	1	1,000	Syn. motor-generator
Point aux Trembles	1	1,000	Syn. motor-generator
Point aux Trembles	1	500	Ind. motor-generator
Shawinigan†	3	1,000	Synchronous converters
Hochelaga	1	2,000	Synchronous converter
Hochelaga	2	1,000	Synchronous converters
Verdun	2	1,200	Mercury rectifier units



Map of the power system of the Montreal Tramways, showing the relative position of the Verdun substation



Load chart for the 24 hours of March 10. The station was shut down at 4 a.m. on account of low current demand and



in these two views. The alternating current enters through the high-tension current through the feeder lines at the left

- 3. Low cost of maintenance.
- 4. Simplified control as compared with the apparatus for starting and synchronizing rotary converters or motor-generators.
- 5. Absence of noise and vibration.

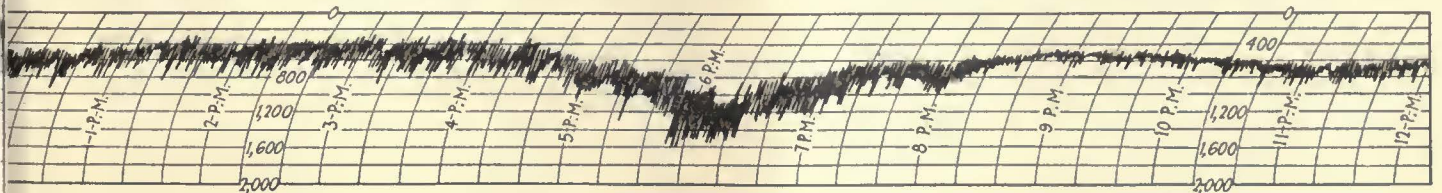
Four mercury-arc rectifiers, each rated at 600 volts and 1,000 amp. d.c., with the necessary transformers and control equipment, make up the installation. These rectifiers are assembled in pairs, each with a single three-phase transformer, in order to simplify the wiring and control equipment and to reduce the cost. There is provision for a third set of rectifiers, which will bring the station capacity up to a total of 3,600 kw. of direct-current output.

At present three-phase, 62½-cycle, 12,000-volt power is taken from the Montreal Light, Heat & Power Company's lines at Gate Avenue and Bond Street, at a point near the Montreal water works aqueduct, from where it is carried in an underground No. 00 three-conductor cable running directly to the substation. The line terminates in a pothead in the basement, from where the three leads are carried to a set of hand-operated 300-amp. disconnect switches at the front of the station. Provision is made for the entrance of a duplicate power line when needed. These may be seen at the extreme

right of the general view of the main floor. The current then goes through a three-pole, single-throw, 250-amp., 24,000-volt oil circuit breaker, operated by Brown-Boveri type N-4 motor control. It is controlled by the line voltage through a potential transformer. The breaker is closed automatically when there is voltage on the line and is tripped by a no-voltage relay when the voltage is off. It can thus be controlled from the power station. The breaker is protected by type H-4 series overload relays which are set for a definite time. If these relays operate they trip and lock out the breaker, which cannot reclose until the lockout is reset manually. Through selectivity with the breakers between the a.c. bus and transformers the line breakers will trip by overload only in the event of a short circuit on the a.c. bus and under these conditions it is not desirable to reclose them.

A second set of disconnect switches on the station side permits the line breakers to be cut out of circuit entirely for inspection or setting. From the main alternating-current bus the current is taken through a set of disconnects and circuit breakers to the primaries of the 1,800-kva., three-phase, 12,600-volt transformers, where the pressure is stepped down to a value suitable for the rectifiers, and also is converted to six phase.

The circuit breakers between the a.c. bus and rectifier



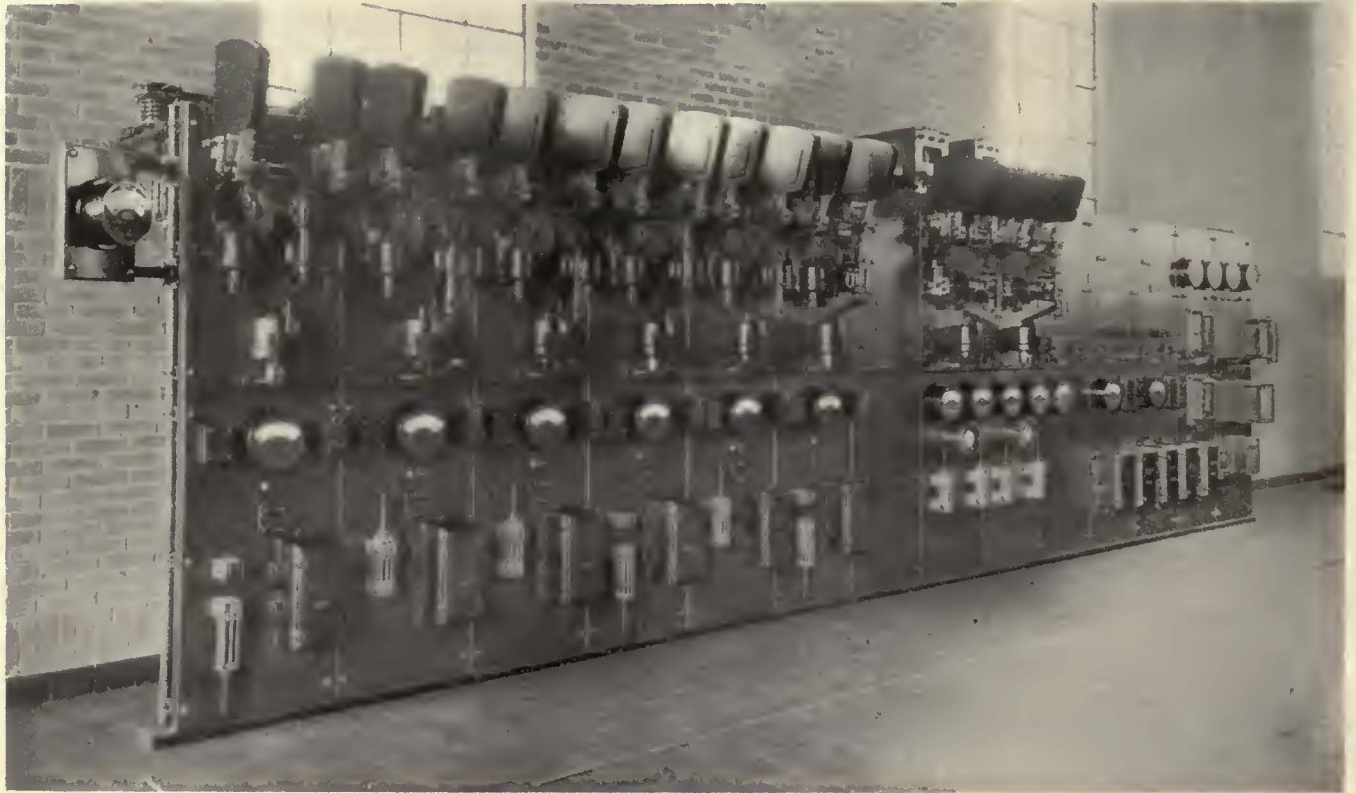
came on again at 5:20 a.m. when the voltage drop on the line became sufficient to actuate the starting relay

transformers are operated by type N-4 motor control and are protected by H-4 overload relays set for instantaneous tripping on overload. If tripped by overload these breakers will reclose after intervals of ten seconds, one minute and three minutes. If tripped after the last closure the breakers will lock out and will not close again until the lockout is reset.

Each transformer has twelve secondary terminals and a neutral, as the windings are in duplicate to supply the two rectifiers independently. The neutral is grounded and forms the negative side of the d.c. circuit. The

in commercial rectifiers to prevent small infiltration of gases it is necessary to pump them out as fast as they enter the case. For this purpose a high-vacuum mercury pump is connected in series with a rotary oil-immersed pump. The rotary pump is driven by a  $\frac{1}{2}$ -hp. a.c. motor and forms the only normally moving part in the entire station. Their operation is independent of the rectifiers and they will maintain the vacuum whether or not the latter are connected to the circuit.

The current that may be drawn from the rectifier is determined mainly by the temperatures that may be



General view of the direct-current switchboard. The feeder panels are at the left and the control for the rectifiers at the right

mercury cathode forms the positive d.c. terminal, and is connected to the 600-volt bus through suitable switches and circuit breakers.

#### RECTIFIERS AND VACUUM PUMPS

The conversion units are Brown-Boveri type GRZ-56 mercury-arc rectifiers, each rated at 1,000 amp. and 600 volts d.c. output. Two of these rectifiers make up a unit which is rated at 1,200 kw.

Each rectifier is incased in an airtight steel shell which contains six anodes, each connected to one of the transformer terminals. The single cathode consists of mercury in a receptacle at the bottom of the pot. Auxiliary anodes are included to insure continuity of the arc and for starting the action when the rectifier is switched into circuit.

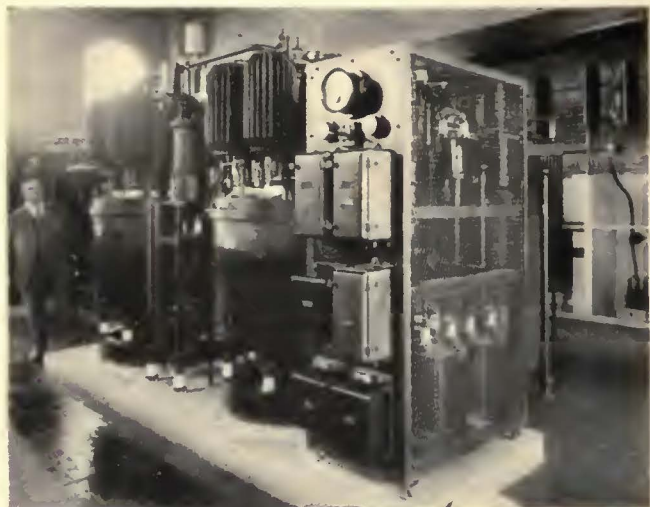
Since the casing of the rectifier is entirely of steel and the interior is not lined with insulating material the pot is at the potential of 600 volts above ground. It is therefore necessary to protect against accidental contact with the casing, which is done by the metal screens which surround the apparatus.

Successful operation of the rectifiers demands that a pressure of the order of 0.01 to 0.001 mm. of mercury be maintained. Since it has not been found practicable

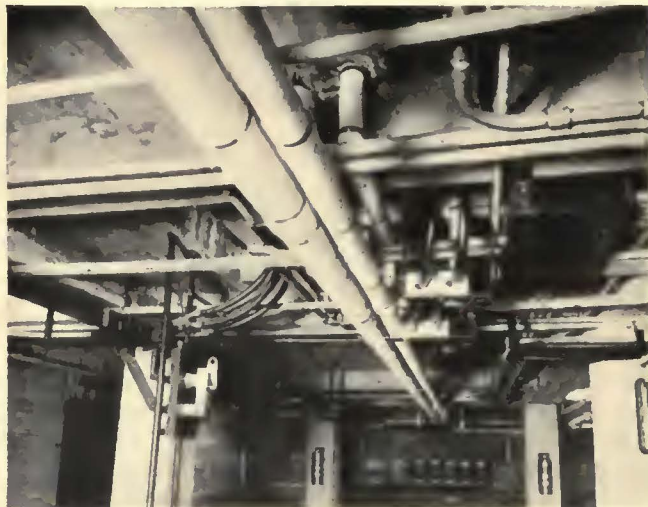
endured by the working parts. In order to make the rating as large as practicable, the rectifiers are cooled by means of water circulated through jackets. This water, which is drawn directly from the city mains, is first passed through the cathode base, from there to the jacketing around the large cylinder and the anode plate, after which it passes to the jacket surrounding the condensing cylinder and then out to the sewer. The quantity of water required is about one-third gallon per minute per 100 amp. d.c. at an intake temperature of 15 deg. C. A small additional amount for the vacuum pump is needed. In view of the small amount of water and the desire to eliminate moving machinery wherever possible, it was decided not to attempt the use of a recooling system. It also was considered inadvisable to attempt recooling during the severe winters, as the heat loss in the station is so small that there would be insufficient protection against freezing.

#### CONTROL AND PROTECTIVE DEVICES

The rectifier station is cut out of circuit entirely if the current falls below a predetermined value. This value is now under process of determination so that the station will go off the line during the hours of the night when the demand is lightest. The station is cut



Near view of one of the mercury-arc rectifier units. Each of the rectifiers is rated at 600 kw., so that the set has a total capacity of 1,200 kw.



This view was taken directly beneath one of the rectifier units to show the connections and the pipes for conveying the cooling water

in automatically by low voltage, so that it comes on the line in the morning when the cars begin regular day service. The value for this relay setting is likewise being determined.

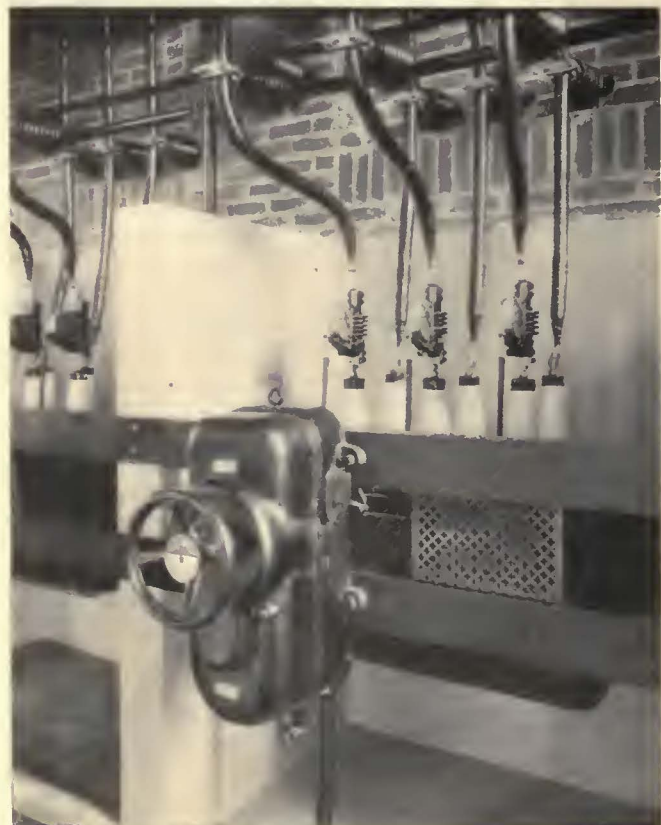
As the current drawn from the a.c. line passes full load on the first rectifier unit (2,000 amp.) the second unit is cut into circuit automatically. It is also possible to arrange the relays so that the second unit will be cut in and out of circuit by means of a time clock. At present the latter method is being followed.

A full set of automatic devices prevent damage to the equipment if load should become excessive or if some part should fail. The action of the oil circuit breakers

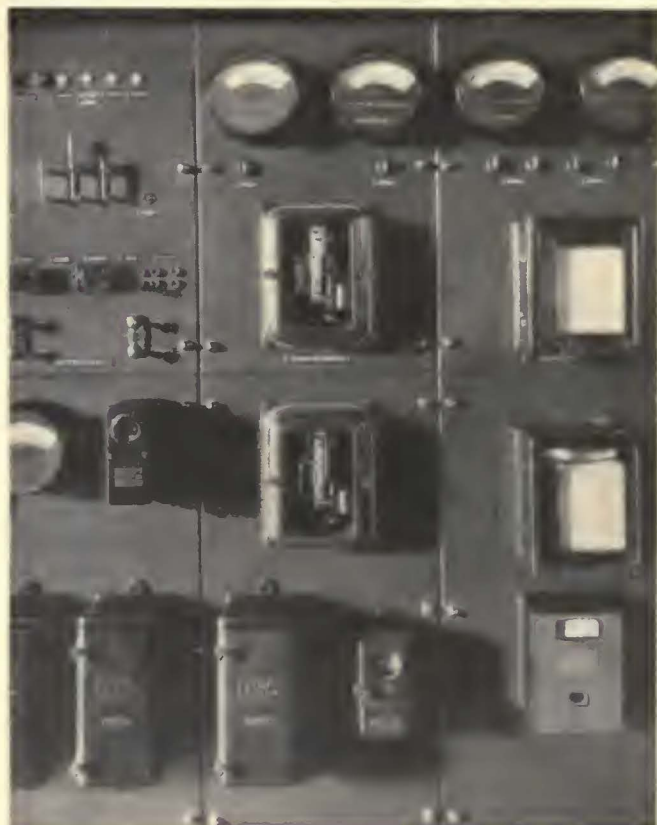
has already been described. If the breakers on one of the rectifier units are locked out the second group immediately will come into service. Thermal relays in the rectifiers and transformers protect against prolonged overheating. Low vacuum or failure of the cooling water supply will also automatically lock out the rectifiers.

Signal lamps on the switchboard indicate the positions of the circuit breakers. Each rectifier group has five four-point selector receptacles on the switchboard, so that the rectifiers can be started by clock, low voltage, low current or manually, as desired, depending on the position of the plug in the receptacles.

Efficiencies guaranteed for the equipment, as meas-



One of the oil circuit breakers and the alternating-current time-element relays on the incoming 12,600-volt line



The automatic control relays for the mercury-arc rectifiers are located on the main switchboard. At the right are the graphic watt-hour meters

ured between the incoming 12,600-volt a.c. lines and the d.c. bus, including the transformers and all auxiliaries, were as follows: At  $1\frac{1}{2}$  load, 93.5 per cent; at full load, 94 per cent; three-fourths load, 94 per cent; half load, 93.5 per cent; quarter load, 91.4 per cent. For the period between Feb. 15 and Feb. 28 the ratio of total output of the station to total input was 89.2 per cent. During this period the load factor was very low and there was relatively little time that the rectifiers were carrying full load.

**PUTTING THE EQUIPMENT IN SERVICE**

After the rectifiers had been installed they were operated at greatly reduced potential to dry them out and permit the vacuum to be raised to the operating maximum. This was accomplished by means of a water rheostat load of 1,000 amp. at 89 volts, which was continued for about 30 hours on each of the four rectifiers in turn. By this means the occluded gases and water vapor were driven out of the anodes.

The only difficulty of any moment that has been encountered in the operation of the station is interference with some of the telephone lines of the local system. The difficulty occurs on party lines with grounded equipment. In some instances there is a high-frequency note, which has been identified as the sixth harmonic of the alternating current wave. Through co-operation of the telephone company it is expected that the trouble will be eliminated in the near future.

A feature of operation that seems inherent during the first few months of operation of the converters is what are known technically as "backfires." While it is not possible to observe the phenomenon directly, it appears to be in the nature of a short circuit between the cathode and one or more of the anodes. When this occurs, the effect is to throw out the a.c. rectifier breaker and in some instances the incoming line breaker. This immediately extinguishes the arc and the rectifier goes back on the line within ten seconds. In no case has this momentary interruption caused any trouble. As the rectifiers remain in service these backfires are becoming less pronounced, and experience with rectifiers in other installations indicates that in the course of a few months they will disappear entirely.

The rectifying apparatus was manufactured by Brown, Boveri & Company of Baden, Switzerland, and the American Brown Boveri Company of Camden, N. J. The installation was made by Griswold & Company, Ltd., of Montreal, while the layout, general engineering and building design were carried out by the engineers of the Montreal Tramways. The cost of the substation building and land, complete with equipment, was approximately \$140,000.

**Data on Rochester Property Reveals Railway's Importance**

**E**VIDENCE of the important rôle of a railway industry in the life of a community is seen in the 1926 activities of the New York State Railways in Rochester. These lines purchased materials and supplies totaling \$843,171 in the city and paid the following taxes: \$43,729 on real estate, \$143,980 on special franchise, \$7,056 on sprinkling, \$41,078 for snow removal and \$166,371 for paving.

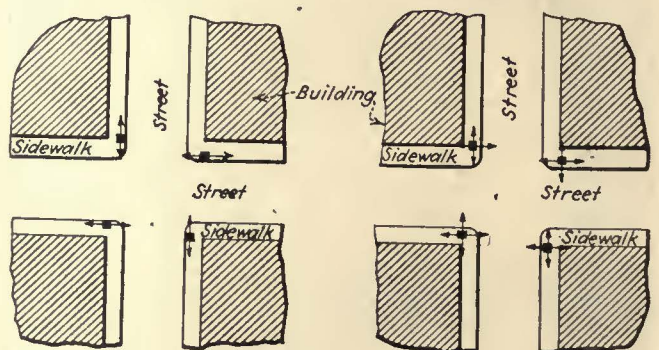
There are 1,700 employees on the Rochester lines of the New York State Railways and the payroll annually totals \$2,841,840.

**Chicago's Traffic Lights Shine Four Ways**

**F**OLLOWING nearly a year's experiment with the co-ordinated lights installed in the Loop at Chicago, the city determined that better results would be possible if the signals were displayed in all four directions and the change was effected overnight late last year. As originally installed, each traffic standard was designed to exhibit signals in two directions only, as shown in the upper diagram. Pedestrians who congregated at the curb about to cross could not readily observe whether the traffic signals were green or red unless they looked diagonally across the intersection. The change effected was to install additional sets of lamps on the heretofore blank sides of the signal units so that now the signal is exhibited from all four sides of each standard. This has been found an improvement, principally in the aid of pedestrian traffic at the intersections. At present there is no ordinance in Chicago



Typical signal light standard in Chicago Loop as it now appears changed to shine in four directions



Typical street intersection in the Chicago Loop

The view at left shows the location and direction in which the signals were exhibited in the original installation. The view at right shows the situation after the change made by adding lights so that the signals would be shown in all four directions, chiefly to aid pedestrian traffic.

compelling pedestrian observance of traffic signals. Traffic police are urging observance, however.

The lamp pedestals were made in standard units so that by removing blank plates on the sides and substituting reflectors, lamps and hoods the new lamps were readily installed.

An article on the co-ordinated lights in the Chicago Loop district appeared in the March 27, 1926, issue of the JOURNAL.

# Base Plate Joint Developed by Eastern Massachusetts Street Railway

By Frank B. Walker

Chief Engineer Eastern Massachusetts Street Railway,  
Boston, Mass.



Some of the special welded rail joints made by the Eastern Massachusetts Street Railway and tested in the Riehle machine at the Massachusetts Institute of Technology

Bending tests show average strength to be approximately equal to or greater than that of fish plate joint. Internal stresses due to heat are eliminated. Cost greatly reduced. Repair of broken rails simplified

EXPERIMENTS recently made by the Eastern Massachusetts Street Railway lead us to believe that a simple rail joint using only a single welded base plate can be built adequately strong at about one-half the cost of a fish plate joint. During the course of our experiments we have welded and broken in a testing machine a large number of joints of various designs. Data from these tests are presented in this article for constructive criticism and in the hope of encouraging experimentation by others. We realize, of course, that the relative durability of the new and old joints can be determined only after actual installation in track, but we feel that the new type has great possibilities.

Undue importance frequently has been attached to strength in a welded rail joint. Nevertheless, strength tests are the only quick means of comparing different types of joints. We know that fish plate joints for 9-in. grooved girder rail, 7-in. high tee rail and 75-lb. low tie rail are strong enough. We have over 110,000 of these joints in our tracks, and since 1921 we have had a breakage of less than one joint per 1,000 per year on the 9-in. and 7-in. rail. In bending tests with 30-in. span, our welded fish plate joints on 75-lb. rail carried an average of 80,600 lb. Among the many joints of this type on our property failures have been extremely rare. Even the weaker joints on old 48-lb., 56-lb. and 60-lb. rails have given us very little trouble. The yearly rate of failures of all standard fish plate joints in service has been about three-tenths of 1 per cent. Each year's record has been better than that of the preceding year. We believe, therefore, that the strength developed by the present joints may be considered sufficient.

Although strong enough, the present joints do not make efficient use of the available metal. Wheel loads on a suspended rail joint cause compression in the head and tension in the base. Wheel loads on a supported

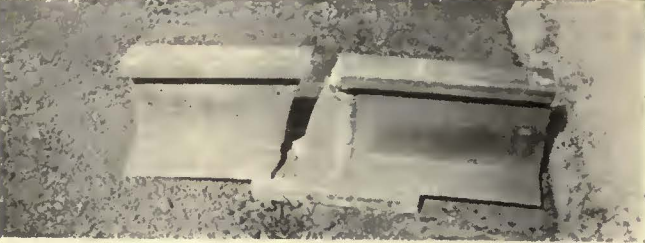
joint cause tension in the head and compression in the base. In either type there is little stress in the web. The metal in the fish plates, therefore, is poorly placed to do its work efficiently. As we nearly always suspend our joints between ties, a welded base plate provides metal where it will carry the tension most efficiently.

The use of base plates in addition to fish plates in welding joints is common practice. We have used them from time to time on our system, but we never con-



Base plate joints developed by Eastern Massachusetts Street Railway

At top, 9-in. grooved girder rail with 1-in. x 7-in. x 16-in. plate.  
In center, 7-in. tee rail with 1-in. x 7-in. x 16-in. plate.  
At bottom, 75-lb. tee rail with 7/8-in. x 7-in. x 16-in. plate.



**Seven-inch tee rail joints tested on 20-in. span**

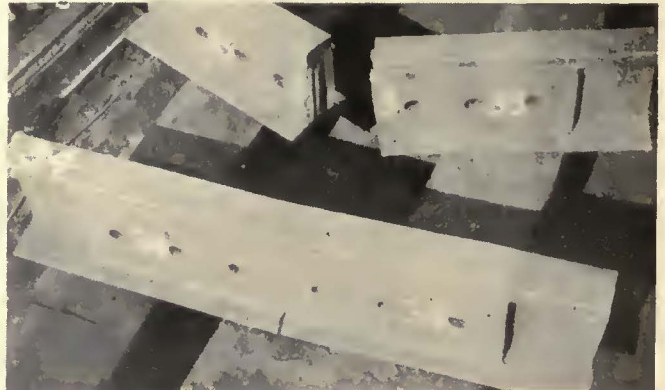
At top, joint with two  $\frac{3}{4}$ -in. x 28-in. fish plates started to yield at 200,000 lb. At 275,000 lb. deflection was so great that load was removed, leaving a permanent set.  
At bottom, joint with  $\frac{3}{4}$ -in. x 7 $\frac{1}{2}$ -in. x 10-in. base plate broke at 286,000 lb.

sidered that the strength added by a base plate was worth the extra cost. Nor did it seem wise to complicate a joint already strong enough to meet our needs. Use of a welded base plate without fish plates, however, has not been widely tried and we determined to experiment with this design in the hope of securing a joint of adequate strength and low cost.

So far our tests seem to indicate that the best joint of this sort is one having a base plate  $\frac{3}{4}$  in. thick, 7 in. wide and 28 in. long or  $\frac{1}{2}$  in. x 10 in. x 28 in. with double bead welding on adjoining webs and flanges. The 28-in.



Joint on 7-in. tee rail without base or fish plates broke at 177,500 lb. on 20-in. span



Standard joints Nos. 16, 17, 34 and 35 with  $\frac{3}{4}$ -in. x 36-in. fish plates on 7-in. high tee rail failed at an average load of 169,000 lb.



Standard joints Nos. 18, 19, and 38 with  $\frac{3}{4}$ -in. x 36-in. fish plates on 9-in. grooved girder rail failed at an average load of approximately 274,440 lb.

Joints Nos. 14, 36 and 37 with 1-in. x 7-in. x 16-in. base plate on 7-in. high tee rail failed at an average load of 177,220 lb.



GENERAL SUMMARY OF BENDING TESTS

Rail	Load at Yield, Pounds		
	Fish Plate Joint	16-In. Base Plate Joint	36-In. Base Plate
9-in. grooved girder...	266,300	246,500	.....
7-in. high tee.....	163,750	177,750	307,750
75-lb. tee.....	80,600	110,000	135,500

length eliminates two tie plates. Rail heads are kept in contact to provide for compression. Together, the beading and the base plate take the shear and tension caused by temperature changes.

BASE PLATE JOINT SHOWS STRENGTH EQUAL TO OR GREATER THAN FISH PLATE JOINT

This joint is at least equal in strength to the fish plate on 9-in. grooved girder rail and superior to it on 7-in. and lighter tee rail. Even in the event of reversal of stresses, this type of joint seems strong enough, as indicated by a test wherein a load of 75,000 lb. was carried with the joint upside down. Data presented in an accompanying table and the photographs reproduced show in detail the results of our experiments. The results of the bending tests are summarized in the tables on this page.



Standard joints Nos. 22, 23 and 30 with 3/4-in. x 20-in. fish plates on 75-lb. tee rail failed at an average load of 80,600 lb.

SUMMARY OF TESTS ON 9-IN. GIRDER RAIL

Standard Joint with 1/2-In. X 36-In. Welding Bars; Top and Bottom Seams

Test No.	*Cost	Load in Pounds		Remarks
		Yield Point	At Failure	
18	\$5.59	285,000	287,500	Broke through plates, at center on one side, through bolt holes on other.
19	5.75	225,000	313,000	Deflected 1/2-in. but did not break.
38	6.33	222,700	222,700	Broke plates through bolt holes.
Average....	\$5.89	266,300	274,440	

Joint with 1-In. X 7-In. X 16-In. Plate Welded to Base and Web; Base of Joint Seam Welded

11	\$2.70	240,000	240,000	Broke through welding. Seams very light.
12	2.70	292,000	292,700	
20	2.30	256,800	256,800	Broke rail from joint at head to end of base plate.
41	1.20	197,100	197,100	Broke through rail outside of base plate.
Average....	\$2.23	246,500	246,600	

\*Costs include all labor and material except rail.

SUMMARY OF TESTS ON 7-IN. TEE RAIL

Standard Joint with 1/2-In. X 26-In. Welding Bars; Tops and Bottoms Welded.

Test No.	*Cost	Load in Pounds		Remarks
		Yield Point	At Failure	
16	\$4.12	145,000	159,000	Did not break.
17	4.12	150,000	177,000	Did not break.
34	4.18	184,800	184,800	One plate broke at joint.
35	4.21	155,200	155,200	Broke through plates at joint.
Average....	\$4.15	163,750	169,000	

Joint with 1-In. X 7-In. X 16-In. Plate Welded to Base and Web; Base at Rail Welded

14	\$2.05	269,200	269,200	Broke rail from rear joint at head
36	1.54	134,350	134,350	to near end of plate at base.
37	1.93	128,100	128,100	
Average....	\$1.84	177,220	177,220	

Joint with 1-In. X 7-In. X 36-In. Base Plates

28	3.48	303,000	362,500	} Defl. 1 1/2 stretched plate
29	3.67	312,500	358,000	

\*Costs include all labor and material except rail.

SUMMARY OF TESTS ON 75-LB. RAIL

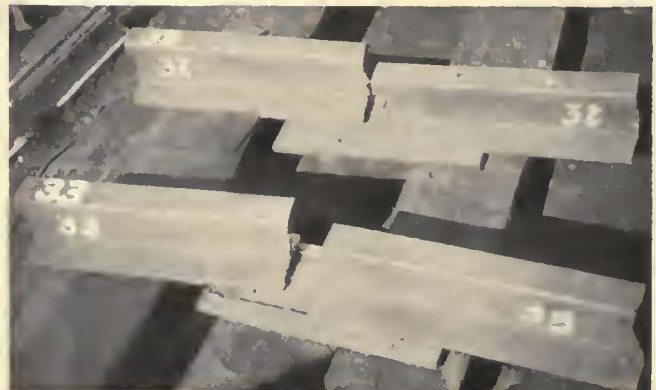
Standard Joint with 1/2-In. X 24-In. Welding Bars; Top and Bottom Welded

Test No.	*Cost	Load in Pounds		Remarks
		Yield Point	At Failure	
22	\$3.11	77,600	77,600	Deflected 1-in. but did not break.
23	3.11	81,400	81,400	Did not break.
30	3.13	82,700	82,700	Broke through plates.
Average....	\$3.12	80,600	80,600	

Joint with 1/2-In. X 7-In. X 16-In. Plate Welded to Base and Web; Base of Rails Welded

15	\$1.86	124,700	124,700	} Cracked through welding, seams very light (single).
21	1.98	120,000	120,400	
32	1.49	99,000	99,500	
33	1.94	96,000	97,900	
Average....	\$1.82	110,000	110,600	

\*Costs include all labor and material except rail.



Joints Nos. 15, 21, 32 and 33 with 1/2-in. x 7-in. x 16-in. base plate on 75-lb. tee rail failed at an average load of 110,600 lb.

Our series of test joints were made with three types of rail, 9-in. girder section 104-401, 7-in. high T-section 91-282 and 75-lb. T-section A.S.C.E. Welding was done by this company with the metallic arc, using a  $\frac{3}{8}$ -in. rod and by the Thomson Research Laboratory of the General Electric Company with the hydrogen or shielded arc. Eight kinds of joints were made: (1) Rails V'd out and welded together without plates; (2) with fish plates only; (3) with 6-in. x 6-in. x  $\frac{3}{4}$ -in. base plate only;



Joints Nos. 11, 12, 20 and 41 with 1-in. x 7-in. x 16-in. base plate on 9-in. grooved girder rail failed at an average load of 246,600 lb.

(4) with  $7\frac{1}{2}$ -in. x 10-in. x  $\frac{3}{4}$ -in. base plate only; (5) with 7-in. x 16-in. x  $\frac{3}{4}$ -in. base plate only; (6) with 7-in. x 16-in. x  $\frac{3}{4}$ -in. base plate only; (7) with 7-in. x 16-in. x 1-in. base plate only; (8) with 7-in. x 36-in. x 1-in. base plate only. No pressure was put upon the rails before or during the welding to bring the heads under compression. The short sections of rails were simply laid together on ties and the plates welded in the usual way, on alternate sides to relieve stresses.

Two joints on 7-in. tee rail with 7-in. x 36-in. x 1-in. base plates were tested. The first had a yield load of 312,000 lb. and carried a maximum load of 358,000 lb. The second had a yield load of 303,000 lb. and a maximum load of 362,000 lb. These loads are almost double those carried by the fish plate joints and the 16-in. base plate type. The results of these two tests lead us to believe that a 7-in. x 28-in. x  $\frac{3}{4}$ -in. base plate joint will

have adequate strength for all practical purposes. We are proceeding with the installation of this type joint in our track.

Some of these joints were made with single and some with double beads. The work was done at two locations by different welders. This variation was intentional in order to secure a wider range of data. Some were made with good and some with poor head contact. Welding was carelessly done on a number of joints. Some joints were made with head welds and in others the webs of the flanges were welded together. For example, one had no welding on the web and was so cut that the rails were separated about  $\frac{1}{4}$  in. The head was sawed at a slight angle so that there was only a partial contact. Others had no head contact when welded, but the head gap was later filled in with thin steel inserts.

It will be noted that in the tests on the standard



Two joints on 7-in. tee rail with 7-in. x 28-in. x  $\frac{3}{4}$ -in. base plates carried maximum loads of approximately 360,000 lb.

fish plate type of joint there were no rail failures, whereas on the base plate type a number of the rails failed. Failure of the rail itself shows that it is weaker than the joint and therefore the rail failures with base plate joints indicate that these joints are stronger than the fish plate joints which did not cause rail failure. As a result of observing the actual tests and the character of the failures, we believe that they were tension failures due to bending, although there may have been a combination of bending and shearing.

Our experiments lead us to the conclusion that the base plate joint has great possibilities. In addition to the advantage of low cost, it has the added virtue of eliminating internal stresses due to heat, a serious fault in the welded fish plate joint. Moreover, as a result of our tests information has been secured which will enable us to repair broken rails with greater confidence than was possible heretofore.

### Suggests Eliminating Parking in Downtown Grand Rapids

GRAND RAPIDS, Mich., is considering its traffic congestion problems and the important factor of parking in the downtown district. Much research has been carried on in safety and traffic circles regarding the solution of the problem and Safety Director Sinke is studying the theory of Fred M. Deane, a business man of the city. Mr. Deane's decision is based on the belief that 75 per cent of the automobiles parked downtown are not needed during the business day and deprive others of valuable space in the crowded area.

# Maintenance Notes

## Street Congestion Increases Car Repairs

By F. E. GEIBEL

Assistant Superintendent of Equipment  
Pacific Electric Railway, Los Angeles, Cal.

WITH additional traffic, the number of flat wheels on our lines has increased considerably during the last few years. A high braking per cent is desirable in order to prevent accidents. Even with brakes in good condition, much depends on the speed, condition of rails and motor-men in keeping down the flat wheel expense.

Traffic congestion has also added considerably to control maintenance cost. The following of traffic necessitates throwing the controller drum on and off many more times than if the track were clear ahead. This throwing off of power is usually during the acceleration period or at slow speeds when the current is high and so the burning of contacts is increased. The braking of these high currents causes arcing at the contact tips and results in heavy renewals.

Fender expense is another item that has been increased considerably

*A car clean a day will keep the health officer away.*

with street congestion. Frequently on our system it is found necessary to take off 50 or 60 bent fenders a day for repairs. This expense for fender repairs amounts to \$15,000 a year. Another expense is that for keeping dash signs in condition. These are subject to considerable

abuse and increased traffic congestion has made repairs necessary at more frequent intervals.

Street congestion also makes it necessary to clean cars at more frequent intervals. Daily cleaning is now done on our system at many points. The general cleaning consists of a thorough washing, both inside and out, at which time trucks and equipment underneath the car are sprayed with paint.

## Chart Shows Progress of Paint Shop Work

JUST how many cars are in the Waterbury paint shop of the Connecticut Company, what cars they are, and the length of time they have been there, can be told by a glance at a chart hanging on the wall of the office of W. S. Dixon, division master mechanic. For this purpose a large sheet of cross-section paper is used. Each vertical column represents a day, and each horizontal line a car. Series numbers of cars are listed at the left. When a car enters the paint shop a heavy red line is drawn across the column for

that day, opposite the number of the car. This line is continued day by day as long as the car remains in the shop. When it leaves, the line is terminated. Bus painting is charted in the same way as car painting, on the same sheet. Notations are made to account for any unusual lapse of time while a vehicle is in the paint shop. When a number of weeks have passed and the lines on the chart have become distant from the car numbers at the left-hand edge, a new column is begun in the middle of the sheet. This chart not only shows

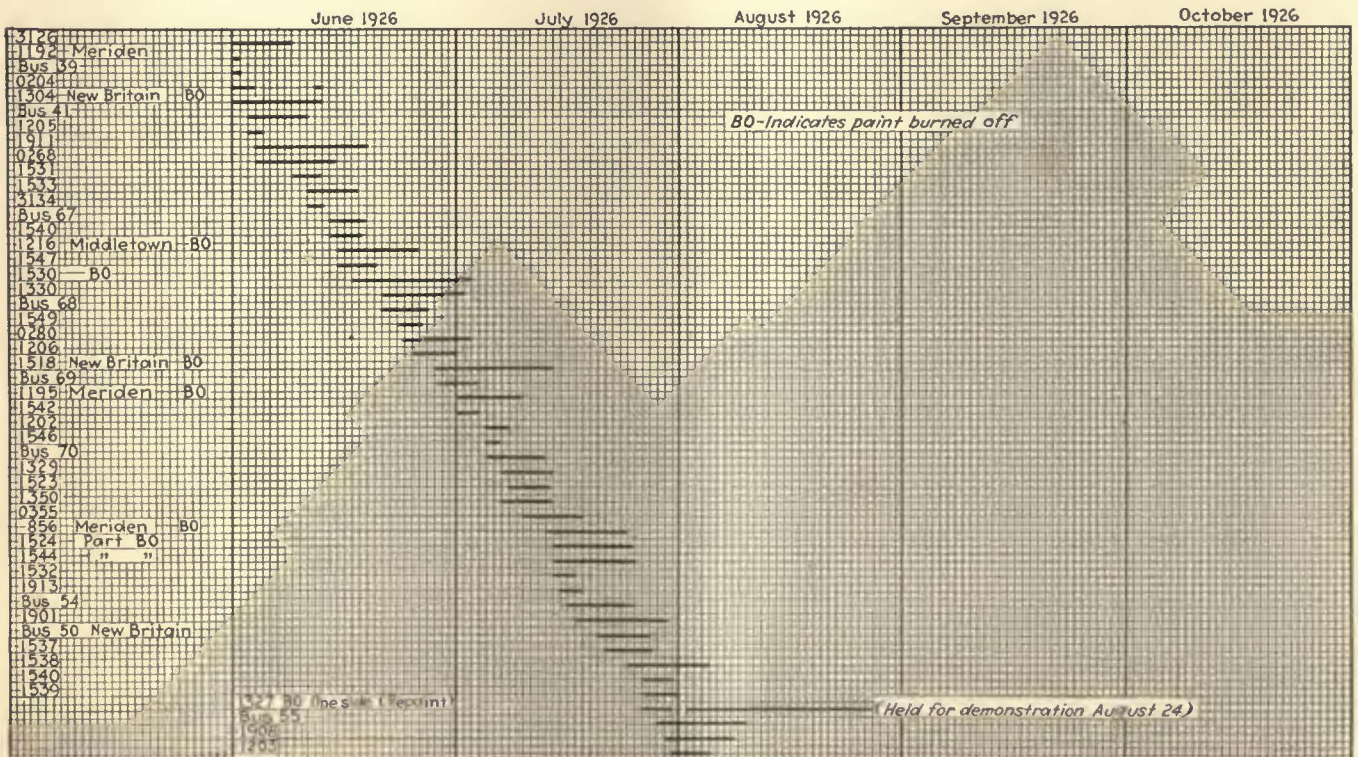


Chart showing day by day the cars and buses in the paint shop of the Connecticut Company at Waterbury

existing conditions in the paint shop, but serves also as a permanent record of the work done.

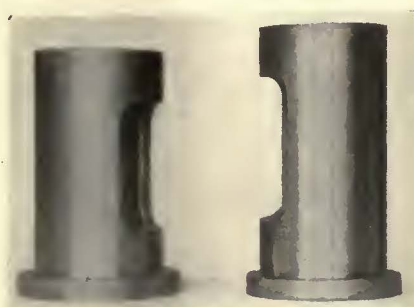
## Smooth Surfaces an Aid to Tight Bearings

BY JOHN S. DEAN

Renewal Parts Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

QUITE commonly loose armature bearings in service turn and shut off the oil feed. Operators seem to depend entirely upon the keys or dowels to keep bearings from turning and do not give sufficient attention to the pressed fit that is desirable when a bearing is placed in its housing. There are a number of reasons why these bearings lose their fit in the housing, but the principal one is that a smooth-fitting surface is not provided when the bearings and housing are first machined for installation.

The importance of machining the outside of bearing shells and in the



Of two bronze bearings with  $\frac{1}{8}$ -in. lining of babbitt for a railway motor the one on the left with a poorly machined surface will not maintain a good fit, while that on the right with polished surface will remain tight in the shell

inside bore of the bearing seat in the housing so as to provide a fine, smooth finish cannot be emphasized too strongly. This is essential to get a tight fit of the bearing and to provide the proper initial allowance which will permit of frequent removal of the bearing shells for rebabbiting and reinstallation. With a smooth machined surface, a good metal-to-

metal fit and a large contact area will be obtained.

If the surfaces are left rough for the press fit the bearing shell may be tight when first assembled, but after it has been pressed out for repairs the high spots will be sheared or torn off and the allowance for press fit will be destroyed. Then when the bearing is replaced in its housing a loose bearing shell will result. The accompanying illustration shows two bearings. The one on the left has a rough finish and is an improper job of machining. The one on the right has a relatively fine finish with a smooth polish.

Experience with wheels and gears has shown that if the finished surface of the bore is machined smooth, when they are pressed on car axles no keys are needed to keep them from turning. In order to provide the smooth surface desirable many railways grind the gear and wheel seats in order to get a good tight dependable press fit.

It is the practice of manufacturers

## An Opportunity to Serve and Profit

First Prize, \$200

Third Prize, \$50

Second Prize, \$100

Twelve Monthly Prizes, \$25 each

ENTER the ELECTRIC RAILWAY JOURNAL contest at once. Send in as many of your maintenance ideas as you like. The JOURNAL will pay \$5 for each item published, whether it wins a prize or not.

Any employee of an operating electric railway or electric railway bus subsidiary may compete for the prizes to be given by ELECTRIC RAILWAY JOURNAL for short maintenance items. Full information is given in the April 16, 1927, issue, pages 700-701.

The author does not necessarily have to be the originator of the idea or device. An article may be submitted by several persons or by a department and need not be written by the person in whose name it is submitted.

Articles may treat of any maintenance practice or device used by any department of an electric railway and should be preferably 100 to 200 words in length and accompanied by one illustration. Brevity consistent with a proper presentation of information will be given weight in judging articles. In no event should they be longer than 400 words with more than two illustrations.

Manuscripts should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York, N. Y. To be eligible for

the capital prizes, the envelope must bear a postmark dated before Aug. 1, 1927.

In addition, a prize of \$25 each will be awarded each month, beginning with the May 21, 1927, issue. Articles submitted will be published in the Maintenance Data Section of ELECTRIC RAILWAY JOURNAL.

If sketches accompany the manuscripts they may be in pencil, or blueprints will be accepted. Each item submitted should bear the name or names of the individual or individuals by whom it is submitted and to whom awards are to be made.

The announcement of the winner each month will be made in the issue devoted to maintenance and construction, the third issue of each month, following the one containing the item.

The winners of the capital prizes will be announced in the Annual Convention Number of ELECTRIC RAILWAY JOURNAL, to be published in September, 1927.

Maintenance men, here is your opportunity! The more items you send in the more chances you have of winning a capital or monthly prize. Get started at once. Articles published in the Maintenance and Construction Issue for May will have the first chance to win one of these prizes.

of modern railway motors to machine to a smooth finish the outside of bearing shells and the bores for the bearing seat in the housings. This practice should also be fol-

lowed by the railways themselves for any work of this nature which they do, as it is essential to secure the maximum metal contact and so retain a good press fit in assembly.

## New Equipment Available

### Machine-Driven Arc Welder

**R**APID extension of the field of usefulness of electric arc welding has induced manufacturers of this type of equipment to bring out many new and interesting welding machines. The accompanying illustration shows a new carbon arc welding machine built by the Lincoln Electric Company, Cleveland, Ohio, which is cooled by water circulating in tubs around the revolving table. The machine will weld cir-

ten metal gives it the physical properties expected in 12 per cent manganese steel. The frame and details of the machine are all made of welded steel.

### Many Improvements in Small Milling Machine

**I**NCORPORATING many novel features, the Artisan Manufacturing Company, Cincinnati, Ohio, has recently placed on the market a small universal milling machine, with a table travel of 14 in., cross-travel of 5 in. and knee elevation of 11 in.

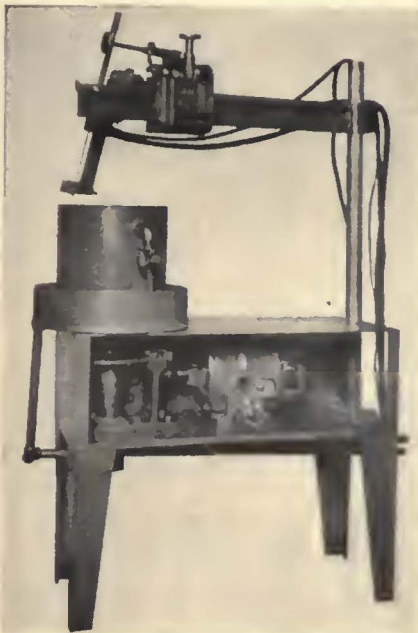
The machine, as shown in the illustration, has a self-contained countershaft mounted on the right-hand side provided with single friction pulley, which also serves as a brake. When belt-driven, power is transmitted directly to the friction pulley from the drive pulley on the line-shaft, and a  $\frac{1}{2}$ -hp. motor is mounted on a housed bracket bolted to the friction clutch pulley. Handle *A* controls the friction and brake, thus enabling the operator instantly to start and stop the spindle from his regular position.

A three-step cone pulley carrying a  $1\frac{1}{2}$ -in. belt is attached to the countershaft and transmits its power to another cone pulley on a jackshaft which rotates more than twice as fast as the spindle. This jackshaft is offset from the spindle and runs in bronze bearings. Its speed produces a high drive-belt velocity and gives the spindle more than double the amount of torque obtained by mounting the pulley directly upon it. A sliding backgear, intermediate of the jackshaft and spindle, provides six spindle speeds.

The spindle has tapered bearings and the spindle nose is threaded. A feed gear in the rear end of the spindle operates through a reverse plate, thus providing power feed to the table in either direction. The reverse plate has gear changes which, with the three-step cone feed pulley, permit of six feeds. The feed belt drives a lower feed cone which is

swung in a bracket for taking up belt slack. This lower feed cone drives shaft *E*, which passes through the column and carries a steel worm which engages worm-wheel *B*, through which passes feed shaft *C*. Feed shaft *C* is universally driven within worm-wheel *B* and the upper half of universal joint *D* and is provided with a snap socket so that it can be attached readily for driving either the table or the cross feed. The illustration shows the cross feed in use, and an adjustable dog on the bar seen just below the saddle automatically trips this feed in either direction. The saddle is square-gibbed with narrow guide-ways having a tapered gib for side-wise wear.

The table has a working surface of 6 in. x 18 in. and may be swiveled to a 45-deg. angle. The table feed shaft, seen directly back of *D*, receives power from it when attached,



Carbon arc welder has cooling tubs around the welding work

cular seams with diameters up to 12 in. The piece on which the welding is done may be partially or totally immersed in water during the welding operation.

The cooling arrangement used was developed to meet the requirements when welding high grade alloy steels on which the heat disturbance due to the welding must be reduced to a minimum. For 12 per cent manganese steel the welding may be done with the piece totally immersed in water and the arc submerged. This cooling arrangement is well adapted to the welding of manganese steel, since the rapid quenching of the mol-



No. 6 Artisan universal milling machine

and an adjustable dog automatically disengages the table feed. The table feed screw is arranged to receive change gears for driving a dividing head in spiral milling, and self-locking micrometer dials, graduated in thousandths, are provided for table, saddle and knee adjustments.

The machine, without motor, weighs 650 lb. and is adapted to light toolroom work. The power cross feed makes it particularly valuable for jig boring. Regular equipment includes over-arm,  $\frac{3}{8}$  in. arbor, oil pot and necessary wrenches, but a complete line of extra attachments, such as dividing head, graduated swivel-base vise, oil pan, pump and piping, is obtainable at slight additional cost.

# Association News & Discussions

## Southwestern Association Meets in Historic New Orleans

President Sawyer and Managing Director Storrs of the American Association Tell How to Improve Conditions in the Electric Railway Industry

"TODAY is a different day in the electric railway industry," declared President W. H. Sawyer of the American Electric Railway Association, speaking before some 500 delegates and guests who braved threatening flood conditions to attend the joint convention of the Southwestern Public Service Association and the Southwestern Geographic Division, N.E.L.A., held at New Orleans, La., on April 26-29.

An appropriate setting for the story of today's electric railway situation was afforded by the South's picturesque Queen City, located within one of the very coils of the mighty Father of Waters, which is both the city's pride and terror. While the great river, gorged with the rainfall of 31 states, lashed at its confining levees and threatened to overwhelm man and his works, there was staged before the very eyes of the utility men a heroic struggle against the forces of destruction. Here, then, was an inspiring setting for a stirring call to action which was sounded by both President Sawyer and Managing Director Storrs in speaking before the assembled utilities regarding the electric railway industry's outlook.

### CONDITIONS HAVE CHANGED, SAID PRESIDENT SAWYER

"Conditions of today are different from those under which we built and learned to operate electric railways," said President Sawyer. Under these conditions there is need for a different kind of men; for a different kind of thinking. The solution of our many problems requires experts—specialists. The methods of the past are no longer effective.

"But in the very difficulties of the job to be done lies the inspiration for us all. We have made some progress—are making progress, but we have only started. There is in the electric railway industry today an unlimited demand for skill and initiative. Are we doing the best job that can be done to meet today's changed conditions? Are we doing the best we know how to do? Are we taking advantage of the progress made by others and applying to our problems the methods which have already achieved improvement under like situations on other properties? Until we do all these things we are not doing today's electric railway job. That job requires the best that is in us. The very difficulties with which we contend afford us inspiration. In the solution of our baffling problems lies

the greatest opportunity that was ever offered to the men of an industry.

"Hard luck stories have no place in the discussions of electric railway men. We make no progress in bemoaning the difficulties through which we have come or those which lie ahead. The day of consoling ourselves with hard luck stories has passed. With the coming

of this new day our eyes are turned to the front and there is courage and hope in our hearts. Electric railway transportation has come through a fire of adversity which has tested the very core of the industry. Despite all of our difficulties; all of our burdens and all of the obstacles to progress which still lie in our path, one incontrovertible fact stands out above everything else. The very life and progress of modern communities depends on the provision of adequate and efficient public transportation. In the foundation-shaking test to which present transportation agencies have been subjected nothing has been found to take the place of the electrically propelled rail-borne car for moving masses of people rapidly and efficiently between their homes and their occupations.

"Transportation is a vital community requirement. The roots of our industry are buried deep in the foundation of community prosperity and growth. We have cause to be proud of our jobs and have every reason for throwing our spirit and our energy into the work of keeping abreast with the march of progress. Conditions are changing—yes, changing, not yearly or monthly, but daily. We are public servants in the true sense of the term and by dedicating ourselves to the community's interest we aspire to that greatest of achievements—the service of mankind. The electric railway industry must and will go forward."

Utility men, power and light as well as railway, were urged by President Sawyer to take an interest in the electric railway situation because of its relation to community development and consequently to the growth of their own business. An abstract of Mr. Sawyer's address before the joint session will be published in a later issue.

In direct line with the same thought Mr. Storrs said that electric railways are becoming convinced that they cannot sell 1910 service in 1927.

"The success of the industry," he said, "depends on attracting enough additional revenue over the minimum which comes from necessity riding to put transportation on a profitable basis."

### MODERNIZATION IN ALL LINES URGED BY MR. STORRS

Mr. Storrs joined with President Sawyer in urging modernization of equipment, methods and thought. He urged upon railway men their responsibility for taking the lead in the study and relief of traffic congestion. As the representative of 75 per cent of the people who use city streets he held that the transportation company must provide talent and initiative for joining with public and civic representatives in the relief of the serious situation brought about by growing traffic congestion. An abstract of Mr. Storrs'

## COMING MEETINGS

OF

### *Electric Railway and Allied Associations*

May 3-5—United States Chamber of Commerce, annual meeting, Washington, D. C.

May 6—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

May 9—National Conference on City Planning, Washington, D. C.

May 11-12—Central Electric Railway Master Mechanics' Association, meeting, Webster Hall Hotel, Pittsburgh, Pa., 9 a.m.

May 18-19—Central Electric Traffic Association, meeting, Tuller Hotel, Detroit, Mich., 9 a.m.

May 31—June 1-2—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

June 6-8—American Association of Engineers, annual convention, Tulsa, Okla.

June 19-23—International Street and Interurban Railway Association, annual conference, Copenhagen, Denmark.

June 24-25—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 29-July 1—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

June 30-July 1—Tramways and Light Railways Association, annual meeting, Bath, England.

July 27-29—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

Oct. 3-7—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open Oct. 1 at noon.

address before the joint session of the two associations will be published in a latter issue.

A tribute to the efficiency and spirit of co-operation displayed by the New Orleans Public Service Company was paid by Mayor A. J. O'Keefe of New Orleans in welcoming the utility men to the city. In responding, J. F. Owens said that the issue of the hour in American business is that of protecting private initiative by keeping government out of business. W. S. Vivian, Middle West Utilities Company, held that the Utilities should act in meeting the question of public ownership before it becomes an issue in the public mind. "After a subject of this kind becomes an issue," he pointed out, "there is a tendency to discredit what is said."

Activities of the two associations during the year were outlined by Harold E. Borton, president Southwestern Public Service Association, and H. B. Flowers, president Southwestern Division N.E.L.A. Mr. Flowers in his address also took occasion to emphasize the importance of refuting the theories of public ownership advocates and of adopting a vigorous policy of combating this threatened menace to the continued development of the Utility industry.

In the absence of Chairman W. H. Burke, Past-Chairman W. W. Holden, superintendent transportation lines, San Antonio, presided at the railway sectional meetings. The program was divided into general subjects of outstanding importance, each being covered by prepared discussions and comments from the floor. The subjects were as follows: "Telling the Transportation Story (a) To the Employee; (b) To the Public"; "Traffic Control"; "Modernization of City and Interurban Equipment." A supplementary report covering the discussion of these subjects will be published next week. A. B. Paterson, vice-president New Orleans Public Service Company, was elected chairman of the railway section for the ensuing year.

### Meeting Postponed

**D**UE to the recent death of the president of the Pennsylvania Street Railway Association, Jilson J. Coleman, the executive committee has decided to postpone to a later date the annual meeting of the association which was planned to be held in Scranton the early part of May. The date of meeting will be decided at the next meeting of the executive committee.

H. L. Mitchell, president of the West Penn Railways, Pittsburgh, has been appointed president of the association to fill the unexpired term of Mr. Coleman.

### Plans for U. S. Chamber of Commerce Meeting

**F**OLLOWING the usual plan, the fifteenth annual meeting of the Chamber of Commerce of the United States, to be held in Washington next week, will be divided into groups. Monday will be devoted to general sessions of the National Councilors. Tuesday there will be a general session begin-

ning at 10 a.m. At 1 p.m. there will be a series of group luncheons with discussions on agriculture, civic development, finance, insurance and manufacturing. At 8:20 p.m. there will be a general session held jointly with the Third Pan-American Commercial Conference, at which the President of the United States will be the principal speaker.

Wednesday morning there will be a general session beginning at 9:40, devoted to business problems from the viewpoints of the various sections of

the country. At 1 p.m. there will be a second set of group luncheon meetings, the topics being domestic distribution, foreign commerce, transportation and communication, and natural resources. The annual dinner will be held at 7:30 p.m. Secretary of Commerce Herbert Hoover will give the address.

Thursday morning at the concluding general session reports from the various sections will be presented, following which there will be the usual business of the session and election of officers for the ensuing year.

## American Association News

### Heavy Electric Traction

**P**ROGRESS reports on the various assignments were considered at a meeting of the committee on heavy electric traction of the Engineering Association held in New York on April 28. Members present were H. F. Brown, chairman; A. H. Armstrong, J. M. Bosenbury, Morris Buck, W. L. Barclay, Jr., representing H. W. Cope, A. H. Daus, J. C. Davidson, J. H. Davis, E. P. Chase representing J. V. B. Duer, H. H. Febrey, J. O. Madison, M. W. Manz and L. S. Wells.

Standards will be reviewed by a sub-committee of which Mr. Wells is chairman. This will include catenary construction as distinguished from the lighter type used for trolley roads. It was agreed that Mr. Wells will confer with other committees also concerned in this work.

Considerable discussion occurred on the subject of track and third-rail bonds. It was proposed to send out a questionnaire to obtain information from which can be made a classification that may lead to a subsequent standard of bonds of this general type. Several suggestions were made regarding additional subjects for study by this sub-committee and it was agreed that these will be looked into for possible inclusion in the annual report.

An expression of opinion on the subject of the bibliography on heavy electric traction was considered. In a letter ballot the members were strongly in favor of obtaining the co-operation of the New York Public Library, which has made a proposal for the publication of the material without cost to the association. After considerable discussion it was voted to recommend to the executive committee that the library's proposition be accepted.

Mr. Armstrong reported for the sub-committee on branch line electrification. His sub-committee is obtaining material for a tabulation of costs of gas-electric rail cars and locomotives, which will be submitted at the next meeting of the committee.

A written report of the committee on train operation with articulated trains was presented by Mr. Daus. This shows information on the latest articulated units in the United States and abroad.

Information is being collected for the tabulation of electrified steam railroad mileage and electric locomotives

by Mr. Cope's sub-committee, and it is planned to have the material in the hands of the members before the next meeting.

The next meeting of the committee is planned for the second week in June, the place to be decided on later.

### Noise Reduction

**S**PECIAL Rolling Stock Committee No. 9 on reduction of noise in car operation held a meeting at Springfield, Mass., on April 14, 15 and 16. Reports as to future plans and progress were outlined and a test was made on the new Springfield car. Members present were H. S. Williams, chairman; C. Bethel, N. R. Brownier, C. A. Burleson, F. L. Hinman, T. H. Minary and H. L. Rogers.

In connection with the development of the noise measuring apparatus, considerable time has been spent on development of the condenser type of sound pick-up. The construction and adjustment were of such minute proportions that the apparatus did not lend itself readily to portability. In order to overcome this it was decided to use a magnetic type of loud speaker for the pick-up. Difficulty was also experienced with the previous apparatus using the micro-ammeter and it was considered highly desirable to use a recording type instrument instead of an indicating type. The apparatus was changed to use a hook-up which permits the use of a recording voltmeter to register the amplitude of the sound vibrations.

Tests which were begun last year and considered tentatively in last year's report are to be run through to completion. It is expected that the final report will contain information on gear noise.

The committee discussed new developments which have been put forward towards the reduction of noise in car operation, the most comprehensive being the truck designs of the Springfield car and that used at Joliet, Ill. Other suggestions made were for noise reduction. These included carrying the entire motor weight on springs, use of rubber supports in which the rubber is vulcanized between two steel bushings, resilient steel wheels, development of a composition brakeshoe, bolting material to the web of wheels, and use of full elliptic springs with cast-on blocks instead of the bolted scroll ends.

# The News of the Industry

## Advance of 1½ Cents for Eastern Massachusetts Men

A new working agreement has been made between the public trustees and the employees of the Eastern Massachusetts Street Railway, Boston, Mass., effective on May 2 for one year, under which the employees are to receive 1½ cents an hour increase in the basic wage rate of 62½ cents.

The blue uniform men, on the other hand, agree not to ask for time and one-half for work performed on snow plows, which was awarded them last year by an arbitration board of which Judge John C. Leggat was chairman.

The 5-cent differential for one-man car operation remains the same. More than 95 per cent of the blue uniform work is performed on one-man cars.

Under the 1926 award, the blue uniform men receive 8½ hours pay for eight hours work, but now the company promises it will make as many straight eight-hour runs as practicable and reasonable and the men agree that they will operate them with no demand for pay for work not actually performed.

With the understanding that runs of eight hours and fifteen minutes will be kept down to a minimum, the men further agree to operate them without demand for time allowance.

Seniority rights for blue uniform men which continued for six months after layoff will be extended to one year. In all other essential respects the present contract is renewed.

The new agreement was reached after a series of conferences between the company's labor representative and the wage committee of the carmen's union, composed of William O. McGowan of Brockton, John F. O'Brien of Lawrence and Thomas J. Powers of Lowell and John H. Reardon of Worcester, chairman of the executive committee of the International Carmen's Union.

By referendum vote the negotiations have been approved by the local unions in Lowell, Lawrence, Haverhill, Salem, Lynn, Chelsea, Melrose, Woburn, Quincy, Weymouth, Brockton, Taunton and Fall River.

## New Fare Scheduled for Kansas City

William G. Woolfolk, president of the Kansas City Public Service Company, Kansas City, Mo., on April 18 filed with the Public Service Commission application for authority to rearrange the schedule of fares charged by the railway in Kansas City, to make the schedule conform to promises in connection with the new franchise. The application asks that the commissioner authorize the new schedule so that it will become effective May 1.

The present schedule is 8 cents cash fare, two tickets for 15 cents, seven for 35 cents, with one-half of these rates for children between the ages of eight and twelve and children less than eight years old free. The new schedule as provided in the ordinance is a single cash fare for adults of 8 cents, two tickets for 15 cents, ten tickets for 70

cents or fifteen tickets for \$1; children less than eight years old, free; between the ages of eight to twelve years old, 4 cents for single fares; four tickets for 15 cents; ten tickets for 35 cents and thirty tickets for \$1, with two children without tickets to be carried at the price of one single cash fare for an adult.

## Survey of Transportation Situation in Chicago

### Prospects of Immediate Consolidation of Chicago Transit Systems Denied by Company Officials—Effect of Home Rule and Terminable Permit Uncertain

**R**UMORS current in the local press on April 25 that agreements had been reached between the new city administration in Chicago and local traction officials for immediate consolidation of the surface, elevated and bus lines on the basis of indeterminate franchises were later denied.

Leonard A. Busby, the Chicago City Railway president, asserted that "we have no oral agreement or understanding of any kind with any one regarding a settlement of the traction question." He said:

We are in favor of a unification of these properties and enabling legislation which will authorize the city to grant a modern type of franchise to permit a consolidation, but so far as I know no attempt to draft or submit legislation of this kind has been made at the present session of the State Legislature.

The steady rise in prices of traction securities since the election of Mayor Thompson is probably responsible for the circulation of these misleading reports, city and company officials believe. A recent tabulation of market prices reveals that first mortgage bonds of the Chicago City Railway which sold on Feb. 1, the date of franchise expiration, at 76, and on April 6, the day after election, at 78½, are now selling at 85. Chicago Railways series A bonds in the same period have gained nearly seventeen points, or from 53½ to 70.

### MAYOR SAID TO DESIRE QUICK SETTLEMENT

Evidence that the new Mayor desires a quick settlement of the problem is found in his campaign addresses and subsequent statements. Although his advocacy of home rule is quite well known, at no time since the recent mayoralty contest was begun has he announced any definite or constructive transit program. In his inaugural address on April 11 the Mayor merely reiterated his campaign pledge to give his very best thought to the matter and intimated he would have something further to say in a later communication to the City Council.

In the meantime, however, the Mc-

Cluggage and Durso bills, the former providing for the return of utility control from the state commission to all Illinois cities over a certain population and the other for local control in the city of Chicago, have been sent to a subcommittee by the General Assembly at Springfield after discussions lasting several months. The measures were vigorously opposed by representatives of the steam railroads and public utility companies of the state. The shelving of the two bills undoubtedly means that no further action will be taken in the matter during the present session of the Legislature. Defeat of Mayor Dever, who was a leader in the fight for home rule, and the failure of Chicago voters to approve the home rule proposition, together with the natural assumption that the new Mayor was unfavorable to home rule, are said to be the reason for the Legislature's sudden decision to sidetrack the bills.

Concern over the outcome of the Chicago mayoralty election, as in the case of the home rule bills, is also reported to have been responsible for the long delay in the presentation of a terminable permit bill in the Legislature at Springfield. The committee appointed to investigate the subject of indeterminate permits made its report to the Senate several months ago after an extensive junketing trip. The report declared that sentiment for such a policy was distinctly favorable wherever it had been tried out. Several members of the committee from the House of Representatives, however, declined to sign the report.

Inasmuch as home rule and the terminable permit legislation were regarded as the very essence of the negotiations for a successful traction settlement at the time the matter was dropped by the local transportation committee of the City Council last February, doubt is now being expressed as to the course of action the City Council will take. At the present time the city has no power to issue a terminable permit to the surface lines or bus lines, and power to consolidate



these lines, together with the elevated lines, into a single vast system and to bring them under local regulation must also be obtained from the Legislature. The various plans which are still pending before the transportation committee are (1) the Lisman plan, sponsored by F. J. Lisman and associated New York banking interests, involving the Chicago Surface Lines and based on a twenty-year grant; (2) the consolidation plan, advocated by the former Mayor and providing for a consolidation of surface and elevated lines on the basis of a terminable permit and home rule, and (3) the proposal made by the Chicago Motor Coach Company, which provides for substitution of buses for street cars in exclusive city-wide service. The two first plans are now in the form of tentative ordinances. At the last meeting held by the committee the companies were asked to agree among themselves on a plan of merger or working agreement with unified service and universal transfers.

While the city is awaiting action by the new Mayor and the local transportation committee, which is again headed by Joseph B. McDonough, the original Dever appointee, the date of expiration of the six months extension of Chicago Surface Lines franchises draws rapidly onward. Only a little more than twelve weeks remains for them to run. If no agreement is reached or ordinance passed before the extension lapses, on July 31, there will arise the question of valuations and many other important matters.

At the present time Samuel Ettelson, newly appointed Corporation Counsel, is making a study of the various traction plans, including subway construction projects, the result of which will be submitted to the Mayor on his return from New Orleans next week.

### St. Louis Resists Higher Fares

That the operating costs of the United Railways, upon which is based the petition for a straight 8-cent fare in St. Louis, will be materially lowered when the system emerges from receivership and the properties return to private management is contended by the city, which is resisting before the Missouri Public Service Commission Receiver Wells' latest application for higher fares. The city's protest against the higher fare was filed with the commission by City Counselor Muench on April 22. The petition of the city points out that the United States Court has ordered the sale of the company's properties on May 25.

Receiver Wells also seeks to have the valuation for rate making increased from \$51,781,348 to \$75,000,000 and claims that an 8 per cent return should be permitted. The present income permits only a 3.3 per cent return on the \$75,000,000 and only 4.27 per cent on the \$51,781,348 valuation. The city is also opposed to the \$75,000,000 valuation. It contends also that the city car riders should not be forced to carry the burden for unprofitable operations in St. Louis County; that the annual depreciation charge of \$1,500,000 is excessive by at least \$300,000, and that the insurance reserve set up by the company is unduly burdensome.

### Change in Control Said to Impend in Oakland

Change in the control of the Key System Transit Company, Oakland, Cal., looms as the result of the election of two new directors at a meeting held on April 22. The new directors are A. J. Lundberg and Gustav Epstein. They replaced A. Crawford Greene and B. H. Dibble, elected at the annual meeting a month ago.

Messrs Lundberg and Epstein are members of the investment firm of J. Barth & Company, large stockholders of the Key System. Barth & Company were unrepresented on the board up to last November, when H. C. Clayburg was elected a director. It is hinted that the members of this concern will now play a prominent part in guiding the financial destinies of the railroad. The size of the executive committee has been increased from five to seven members so as to include Messrs Clayburg and Lundberg.

Stock of the Key System has been declining steadily in the market during the last year, especially the prior preferred and the preferred. Moreover, the quarterly dividend on prior preferred has been passed. In announcing the decision of the directors to skip this dividend President Lester S. Ready stated:

It has been the aim and hope of directors and the management that this would not be necessary, but the conditions that have developed during the past year have convinced them that the best interests of the company and of the stockholders will be served if this action is taken.

Mr. Ready cited as factors in the present financial status of the company the \$400,000 annual increase in operation expenses through the higher wage award made by the arbitration committee a year ago; the expenditure of \$6,000,000 for capital additions and betterments in 1925 and 1926 and the failure of the new revenue provided through an increase in railway and trans-bay ferry rates to meet the higher operating expenses and cost of improvements. In a statement made by him Mr. Ready said:

It was contemplated that following the increase in rates some loss of passengers would result, but it was expected that within a few months the traffic would recover, especially in view of the added track facilities and improvements in track and equipment.

To date the passenger traffic, due to material increase in ownership and use of automobiles, has not increased to an extent to offset the added costs. In addition a temporary depression of gross revenue has occurred during the first three months of 1927, owing to the more than normal rainfall.

Rumors are rife in San Francisco that the Hill interests are maneuvering to get control of the Key System as part of their transcontinental system and make their terminal in the Key mole. These reports, however, are contradicted by statements that the Key and the Southern Pacific are shortly to merge so as to eliminate present costly duplication of service.

Surveys with this object made by engineers are now being studied by the officials of both roads. An announcement centering around the Key and Southern Pacific lines seems certain in the near future.

In the meantime the Key officials are making plans for formal application for a higher fare. Hearing on this matter will come up before the Railroad Commission on May 10. At this hearing it is likely that there will be a hot fight, as John L. Davie, Oakland Mayor, who is none too friendly to the Key System, has just been re-elected for another four-year term, defeating Frank Colbourn. The latter was a member of the arbitration committee that awarded the car men of the Key System a higher wage in 1925.

### Traction Settlement Looms Again in Toledo

Action looking toward a settlement of the railway difficulties in Toledo, Ohio, may be sought before the voters at the primary election in August. Demand to this end has been made in conferences between officials of the Community Traction Company and representatives of the city administration. Recent discussion indicates that action must be taken on the contention of the Street Railway Board of Control that between \$2,000,000 and \$3,000,000 must be written off the capital value of the company to take care of abandonments, obsolescence and correct some of the evils in valuation adopted under the Milner plan. Concessions in the way of power rates are to be asked in return for a monopoly of bus and railway service. Following the Riggs survey two years ago an effort was continued to draft a new franchise keeping the salient factors of the Milner plan but correcting many of its defects brought to light in six years of operation.

The result of these negotiations between attorneys from the New York office of Henry L. Doherty & Company and the city law director was unfavorable to the Board of Street Railway Control, which has had direct contact with the operations during the entire life of the Milner franchise ordinance. Since this stand was taken negotiations have been intermittent, with conditions getting worse.

The city has a program of about \$3,500,000 of new paving and reconstruction of streets which involves the traction company at several points. The Board of Control has asked for revision of power rates, new bus lines and extensions, and in the meantime the company has continued to lose business to private automobiles and competing independent bus lines.

After weeks of effort to arrive at a decision Service Director William B. Guitteau has had legislation introduced in the City Council providing for the repaving of St. Clair Street in the downtown district by the city if the railway refuses to go ahead with the work inside of 60 days. Abandonment of this stretch of track was recommended as a part of the Riggs plan, but J. Frank Johnson, general manager, says the abandonment can come only as a part of the general plan.

Before the City Council are three or four plans for complete bus service for the city and it is believed that they constitute one way out of the tangle in the event the railway situation is not brought to a settlement in a few months.

## Wiring Havoc in New York Subway

Fire broke out on the afternoon of Sunday, April 17, in the new subway under construction by the city of New York under Eighth Avenue. The fire started at 36th Street, damaged cables and subway construction to an extent estimated by the builders at \$500,000 and almost completely stopped telephone and light and power service in a large section of the mid-town business area. Police and fire signals were put out of commission, and grave hazards faced the firemen who poured water into the excavation.

For three hours or more several large hotels were deprived of utility service, newspaper offices were hampered, at least one hospital was without electricity, and trolley service was somewhat crippled. Despite the fact that it was Easter Sunday, wiremen and other utility workmen were recruited from the forces of the telephone and light and power companies from all over the city and contiguous territory to repair damage and restore service, and the torn-up and undermined streets beneath which the new subway is to run showed even more sub-surface activity than on weekdays.

On Monday morning the fire broke out again with even worse results than the day before, paralyzing 15,000 telephones, darkening tens of thousands of electric light bulbs and stopping elevators throughout the district between 34th and 38th Streets and Seventh and Ninth Avenues. The disruption of telephone, light and power service halted business activities in the district almost as completely as if that zone had been visited by an extensive disaster. All electric power was cut off from a twelve-story department store covering most of a city block. Many business places shut down for the day or closed



Fire in the Eighth Avenue subway gave New York firemen a hard fight

early, and it was estimated that twenty thousand workers were forced to be idle. In the section affected is housed a large part of the garment industry of the city. When night fell residents in side streets had to resort to oil lamps and candles and watchmen of loft buildings carried lanterns and flashlamps.

The New York Edison Company made final connections of feeder cables sufficient to carry full-capacity load of 100,000 kw. late on Tuesday evening, and when the business buildings were opened on Wednesday morning there was energy for elevators and electric lights in all establishments, but many buildings were still cut off from telephone communication.

## New Franchise Sought in Sandusky

A franchise to take the place of the one that expired nearly a year ago was submitted to the City Commission of Sandusky, Ohio, on April 18 by F. W. Coen, president, and L. K. Burge, vice-president and general manager of the Lake Shore Electric Railway. The draft was discussed behind closed doors

and its provisions were withheld. It is understood, however, that it makes provision for a fare higher than 5 cents.

## "Making Transportation Pay"

"Making Transportation Pay" is the title that has been chosen this year for the digest of the presentations made by electric railways in 1926 for the Charles A. Coffin prize. This title was selected because it epitomizes the present trend of managerial thinking. The book shows that transportation is being made to pay and how it is being done.

Complimentary copies are being sent to a selected list, including public utility commissions, investment bankers and public and college libraries, as well as members of other organizations interested in the electric railway industry. A limited number of extra copies of the book are available to others at the cost price of \$2.

This is the fourth volume of the series of "Electric Railway Practices" issued since the establishment of the award by the Charles A. Coffin Foundation.



This view of the second fire shows great patches of planking torn up and temporary electric cables installed

## Transportation Tied Up in Peterboro

Peterboro, Ont., is being supplied with transportation service by a local cartage company. The Peterboro Radial Railway, operated by the Hydro-Electric Power Commission of Ontario, has been closed since March 31. The city and the commission were unable to come to terms on a price for the utilities. The commission placed a price of \$575,000 on the gas and railway utilities and the City Council countered with an offer of \$150,000. It is desirable to sell the railway, the commission declared, because it is losing \$50,000 a year, an amount borne by all hydro municipalities in the Central Ontario System. The railway is valued at \$475,000, and if it is junked, which to some seems probable, this loss will have to be absorbed by the other hydro municipalities in the system.

Meanwhile the city is handicapped by lack of transportation and a further difficulty was encountered when the Mayor announced that the Hydro commission's contract with the Gotfredson Bus Corporation did not expire until May 20.

## Bill Against One-Man Cars Lost in Tennessee

One-man cars are to continue to operate in the cities of Tennessee due to the action of the House of Representatives in rejecting the bill offered by various delegations of the larger cities which would have prohibited their usage in all cities of 30,000 population or over. The Knoxville delegation, backed by the smaller counties, opposed the bill and in rejecting an amendment to permit the cars in all towns under 30,000 population brought about the defeat of the bill.

## Summer Excursion Rates Announced by South Shore

Anticipating a large volume of summer travel to Indiana Dunes State Park, newly created reservation, the Chicago, South Shore & South Bend Railroad will provide low week-end rates from Chicago. The round trip rate to Tremont, park gateway, will be \$2; to Miller, \$1.50, and to Wilson, \$1.75, the two latter places also being popular with summer visitors to the Dunes. The tickets sold on this basis will have a return limit three days following date of sale. The South Shore Line is the only line providing regular service to these Dunes points.

## Tract on Courtesy Bristles with Interest

"Our Part in Public Service" is the title of a handsome vest pocket booklet on public relations issued by the Nashville Railway & Light Company, Nashville, Tenn.

The booklet has been distributed to 1,400 employees. It covers every phase of public relations work, both in the operating and electric accessories field. In a modest preface, J. P. W. Brown, vice-president, explains that while the principles set forth are not new, having been discussed in employee group meet-

ings, nevertheless they are essential to the company's success.

The text matter of the little code of principles bristles with interest and attacks many new phases of contacting with the public. Of outstanding significance are the paragraphs devoted to definition of courtesy, telephone speech and the opportunities for public service.



**Interurban Lowers Wages.**—A reduction of 10 per cent in wages of all officials and employees of the Buffalo & Erie Railway has been ordered, effective May 1. This company operates an interurban between Buffalo, N. Y., and Erie, Pa.

**Adjustment Department Formed.**—A new department of the Kansas City Public Service Company, Kansas City, Mo., has been formed. It is known as the adjusting department. It replaces the old claim department of the company. The new department is under the supervision of Arthur T. Bagley, who will be superintendent of personnel and manager of this department for the company.

**Reprints of Interview.**—"Three Classes of Service," which appeared in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 26, 1927, has been reprinted in pamphlet form. The number now in circulation is 85,000. The article was an interview by Charles Gordon, editor of the ELECTRIC RAILWAY JOURNAL, with T. E. Mitten.

**Seeks Ten-Cent Fare.**—A petition was presented recently to the City Council of Ames, Iowa, by the Fort Dodge, Des Moines & Southern Railway calling for a 10-cent fare on cars and buses operating between the loop district and Iowa State College.

**Would Provide Study of Transit Needs.**—A bill to create a special commission to study the city's transportation needs, particularly a rapid transit system, will be presented at once to the new St. Louis, Mo., Board of Aldermen. Samuel L. Wimer, chairman of the special committee on rapid transit of the old board, will be sponsor for the new measure.

**Official Credited with Idea.**—The rebate slip for passengers who inadvertently or accidentally drop more change than is necessary in the Johnson fare boxes is being used effectively on the lines of the Southern Colorado Power Company in Pueblo, Col. The details of the idea, reference to which was made in the ELECTRIC RAILWAY JOURNAL, issue of April 9, 1927, page 669, were worked up and carried out by W. C. Porter, superintendent of transportation.

**Facts on One-Man Car Operation.**—The Toronto Transportation Commission, Toronto, Ont., has recently published in the daily newspapers a series of announcements presenting data on the one-man cars. Publishing such information is in line with the practice of the commission of taking the public into its confidence in all important de-

velopments in regard to the system. The purpose of the announcement was to correct any false impression and to win the public over to use the rear exits of the "treadle" cars and otherwise co-operate with the operators by using the car so that the service they provide might be convenient and efficient.

**One-Man Car Service Extended.**—Cars on all the lines of the Valley Railways, Harrisburg, Pa., are run now on the one-man basis, following the extension to two lines on April 18, and part of a third line which formerly had two-man operation.

**Would Elect and Not Appoint Members.**—A bill has been introduced in the Wisconsin Assembly providing for the election of Railroad Commission members instead of their appointment by the Governor, as is the case now. The bill states that at the general election on April 1, 1928, the voters shall determine by referendum whether or not Railroad Commission members shall be elected by the people.

**Seeks Ten-Cent Rate on New Line.**—The Public Service Railway will provide bus service for the lower east side of Union City between Hoboken and Grantwood, N. J., if the City Council of Hoboken agrees to a 10-cent fare for the run up the viaduct the same as on the Hillside line. This is the claim of W. H. Shepherd, divisional manager of the company, at a conference on the transportation situation at the committee of the whole session at City Hall on April 18. The proposed extension of the Hillside Line would mean the rerouting of buses of some of the present fleets. The willingness of the company to expand its service was disclosed by Mr. Shepherd. He referred to his going to that section a year ago and of an increase of 7,500 miles in daily mileage under his direction and of intention to continue that policy within reason as a means of increasing revenue for his company.



**Austrian Electric Line Completed.**—Service has commenced between Woral and Innsbruck, Austria. This line, 45 miles long, is a section of the Austrian State Railroad and is part of the line included in the electrification program which has recently been completed on this system.

**New Swiss Electric Locomotives.**—The first of a new and improved type of electric locomotive has lately been turned out from the Brown-Boveri works at Munchenstein, Switzerland, for service in hauling the heavy express trains between Berne and Zurich. The engine, which runs on seven pairs of wheels and weighs 115 tons, is said to have attained a speed of more than 62 m.p.m.

**Flood Lighting at London Stations.**—According to the London Underground Railways, the experiment of flooding the stations with light is proving successful at the City and South London

Railway extension and will be introduced at the Finsbury Park station of the Great Northern, Piccadilly & Brompton Railway. Powerful searchlights are placed also on the roofs of the outdoor stations to emphasize their position.

**Railroad Electrification in Holland.**—Electric trains will soon begin to run from Haarlem to Rotterdam and Haarlem to Ymuiden in Holland. By next October it is expected that the Amsterdam-Rotterdam line will be completed.

**London County Council Re-equips Cars.**—Fifty cars in London have been re-equipped with upholstered cross seats. Operation of these cars has proved so successful that the London County Council will extend the program to 50 more cars. About 250 cars are in line to be improved. Total cost for the work will be £54,000.

**London Underground Railways to Use One Guard on Trains.**—All trains operating in the London Underground Railways will in the future have only one guard to a train. This system has been used on four and six-car trains only in the past, but according to recent official news of the Underground more men will be added to the staff to direct the traffic, and automatic devices will be substituted in place of guards. Experiment is now being made of a telephone to be used for communication between the motorman and the guard. This change of system is a process which will take at least two or three years to carry out, the time allowed for equipping all of the cars.

**Tramways Association Meet at Bath.**—Bath, England, is the meeting place chosen for the annual conference of the Tramways & Light Railways Association to be held June 30 and July 1.

**Express Buses for Manchester.**—Manchester Corporation Tramways department has started experimental express bus service to parallel each of the tramway routes. Fares on these buses, however, are twice those charged on the tramway lines, but the buses do not stop between the tramway fare zone points, which are about  $\frac{3}{4}$  mile apart. The service will be linked up so that beyond the range of the tramways the buses will stop at all intermediate points and ordinary fares will be charged.

**Glasgow's Plans for New and Improved Cars.**—Purchase of 50 new cars and the improvement of 150 cars now in service were recommended by the Glasgow Town Council, and approved on April 14. The cost is estimated at £345,000. For twenty years Glasgow has made little change in car design. In the report submitted by L. Mackinnon, general manager of the Glasgow Corporation Tramways department, it was stated that the speeding up of the service in Glasgow had emphasized the necessity for bringing the cars up to date by the introduction of modern motors to give increased acceleration and retardation and higher running speeds. At the present time, according to the report, there are 1,004 Glasgow built cars in stock, including 332 constructed less than seventeen years ago, 235 built between seventeen and 22 years ago and 437 more than 22 years ago.

## Recent Bus Developments

### Right of Philadelphia to Tax Interstate Buses Upheld

The fight of the city of Philadelphia, Pa., for local jurisdiction over interstate buses has been carried to a successful conclusion in the United States District Court by James F. Ryan, Assistant City Solicitor.

The American Transit Company and the American Motor Coach System, both Delaware corporations, with local offices in Philadelphia, had obtained a temporary restraining order preventing the city from collecting the \$50 fee per bus authorized by Council. P.R.T. buses, local and interstate, all pay that fee.

The city, contending that the aggregate annual collection of \$12,500 for the 250 buses engaged in interstate traffic would scarcely meet the expenses of proper regulation in the public interest, went before the court in an endeavor to make a test case of the operators' action.

Judge Thompson dismissed the injunction. In ruling in favor of the city, he pointed out that the bus was a new factor in transportation. He cited increased population, narrow streets, and the occupation of roadways by buses of more than ordinary weight and size as a modern problem. These buses, he said, carrying as many passengers as possible, would become a menace to the city unless properly regulated. The court said:

It is essential to the orderly supervision of traffic, that the route, stop, start and loading points of these interstate buses should be clearly designated. Each bus also should bear a city license plate. The designation should be filed for immediate reference in an appropriate office.

A \$50 fee for each bus is certainly not unreasonable, in view of the testimony from two companies that monthly receipts for twelve buses averaged between \$18,000 and \$20,000.

The court pointed out that Congress had not yet dealt with the interstate motor vehicles in Philadelphia, and while it might do so in the future, it was now within the province of the states to provide reasonable police regulation.

As a result of the decision abolition is likely to follow of all existing ordinances regulating passenger-carrying motor vehicles in Philadelphia and enactment by Council of a new measure providing complete police jurisdiction over interstate as well as local buses will be effected shortly.

### More Bus Substitutions in Massachusetts

The Selectmen of Ware, Mass., have granted a permit to the Conlin Bus Lines, Worcester, to connect Enfield, Ware and West Brookfield by bus. At the latter point the buses will connect for Worcester and Boston. There will be summer and winter service. The State Department of Public Utilities is expected to approve the plan so that service can start on May 1. The matter of granting a permit to the Springfield Street Railway to operate buses be-

tween Ware and Palmer was discussed by the Selectmen and it was decided to propose to the railway that it take up the rails in Ware but leave the ties in place. If the proposition is acted upon favorably by the railway the bus permit will be granted.

### Prospective Bus Line to Be Under Hamburg Railway Management

Petition has been made to the New York Public Service Commission by William D. Allen for the operation of a bus line between Orchard Park and Lafayette Square in Buffalo traversing Buffalo, East and West Quaker Streets in Orchard Park, Orchard Road in East Hamburg, Orchard Park Road and Potter Road in West Seneca to the intersection with Orchard Park Road at the Buffalo City Line. The petition states that it is ultimately planned to form a corporation for the running of the bus line, the management to be the same as that of the receiver of the Hamburg Railway. As soon as the Ridge Road is opened across the railroad east of the Lackawanna city line it is proposed to secure permission to operate buses in alternate trips over the Ridge Road to South Park Avenue and to co-ordinate this line with the service given by the Hamburg Railway. Three large railway bondholders have agreed to take sufficient stock adequate to finance the operation of the new line.

### Southern Pacific Supplements Service with Bus Auxiliary

Entering the highway motor transport field for the first time, the Southern Pacific Company on April 19 filed with the Secretary of State at Sacramento articles of incorporation of the Southern Pacific Motor Transport Company, a California corporation, to operate as an auxiliary to the railroad activities. San Francisco is named in the articles as the business center of the proposed new corporation and the purpose of the organization is outlined as being "to own, hold, control, lease, purchase, sell, operate and manage motor stages and motor trucks in streets and highways, public or private, within and without the State of California."

Speaking of the action of the company, Paul Shoup, executive vice-president of the Southern Pacific, said that the competition of privately owned machines and of bus companies in connection with the construction of good highways in the territory served had so decreased the earnings from certain trains, especially those engaged in branch-line service, as to necessitate taking off these trains. The Southern Pacific Motor Transport Company has been organized as a separate corporation with independent operation. This service will be developed as the need arises. The company will be empowered to engage in all forms of transportation.

## Would Operate Buses in Batavia

Batavia is soon to be added to the list of smaller up-state New York cities supplanting trolleys with buses. The Batavia Traction Company at a meeting of the Common Council asked permission to operate buses and discontinue its trolley system, which has served the city since 1901. The Council held the matter in abeyance pending investigation, although it is a foregone conclusion that the days of the street railway are numbered.

If the Council grants the request immediate application will be made to the State Public Service Commission for permission to make the change. Stephen W. Brown, president of the corporation, and other representatives of the railway stated that the company could no longer stand the drain on its finances in keeping the railway line in operation. The equipment consists of only four cars. Mr. Brown said that the company had lost more than \$60,000 in thirteen years. It was stated that there were no funds in the utility's treasury even for current expenses and that a bus system was the only solution.

While city officials and public sentiment generally are favorable to the shift, the question of fare is to be threshed out. The present fare is 5 cents. There is some sentiment for municipal bus operation, but it is expected that the Batavia Traction Company will continue to be the city's transit agency, but with buses instead of trolleys.

## Bus Bill Signed by Pennsylvania Governor

Governor Fisher of Pennsylvania on April 18 signed the Parkinson Senate bill which permits any electric railway incorporated heretofore under the laws of Pennsylvania and owning at least two-thirds of the capital stock of any motor company or street railway now or hereinafter organized under the laws of the state to acquire the latter. Acquisition must be subject to the approval of the Public Service Commission.

## Bus a Vital Co-ordinating Factor in Detroit's Transportation

The most practical and proved panacea for the traffic and transportation ills that are at present the most pronounced growing pains of the city of Detroit is the bus. In voicing this opinion Del A. Smith, general manager of the Department of Street Railways, claims that the bus is a vital adjunct to the electric railway system. He says engineering skill has accomplished no greater or prouder task than in bringing the bus to its present high state of development.

In the *Detroit Times* of April 5 Mr. Smith outlines the phenomenal growth of the bus in general and particularly in the locality of Detroit. The department established 116 miles of bus routes in June, 1925, and is now operating more than 160 route-miles employing 310 buses for these routes. In this great wave of modernism and improvement Mr. Smith believes that the department should go slow in stocking itself with equipment that may be im-

practical and obsolete tomorrow. He is watching closely experiments in other cities, both in the matter of developing the bus and in meeting the competition from independent lines. Mr. Smith favors the Mayor's plan of some day taking over the Detroit Motor Bus Company's routes and equipment. He said that would be the fairest and most practical plan, but any harsh or summary action in that direction would not be fair to stockholders or in accord with the original agreement with the private company.

**Discontinuance Application Dismissed.**—The California Railroad Commission has dismissed the application of the Pacific Electric Railway for permission to discontinue a portion of its Upland-San Antonio Heights motor coach line between 24th Street and San Antonio Heights, upon request of that company.

**Seeks to Operate Bus Line.**—Authority to operate a bus line between Ogden, Utah, and the Utah-Idaho state line is asked by the Utah-Idaho Central Railroad in a petition recently filed with the Public Utilities Commission. The contemplated service would cover both freight and passengers. According to its petition the company would continue its rail service and would operate its bus lines in addition to this equipment, if granted a certificate of convenience and necessity.

**Abandons Bus Route.**—The bus route of the Worcester Consolidated Street Railway, Worcester, Mass., over Burditt Hill, Clinton and through West Boylston has been abandoned. Instead of this two-hour service by that route the Consolidated is running buses hourly through Boylston Center. The company gives as a reason for the abandonment of the line that better time can be made on the new route, which is 3 miles shorter, and there is not sufficient riding on the Burditt Hill route.

**Bus Charter Granted.**—A certificate has been granted by the California Railroad Commission to the Los Angeles Railway to operate motor coach service between Seventh and Los Angeles Streets, in the city of Los Angeles, and the intersection of Whittier Boulevard and Simmons Avenue.

**Petition Shows Railway-Bus Agreement.**—The Jamestown-Dunkirk Transit Company, Inc., has petitioned the New York Public Service Commission for an amendment to its certificate for a bus line in Dunkirk to permit it to change the route over which the line operates. With the petition there is filed a copy of the resolution of the Common Council of Dunkirk, wherein it is shown that an operating agreement has been made between the transit company and the Buffalo & Erie Railway as to the operation of buses and cars in the city. This agreement has been approved by the civic authorities.

**Ruling Reduces Speed of Buses.**—The Board of Public Service of St. Louis, Mo., on April 6 decided to limit the speed of buses operated on Waterman Avenue between Union and Skinker Boulevards at 15 m.p.h. The former limit was 25 m.p.h. The ruling was the result of numerous protests from certain residents who had contended that

the double-deck, solid-tired buses operated by the People's Motorbus Company were shaking their houses and causing damage to the property.

**Buses for Week-End Rushes.**—Eight bus runs from Framingham to Boston, Mass., have been eliminated on the Boston & Worcester Street Railway, but three additional railway runs have been placed in operation over the same route. This practically amounts to hourly service between the two points. The buses are being held in reserve for week-end rush runs and other special occasions.

**Buses in Oswego.**—Territory never before reached was opened up at Oswego, N. Y., on April 22 when buses replaced the local railway. The fare was 5 cents. The Empire State Railroad Corporation abandoned its railway operations and auxiliary buses in that city after 40 years of service, carrying out an order of the Public Service Commission which permitted abandonment of the lines on the basis of several years financial losses with a 7-cent fare. Oswego is a city of 22,000.

**Opposes Bus Charter.**—The plan of the Reading Railway for a subsidiary company to operate buses supplementary to steam train service in 24 Pennsylvania counties was opposed on April 22 by the Philadelphia Rapid Transit Company, Philadelphia, Pa. Its protest with the Public Service Commission at Harrisburg was filed after the Reading Transportation Company, the subsidiary company, had applied for a state charter. The traction company's counsel said action was based upon a determination to protect the electric railway bus rights in suburban districts of Philadelphia and in adjacent counties. The plans of the Reading Railway to enter the bus field were upset last year when Governor Pinchot refused to ratify an application for a charter.

**General Transfer System to Be Adopted.**—The International Railway and its subsidiary, the International Bus Corporation, Buffalo, have informed the City Council they will adopt a general transfer system covering all bus and car routes if the municipal authorities will approve the company's application for the proposed Kensington-Bailey bus line. If the proposed franchise is granted, the company will not seek to amend existing bus consents covering restricted transfer privileges, but merely will modify its operating rules to give a universal transfer.

**Would Abandon Bus Line.**—The Key System Transit Company has applied to the California Railroad Commission for permission to abandon operation of its bus service between the intersection of Los Angeles Avenue and Spruce Street and Alta Road and Spruce Street in the city of Berkeley. This bus line has been operated as an experiment by the company and the earnings have been found insufficient to justify its further maintenance. The company asks the commission, in the event that permission to abandon the line is not granted, to charge a fare of 10 cents, with free transfer privilege to the Spruce Street car line, and a 3-cent transfer charge from the Spruce Street car line to the bus line.

# Financial and Corporate

## Sale of United Railways Set for May 25

The properties of the United Railways, St. Louis, Mo., including trackage, franchises, rolling stock, lands and all appurtenances, will be sold by Special Master William L. Igoe, acting for the United States District Court on May 25.

The property will be bought in for the St. Louis Public Service Company, organized by the reorganization committee of the United Railways to take over and operate the system when the receivership is terminated. The property will be bought subject to the lien of the United Railways general bond issue and the consolidated first mortgage of the St. Louis & Suburban Railway. The property has been in receivership since 1919.

On application of the Mercantile Trust Company, Judge Faris on April 19 set May 23 as the date for a hearing on a proposed amendment of the allowance of interest on approximately \$3,000,000 of unsecured claims against the United Railways. These claims include \$2,396,322 on mill tax judgment with 6 per cent interest to Aug. 5, 1926, due St. Louis. A federal law is said to prohibit the payment of interest on claims during receivership. The Mercantile Trust Company, trustee for the St. Louis Transit bonds, has asked interest be allowed only to April 12, 1919. Counsel for the trust company informed Judge Faris that court orders allowing the claims with interest up to Aug. 5, 1926, have been oversights by the attorneys who drew up the papers. With interest to date the city's mill tax claim aggregates \$2,600,000.

## Another Liquidation Dividend by Toronto Railway

Shareholders of Toronto Railway, Toronto, Ont., which has been in process of liquidation for several years, will be notified in the next few days of a disbursement of \$1.50 a share on the capital stock of the company. This interim payment will bring the total liquidation dividend so far paid to \$115.50 a share.

The work of winding up the company awaits disposition of two suits at law, one by the company and one against it. The first is a claim for about \$55,000 from the Niagara Parks Commission, representing a deposit and accrued interest. This deposit was made many years ago on behalf of the Electrical Development Company as a guarantee against claims for physical damage to concessions, etc., in the park while certain work was in process. The time for the filing of claims against this fund expired more than ten years ago. The park commission has declined to pay over the amount until final settlement of claims made by the city of Niagara Falls. It is understood that the railway is willing that the commission settle

the claim out of court for what it considers a reasonable amount.

The suit against the company has been brought by an engineer formerly employed under the chief engineer of the railway. The plaintiff in this action claims \$25,000 on account of patents developed while he was connected with the railway. He also contends that he did not receive proper notice of dismissal from the employ of the railway company.

These two matters are the only ones which are delaying the final wind-up of the Toronto Railway.

The property of the Toronto Railway was taken over by the city and is now included in the municipal system under the direction of the Toronto Transportation Commission.

## Bids Received for Sale of Detroit Carhouse Property

In response to the request of the Street Railway Commission at Detroit, Mich., for bids for the sale of property for which the department has no practical use adjacent to the Woodward Avenue carhouse, a high bid in the amount of \$460,000 was obtained. The property has a frontage of 500 ft. on Woodward Avenue and a depth of 100 ft. The plot is opposite the Highland Park plant of the Ford Motor Company. The sale at this price, which was the highest of several bids received, was not approved by the Council.

Some time ago Del A. Smith asked approval of the expenditure of \$280,000 for a west side carhouse site as a step in carrying out plans to split the Grand River-Jefferson Street car line into two lines. A site of 14 acres on Coolidge Avenue was suggested for the carhouse, together with a garage for Grand River line buses. A new carhouse having a capacity of 50 trains was planned.

## Railways Not Earning Fair Return on Investment

Statistics Covering Operations in 1926 Reveal Increase of Nearly 23,000,000 Car-Miles and 46,000,000 Bus-Miles—Total Service Mileage 2,087,282,159—Return on Investment Slightly Over 4 Per Cent for Total Group—Fares Are Still Too Low

TABLES summarizing the operations of the electric railway industry in 1926 show that the confidence of the electric railways in the future of their business is increasing. They are expanding their service and believe in their future. In particular the results shown in the separate statements for city lines indicate that their intensive efforts to develop their service are having their effect in increased earnings. Their net income was \$24,933,183 in 1926, compared with \$22,996,661 in 1925, an increase of 8.42 per cent.

Furthermore, many other companies are beginning to share in this improve-

ment, among them smaller companies which heretofore have had very little share in the better conditions which the large companies have been experiencing. This is brought out when the statement for the city companies is broken down into groups according to the size of the companies.

The intermediate group, comprising companies earning from \$250,000 to \$1,000,000 a year, showed an increase in their gross income, before fixed charges, of 2.21 per cent, which compares favorably with the decrease of 1.63 per cent in this item reported by the large city companies earning more

### Statistics Compiled by American Electric Railway Association

COMBINED OPERATIONS OF 353 COMPANIES				
	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$824,827,471	\$817,203,432	\$7,624,039	0.93
Railway operating expense.....	605,871,716	598,763,102	7,108,614	1.19
Net operating revenue.....	\$218,955,755	\$218,440,330	\$515,425	0.24
Operating ratio (per cent).....	73.45	73.27	0.18	0.25
Miles of track.....	32,096.12	32,155.46	(D) 59.34	(D)0.18
Revenue passengers.....	11,313,080,443	11,278,726,640	34,353,803	0.30
Total passengers.....	14,222,469,639	14,146,925,787	75,543,852	0.53
Car-miles (revenue).....	1,963,934,988	1,941,047,710	22,887,278	1.18

COMBINED OPERATIONS OF 353 RAILWAY COMPANIES AND 138 CONTROLLED BUS UNDERTAKINGS				
	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Operating revenue.....	\$857,062,186	\$836,181,160	\$20,881,026	2.50
Operating expense.....	638,222,627	618,635,798	19,586,829	3.16
Net operating revenue.....	\$218,839,559	\$217,545,362	\$1,294,197	0.59
Operating ratio (per cent).....	74.46	73.98	0.48	0.64
Miles of track and bus route.....	37,746	36,005	1,741	4.83
Revenue passengers.....	11,713,019,298	11,535,252,086	177,767,212	1.54
Total passengers.....	14,660,626,195	14,423,628,227	236,997,968	1.69
Car and bus-miles.....	2,087,282,159	2,017,475,646	69,806,513	3.46

than \$1,000,000 per year. Unfortunately for the smaller companies, they were unable to reduce their fixed charges as the larger companies did, but on the contrary had an increase in these charges of 5.51 per cent, which produced a decrease in their net income of 6.08 per cent, compared with an increase in the net income of the larger companies of 8.99 per cent. The failure to reduce their fixed charges is a misfortune that can probably be remedied by a careful study of their capital structure.

Edmund J. Murphy, the chief statistician of the American Electric Railway Association, writing in *Aera* for May, says that the significant thing to be noted is that in so far as purely operating results are concerned, this group was able to effect a greater improvement during the year than the larger companies did.

**SMALL COMPANIES LOSING GROUND**

The companies in the third city group, earning less than \$250,000 a year, have not yet begun to experience the better conditions which have had a favorable effect on the other two groups. These small companies are still losing ground. However, it should be borne in mind in connection with these companies that they constitute only a fraction of the electric railway industry. Out of a total of 8,919,016,768 passengers carried by 231 companies that have been classified into groups only 80,484,333, or about 0.9 per cent, were carried by companies in the Class C group. Their influence on any statement reflecting the operations of the whole industry, therefore, is practically negligible.

In terms of vehicle-miles operated, the industry rendered more service in 1926 than in any previous year of its history. The 353 companies operated 22,887,278 more car-miles last year than

they did in 1925. The total revenue car-miles operated in 1926 was 1,963,934,988, compared with 1,941,047,710 in 1925. In addition these companies operated 123,347,171 bus-miles, 46,919,235 more than in 1925. The total service-miles operated, therefore, was 2,087,282,159 in 1926, as against 2,017,475,646 in 1925, an increase of 69,806,513 service-miles.

**INCREASED SERVICE AT INCREASED EXPENSE**

The figures clearly indicate that the electric railways are using the motor bus to extend their transportation service. On the other hand, it is made equally clear that they are not curtailing or reducing their rail service, but on the contrary are giving more rail service, measured in car-miles, than they ever did. The number of miles of single track operated by these 353 companies in 1926 was 32,096, about 60 miles less than they operated in 1925. It represents about 78 per cent of all the electric railway track in the country. The number of miles of bus route operated in 1926 was 5,650, an increase of 1,800 miles. It is practically all additional service.

This additional service, of course, meant increased expenditure on the part of the railways. Operating costs remained approximately the same in both years; the average cost per car-mile was 33.77 cents in 1926 compared with 33.55 cents in 1925, an increase of only 0.7 per cent. The number of cars operated and the number of miles of track, as already indicated, were also approximately the same. The additional miles operated over this track, however, added about \$7,000,000 to the expense. In the bus end of the business 1,220 new buses were added during the year. If the investment per bus is put at \$7,500, as has been suggested by one authority, the probable amount of new

money put into the business in this one year was \$9,100,000. The additional mileage operated by the buses cost the companies about \$12,500,000 in increased operating expenses. As Mr. Murphy sees it the increased service rendered cost the companies \$19,500,000 in increased operating expenses and \$9,100,000 in new equipment, or a total of \$28,600,000.

On their rail and bus lines in 1926 these 353 companies alone carried 14,660,626,195 passengers, 236,997,968 more than they carried in 1925. Analysis of the complete returns makes it unmistakably clear that the revenue received does not cover the cost of the service. According to Mr. Murphy the return to the companies, taking the group as a whole, is in no way commensurate with the magnitude of the service rendered; is not sufficient, in fact, to enable the industry to finance itself properly. After expatiating on the facts, the author concludes that "with more than half of their capitalization represented by funded obligations, and with the cost of money running up to 7 per cent to them, it is not hard to understand why there is so little left for the stockholder." Out of 231 companies reporting only 45 paid any dividends.

**INADEQUACY OF FARES DISCUSSED**

In extenuation of this idea it is pointed out that the average fare per revenue passenger in 1926 was 7.1 cents. It was the same in 1925. There was no change. In 1912 the average fare per revenue passenger was 5.27 cents. In the intervening years, therefore, the average fare has risen about 35 per cent. At the present time, according to current indexes, the cost of materials used by electric railways is 53 per cent above pre-war levels, while wages are up approximately 110 per cent. Weighing these in the proportion

**Statistics Compiled by American Electric Railway Association**

**Part I—Combined Operating Reports of 231 Electric Railways for the Calendar Year 1926 Compared with 1925**

TABLE I—COMBINED INCOME STATEMENT

	1926		1925		—Increase or (D) Decrease—		Cents per Car-Mile		
	Total	Per Cent	Total	Per Cent	Total	Per Cent	1926	1925	Per Cent Increase
Railway operating revenue.....	\$554,654,259		\$554,286,419		\$367,840	0.07	44.83	45.01	(D) 0.40
Railway operating expense.....	417,744,496		413,196,152		4,548,344	1.10	33.77	33.55	0.66
Net operating revenue.....	\$136,909,763		\$141,090,267	(D)	\$4,180,504	2.96	11.06	11.46	(D) 3.49
Net revenue: Auxiliary operations.....	2,735,257		2,861,439	(D)	126,182	4.41	0.22	0.23	(D) 4.35
Taxes.....	34,693,231		34,851,679	(D)	158,448	0.45	2.80	2.83	(D) 1.06
Operating income.....	\$104,951,789		\$109,100,027	(D)	\$4,148,238	3.80	8.48	8.86	(D) 4.29
Non-operating income.....	10,370,196		9,739,426	(D)	630,770	6.47	0.84	0.79	6.33
Gross income.....	\$115,321,985		\$118,839,453	(D)	\$3,517,468	2.96	9.32	9.65	(D) 3.42
Deductions from gross income.....	92,734,764		95,622,222	(D)	2,887,458	3.02	7.50	7.76	(D) 3.35
Net income.....	\$22,587,221		\$23,217,231	(D)	630,010	2.71	1.82	1.89	(D) 3.70
Dividends.....	a\$15,632,999		b\$14,550,968	(D)	1,082,031	7.44	.....	.....	.....
Operating ratio (per cent).....	75.32		74.55	(D)	0.77	1.03	.....	.....	.....
Ratio: Net income to operating revenue.....	4.07		4.19	(D)	0.12	2.86	.....	.....	.....

a Reported by 45 companies. b Reported by 46 companies.

TABLE II—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1926		1925		—Increase or (D) Decrease—		Cents per Car-Mile		
	Total	Per Cent	Total	Per Cent	Total	Per Cent	1926	1925	Per Cent Increase
Way and structures.....	\$60,122,195		\$60,572,914	(D)	\$450,719	0.74	4.86	4.92	(D) 1.22
Equipment.....	55,051,245		53,372,489	(D)	1,678,756	3.15	4.45	4.33	2.77
Power.....	56,495,959		56,830,036	(D)	334,077	0.59	4.57	4.61	(D) 0.87
Conducting transportation.....	182,274,493		181,026,591	(D)	1,247,902	6.69	14.74	14.71	0.20
Traffic.....	2,235,114		1,905,539	(D)	329,575	17.30	0.18	0.15	0.20
General and miscellaneous.....	60,309,743		58,085,769	(D)	2,223,974	3.83	4.87	4.72	3.18
Transportation for investment—Cr.....	—510,696		—316,832	(D)	—193,864	61.19	0.04	0.03	33.33
Total operating expense.....	a\$417,744,496		b\$413,196,152	(D)	\$4,548,344	1.10	c33.77	d33.55	0.66

c Includes \$1,766,443 undistributed expense. d Includes \$1,719,646 undistributed expense.

in which they enter into the cost of operation, 93 per cent is reached as the average increase in cost of materials and labor. In order to produce the same net today as in 1912, therefore, the average fare should have increased 56 per cent instead of the 35 per cent it has increased. In other words, the average fare of this group of companies should have been 8.22 cents instead of 7.10 cents.

The author says:

**FINANCIAL STRUCTURES IMPROVED**

Undoubtedly this failure to raise fares in proportion to the increase in the cost of operation has been an important cause, if not the most important cause, of the present condition of the electric railways. On the other hand, it cannot be denied that many electric railway managements have neglected to take advantage of improved methods and equipment which might help them to better their condition. They have been especially derelict in the field of public relations, which is undoubtedly the master key to the solution of their problems. This is proved by what has been accomplished by the more progressive managements among both the larger and smaller properties.

Operating under conditions identical with those of the rest of the industry they have by their skill and their readiness to adopt new ideas succeeded in holding or increasing their traffic and enlisting the co-operation of their patrons so that as a result they have been able to secure more equitable consideration from their public authorities. Fortunately more and more managements are learning from these examples that at least part of their problem is solvable by their own efforts and they can be counted upon to put forth greater efforts along better directed lines in the future than they have in the past.

As the author sees it, the companies

are making serious efforts to recast their financial structures along more conservative lines as was recommended in the report of the Advisory Committee on Electric Railway Finance. As a result of this reduction in fixed charges the net income of these companies was only slightly less than in 1925, \$630,010, or 2.71 per cent less. The final net income in 1926 was \$22,587,221, as compared with \$23,217,231 in 1925. As has already been pointed out, if the city companies in the intermediate group could have effected a reduction in their fixed charges similar to that of the "A" companies this net income would have been increased materially.

Practically all of this net income was earned by the city companies alone. The straight out interurban lines as a group operated at a deficit of \$3,692,565, while the combination city and interurban companies earned a net income of only \$1,346,603, which was a decrease of 62.66 per cent from the net income of \$3,605,885 earned in 1925. Presumably this net was produced by the city operations in this group as distinct from the interurban divisions. It does not entirely offset the

deficit in the straight interurban group. This was done by the city companies, which earned a net income of \$24,933,183, an increase of \$1,936,522, or 8.42 per cent, over the net income of 1925.

**NET INCOME EARNED BY CLASS A COMPANIES**

Practically all of the net income of the city companies was earned by the Class A companies, the large companies having annual operating revenues of \$1,000,000 or more. This group produced \$24,212,808 of the net income of the whole city group, an increase of \$1,997,080, or 8.99 per cent. The Class B group of city companies, having annual revenues between \$250,000 and \$1,000,000, earned a net income of \$768,071, a decrease of 6.08 per cent from 1925, while the Class C group, with annual revenues of less than \$250,000 per

**Part II—City Lines—Combined Reports of 98 Companies Operating City Lines Exclusively**

TABLE V—COMBINED INCOME STATEMENT

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$396,636,549	\$394,400,201	\$2,236,348	0.57
Railway operating expense.....	292,176,016	288,334,927	3,841,089	1.33
Net operating revenue	\$104,460,533	\$106,065,274	(D) \$1,604,741	(D) 1.51
Net revenue: Auxiliary operations.....	946,992	1,038,075	(D) 91,083	(D) 8.77
Taxes.....	24,656,645	24,635,667	20,978	0.09
Operating income.....	\$80,750,880	\$82,467,682	(D) \$1,716,802	(D) 2.08
Non-operating income..	5,847,424	5,456,818	390,606	7.16
Gross income.....	\$86,598,304	\$87,924,500	(D) \$1,326,196	(D) 1.51
Deductions from gross income.....	61,665,121	64,927,839	(D) 3,262,718	(D) 5.03
Net income.....	\$24,933,183	\$22,996,661	\$1,936,522	8.42
Dividends.....	\$14,114,326	\$12,248,138	\$1,866,188	15.24
Operating ratio, per cent	73.66	73.11	0.55	0.75
Ratio: Net income to operating revenue...	6.29	5.83	0.46	7.89

a Reported by 29 companies.

TABLE III—OPERATING STATISTICS—231 COMPANIES

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles...	1,198,394,439	1,194,479,026	3,915,413	0.33
Total revenue car-miles	1,237,170,988	1,231,595,630	5,575,358	0.45
Revenue passengers <sup>1</sup> ...	7,091,099,427	7,159,077,205	(D) 67,977,778	(D) 0.95
Transfer passengers <sup>2</sup> ...	1,763,652,908	1,745,789,612	17,863,296	1.02
Total passengers <sup>3</sup> ...	8,919,016,768	8,971,547,179	(D) 52,530,411	(D) 0.59
Passenger revenue.....	\$517,836,495	\$518,970,998	(D) \$1,134,503	(D) 0.22
Revenue car-hours <sup>4</sup> ...	113,847,101	113,958,283	(D) 111,182	(D) 0.10
Passenger car-hours <sup>5</sup> ...	111,866,605	111,978,615	(D) 112,010	(D) 0.10
Miles of single track.....	24,082.70	24,045.60	37.10	0.15
Passenger cars operated <sup>6</sup>	28,362	28,401	(D) 39	(D) 0.14

a Average maximum number of passenger cars in service daily.

<sup>1</sup> Reported by 226 companies. <sup>2</sup> Reported by 156 companies.

<sup>3</sup> Reported by 199 companies. <sup>4</sup> Reported by 191 companies.

TABLE IV—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES—231 COMPANIES

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$554,654,259	\$554,286,419	\$367,840	0.07
Per mile of single track.....	\$23,031	\$23,051	(D) 20	(D) 0.09
Gross income.....	\$15,321,985	\$118,839,453	(D) 103,517,468	(D) 2.96
Per mile of single track.....	\$4,789	\$4,942	(D) 153	(D) 3.10
Passenger revenue.....	\$517,836,495	\$518,970,998	(D) 1,134,503	(D) 0.22
Per revenue passenger.....	17.1c	17.1c	.....	.....
Per total passenger.....	15.7c	15.7c	.....	.....
Per mile of single track.....	\$21,502	\$21,583	(D) 81	(D) 0.38
Per passenger car-mile.....	43.2c	43.4c	(D) 20	(D) 0.46
Per car operated.....	\$16,192	\$16,205	(D) 13	(D) 0.08
Per passenger car-hour.....	\$4.09	\$4.10	(D) 10	(D) 0.24
Revenue passengers.....	17,091,099,427	17,159,077,205	(D) 67,977,778	(D) 0.95
Per mile of single track.....	304,599	308,115	(D) 3,516	(D) 1.14
Per passenger car-mile.....	16.0	16.1	(D) 10	(D) 1.64
Per car operated.....	\$224,011	\$225,796	(D) 1,785	(D) 0.79
Per passenger car-hour.....	858	859	(D) 1	(D) 1.69
Total passengers.....	18,919,016,768	18,971,547,179	(D) 52,530,411	(D) 0.59
Per mile of single track.....	383,118	386,120	(D) 3,002	(D) 0.77
Per passenger car-mile.....	17.6	17.7	(D) 10	(D) 1.30
Ratio: Transfer passengers to revenue passengers (per cent).....	24.9%	24.4%	0.5%	2.05
Revenue car miles.....	1,237,170,988	1,231,595,630	5,575,358	0.45
Per mile of single track.....	51,372	51,219	153	0.30
Per car operated.....	\$38,599	\$38,385	214	0.56
Per car-hour.....	\$9.27	\$9.24	30	0.32
Car-hours.....	2113,847,101	2113,958,283	(D) 111,182	(D) 0.10
Per car operated.....	74,068	74,046	22	0.54

<sup>1</sup> 226 companies. <sup>2</sup> 199 companies. <sup>3</sup> 191 companies. <sup>4</sup> 198 companies. <sup>5</sup> 184 companies. <sup>6</sup> 195 companies. <sup>7</sup> 169 companies.

TABLE VI—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures.....	\$38,974,130	\$40,174,856	(D) \$1,200,726	(D) 2.99
Equipment.....	38,330,429	36,959,018	1,371,411	3.71
Power.....	37,970,036	38,095,788	(D) 125,752	(D) 0.33
Conducting transportation.....	135,453,291	133,530,457	1,922,834	1.44
Traffic.....	1,042,390	716,660	325,730	45.46
General and miscellaneous.....	38,741,674	37,268,505	1,473,169	3.95
Transportation for investment—Cr.....	—83,802	—114,209	(D) —30,407	(D) 26.62
Total operating expense.....	\$292,176,016	\$288,334,927	\$3,841,089	1.33

a Includes \$1,747,868 undistributed expense.

b Includes \$1,703,906 undistributed expense.

TABLE VII—OPERATING STATISTICS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles...	866,532,242	856,395,412	10,136,830	1.18
Total revenue car-miles	868,828,647	859,048,561	9,780,086	1.14
Revenue passengers <sup>1</sup> ...	5,540,229,291	5,554,933,217	(D) 14,703,926	(D) 0.26
Transfer passengers <sup>2</sup> ...	1,574,719,591	1,554,930,129	19,789,462	1.27
Total passengers <sup>3</sup> ...	7,115,948,882	7,109,863,346	6,085,536	0.05
Passenger revenue.....	\$385,787,072	\$383,948,891	\$1,838,181	0.48
Revenue car-hours <sup>4</sup> ...	85,018,306	84,572,717	445,589	0.53
Passenger car-hours <sup>5</sup> ...	84,800,918	84,346,146	454,772	0.54
Miles of single track.....	11,155.06	11,131.88	23.18	0.21
Passenger cars operated <sup>6</sup> .....	21,369	21,325	44	0.21

a Average maximum number of passenger cars in service daily. <sup>1</sup> Reported by 95 companies. <sup>2</sup> Reported by 76 companies. <sup>3</sup> Reported by 86 companies. <sup>4</sup> Reported by 88 companies.



year, had a deficit of \$47,696, which was \$10,805 greater than in 1925. All of the groups of the interurban companies operated at a deficit, while among the combination companies only the Class A group earned any net income. It amounted to \$2,388,006 and represented a decrease of 50.48 per cent from 1925.

It is quite apparent from the foregoing that only the larger city companies made any money in 1926—those in the class earning more than \$250,000 per year. This is the class that has been freest from competition and has been least affected by the use of the private automobile. It is also the class whose problems have received the most careful consideration, probably for the very reason that no satisfactory competitive service was available. In consequence the companies in this group,

not all of them, perhaps, but some of them, have succeeded in securing rates that in some measure meet the cost of service.

The rest of the companies in the other groups are struggling, with varying degrees of success, to give a service the cost of which is not covered by their revenues. Either these companies must receive adequate revenues or the service they give must be curtailed. The companies are making a commendable effort to improve and extend their service wherever there seems to be the faintest chance of justifying it; these efforts must receive the co-operation of the traveling public expressed in an adequate system of rates.

This is particularly true in the smaller communities and outlying districts. The tables show that the smaller companies are in a precarious situation, are

not in fact earning their fixed charges. Their condition is of course due to the omnipresent private automobile, whose inroads into the passenger traffic of the local street railways during the past ten years have cut down their sources of revenue. The problem presented is a serious one both to the companies themselves and the public they serve. In the case of the former there is a large investment at stake, while in the case of the public a decision has to be made as to whether they want and are willing to pay for a common carrier service, to which they have become accustomed but which they no longer patronize as intensively as they once did. It is a question of adequate rates or no service. When a certain fraction of the patrons of a railway cease to use it, the remaining fraction must naturally pay a higher per capita rate if they

**Part III—Interurban Lines—Combined Reports of 50 Companies Operating Interurban Lines Exclusively**

TABLE VIII—INCOME STATEMENT OF 50 ELECTRIC RAILWAYS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$20,861,035	\$20,985,530	(D) \$124,495	(D) 0.59
Railway operating expense.....	17,590,451	17,499,048	91,403	0.52
Net operating revenue.....	\$3,270,584	\$3,486,482	(D) \$215,898	(D) 6.19
Net revenue: Auxiliary operations.....	180,441	174,934	5,507	3.15
Taxes.....	1,236,234	1,293,882	(D) 57,648	(D) 4.46
Operating income.....	\$2,214,791	\$2,367,534	(D) \$152,743	(D) 6.45
Non-operating income.....	218,781	237,561	(D) 18,780	(D) 7.91
Gross income.....	\$2,433,572	\$2,605,095	(D) \$171,523	(D) 6.58
Deductions from gross income.....	6,126,137	5,990,410	135,727	2.27
Net income.....	*\$3,692,565	*\$3,385,315	(D) \$307,250	.....
Dividends.....	a\$178,323	a\$170,766	\$7,557	4.43
Operating ratio, (per cent)	84.32	83.39	0.93	1.11
Ratio: Net income to operating revenue.....	.....	.....	.....	.....

\* Deficit. a Reported by three companies.

TABLE IX—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures.....	\$3,101,579	\$3,215,090	(D) \$113,511	(D) 3.53
Equipment.....	2,140,856	2,009,202	131,654	6.55
Power.....	3,047,981	3,076,690	(D) 28,709	(D) 0.93
Conducting transportation.....	5,617,926	5,617,182	744	0.01
Traffic.....	356,658	360,250	(D) 3,592	(D) 1.00
General and miscellaneous.....	3,314,371	3,215,915	98,456	3.06
Transportation for investment—Cr.....	—7,495	—11,021	(D) —3,526	(D) 31.99
Total operating expense.....	a\$17,590,451	b\$17,499,048	\$91,403	0.52

a Includes \$18,575 undistributed expense.  
b Includes \$15,740 undistributed expense.

TABLE X—OPERATING STATISTICS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles.....	35,005,554	35,543,691	(D) 538,137	(D) 1.51
Total revenue car-miles.....	46,299,079	45,753,368	545,711	1.19
Revenue passengers.....	53,342,580	55,097,566	(D) 1,754,986	(D) 3.19
Transfer passengers <sup>1</sup> .....	1,284,850	1,293,212	(D) 8,362	(D) 0.65
Total passengers.....	55,929,159	57,710,107	(D) 1,780,948	(D) 3.09
Passenger revenue.....	\$12,958,716	\$13,477,663	(D) \$518,947	(D) 3.85
Revenue car-hours <sup>2</sup> .....	1,990,427	1,933,574	56,853	2.94
Passenger car-hours <sup>2</sup> .....	1,261,551	1,247,595	13,956	1.12
Miles of single track.....	3,212.48	3,211.53	0.95	0.03
Passenger cars operated <sup>3</sup> .....	616	595	21	3.53

a Average maximum number of passenger cars in service daily. <sup>1</sup>Reported by 16 companies. <sup>2</sup>Reported by 37 companies. <sup>3</sup>Reported by 40 companies

**Part IV—City and Interurban Lines—Combined Reports of 83 Companies Operating Combined City and Interurban Lines**

TABLE XI—INCOME STATEMENT

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$137,156,675	\$138,900,688	(D) \$1,744,013	(D) 1.26
Railway operating expense.....	107,978,029	107,362,177	615,852	0.57
Net operating revenue.....	\$29,178,646	\$31,538,511	(D) \$2,359,865	(D) 7.48
Net revenue: Auxiliary operations.....	1,607,824	1,648,430	(D) 40,606	(D) 2.46
Taxes.....	8,800,352	8,922,130	(D) 121,778	(D) 1.36
Operating income.....	\$21,986,118	\$24,264,811	(D) \$2,278,693	(D) 9.39
Non-operating income.....	4,303,991	4,045,047	258,944	6.40
Gross income.....	\$26,290,109	\$28,309,858	(D) \$2,019,749	(D) 7.13
Deductions from gross income.....	24,943,506	24,703,973	239,533	0.97
Net income.....	\$1,346,603	\$3,605,885	(D) \$2,259,282	(D) 62.66
Dividends.....	a\$1,340,350	b\$2,132,064	(D) \$791,714	(D) 37.13
Operating ratio, per cent	78.73	77.29	0.44	1.86
Ratio: Net income to operating revenue.....	0.98	2.60	(D) 1.62	(D) 62.31

a Reported by 13 companies. b Reported by 14 companies.

TABLE XII—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures.....	\$18,046,486	\$17,182,968	\$863,518	5.03
Equipment.....	14,579,960	14,404,269	175,691	1.22
Power.....	15,477,942	15,657,558	(D) 179,616	(D) 1.15
Conducting transportation.....	41,203,276	41,878,952	(D) 675,676	(D) 1.61
Traffic.....	836,066	828,683	7,383	0.89
General and miscellaneous.....	18,253,698	17,601,349	652,349	3.71
Transportation for investment—Cr.....	—419,399	—191,602	—227,797	118.89
Total operating expense.....	\$107,978,029	\$107,362,177	\$615,852	0.57

TABLE XIII—OPERATING STATISTICS

	1926	1925	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles.....	296,856,643	302,539,923	(D) 5,683,280	(D) 1.88
Total revenue car-miles.....	322,043,262	326,793,701	(D) 4,750,439	(D) 1.45
Revenue passengers <sup>1</sup> .....	1,497,527,556	1,549,046,422	(D) 51,518,866	(D) 3.33
Transfer passengers <sup>2</sup> .....	187,648,467	189,566,271	(D) 1,917,804	(D) 1.01
Total passengers.....	1,717,235,840	1,771,806,308	(D) 54,570,468	(D) 3.08
Passenger revenue.....	\$119,090,707	\$121,544,444	(D) \$2,453,737	(D) 2.02
Revenue car-hours <sup>3</sup> .....	26,838,368	27,451,992	(D) 613,624	(D) 2.24
Passenger car-hours <sup>3</sup> .....	25,804,136	26,384,874	(D) 580,738	(D) 2.20
Miles of single track.....	9,715.16	9,702.19	12.97	0.13
Passenger cars operated <sup>4</sup> .....	6,377	6,481	(D) 104	(D) 1.60

a Average maximum number of passenger cars in service daily. <sup>1</sup>Reported by 81 companies. <sup>2</sup>Reported by 63 companies. <sup>3</sup>Reported by 76 companies. <sup>4</sup>Reported by 63 companies.

Part V—Combined Statements of All Three Types of Companies on a Car-Mile Basis

TABLE XIV—INCOME STATEMENT OF 98 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 83 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease
	1926	1925		1926	1925		1926	1925	
Railway operating revenue...	45.65	45.91	(D)0.56	45.06	45.87	(D)1.77	42.59	42.50	0.21
Railway operating expense...	33.63	33.56	0.21	37.99	38.25	(D)0.68	33.53	32.85	2.07
Net operating revenue...	12.02	12.35	(D)2.67	7.07	7.62	(D)6.22	9.06	9.65	(D)6.11
Net revenue; Auxiliary operations...	0.11	0.12	(D)8.33	0.39	0.38	2.63	0.50	0.50	.....
Taxes.....	2.84	2.87	(D)1.03	2.67	2.83	(D)5.65	2.73	2.73	.....
Operating income.....	9.29	9.60	(D)3.23	4.79	5.17	(D)7.35	6.83	7.42	(D)7.95
Non-operating income.....	0.68	0.64	6.25	0.47	0.52	(D)10.62	1.34	1.24	8.06
Gross income.....	9.97	10.24	(D)2.64	5.26	5.69	(D)7.56	8.17	8.66	(D)5.66
Deductions from gross income	7.10	7.56	(D)6.08	13.23	13.09	1.07	7.75	7.56	2.51
Net income.....	2.87	2.68	7.09	*7.97	*7.40	.....	0.42	1.10	(D)61.82

\* Deficit.

TABLE XV—OPERATING EXPENSES OF 98 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 83 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease
	1926	1925		1926	1925		1926	1925	
Way and structures.....	4.49	4.68	(D)4.06	6.70	7.03	(D)4.69	5.60	5.26	6.46
Equipment.....	4.41	4.30	2.56	4.62	4.39	5.24	4.53	4.41	2.72
Power.....	4.37	4.43	(D)1.35	6.58	6.72	(D)2.08	4.81	4.79	0.42
Conducting transportation...	15.59	15.54	0.32	12.13	12.28	(D)1.22	12.79	12.82	(D)0.23
Traffic.....	0.12	0.08	50.00	0.77	0.79	(D)3.92	0.26	0.25	4.00
General and miscellaneous	4.46	4.34	2.76	7.17	7.03	1.99	5.67	5.38	5.39
Transportation for invest.—									
Cr.....	0.01	0.01	.....	0.02	0.02	.....	0.13	0.06	116.67
*Total operating expenses.	33.63	33.56	0.21	37.99	38.25	(D)0.68	33.53	32.85	2.07
* Undistributed expenses included in total.....	0.20	0.20	.....	0.04	0.03	.....			

want the service continued, especially if, as is actually the case, the cost of operation has meanwhile increased. If the rate necessary to maintain service is more than the service is worth to the people of the community, service must be abandoned.

This is true whether the line be a bus line or a railway. In communities where the riding habit is low and the density of traffic consequently below a certain minimum, the bus undoubtedly is more economical, but the point to be made here is that neither vehicle can

hope to operate successfully at the fare which formerly sufficed for the railway. When only a fraction of the former patrons now use the service, rates must be recast on a new basis. And in view of the fact that in many of these small communities there is some doubt as to whether any rate which patrons are willing to pay would yield a return on the investment, it would seem logical in these cases to leave the operator free to charge whatever rate he wants to so that he may experiment to determine if there is any rate that will yield a fair return. It is no longer a question of confiscation or extortion, but of whether or not there is an economic demand for the service.

The smaller companies as a group are not earning their fixed charges—are operating at a deficit which was larger in 1926 than in 1925. Their traffic continues to fall off rapidly. The paramount question with respect to them is whether or not they will survive. Unquestionably it would seem to be the part of wisdom for any of these small communities that want to keep their street car service—and the evidence is that all of them do—to relieve them of all burdensome restrictions and taxes and give them a free hand to see if they can work out their own salvation.

In conclusion Mr. Murphy says:

The problems of these small companies are, as has already been said, acute and serious, but at this point, perhaps, it should be said again that they constitute a very small fraction of the electric railway industry and what has been said about them in no way vitilates the statements that were previously made about the industry as a whole.

The other companies, the great bulk of the industry, while by no means prosperous, are nevertheless confidently going forward with plans for the future. For them the year 1926 was marked by unusually steady,

Part VI—Derived Ratios

TABLE XVI—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES

	98 City Companies			50 Interurban Companies			83 Companies Operating Both City and Interurban Lines		
	1926		Per Cent Increase or (D) Decrease	1926		Per Cent Increase or (D) Decrease	1926		Per Cent Increase or (D) Decrease
	1925		1925		1925	1925		1925	
Railway operating revenue.....	\$396,636,549	\$394,400,201	0.57	\$20,861,035	\$20,985,530	(D) 0.59	\$137,156,675	\$138,900,688	(D) 1.28
Per mile of single track.....	\$35,557	\$35,430	0.36	6,494	\$6,534	(D) 0.61	\$14,118	\$14,316	(D) 1.36
Gross income.....	\$86,598,304	\$87,924,500	(D) 1.51	\$2,433,572	\$2,605,095	(D) 6.58	\$26,290,109	\$28,309,858	(D) 7.13
Per mile of single track.....	\$7,763	\$7,898	(D) 1.71	\$758	\$811	(D) 6.54	\$2,706	\$2,918	(D) 7.27
Passenger revenue.....	\$385,787,072	\$383,948,891	0.48	\$12,958,716	\$13,477,663	(D) 3.85	\$119,090,707	\$121,544,444	(D) 2.02
Per total passenger.....	16.8c.	16.8c.	.....	24.3c.	24.5c.	(D) 0.70	27.8c.	27.7c.	1.30
Per mile of single track.....	15.3c.	15.3c.	.....	23.2c.	23.4c.	(D) 0.86	26.8c.	26.7c.	1.49
Per car-mile.....	\$34,584	\$34,491	0.27	\$4,034	\$4,197	(D) 3.88	\$12,258	\$12,528	(D) 2.16
Per passenger car-mile.....	44.5c.	44.8c.	(D) 0.77	37.0c.	37.9c.	(D) 2.35	40.1c.	40.2c.	(D) 0.25
Per car operated.....	\$16,036	\$15,981	0.34	\$18,112	\$19,306	(D) 6.18	\$7,165,527	\$7,166,552	(D) 0.77
Per passenger car-hour.....	\$44.09	\$44.11	(D) 0.49	\$6.44	\$6.52	(D) 1.23	\$3.98	\$3.98	.....
Revenue passengers.....	15,540,229,291	15,554,933,217	(D) 0.26	53,342,580	55,097,566	(D) 3.19	21,497,527,556	21,549,046,422	(D) 3.33
Per mile of single track.....	1529,448	1532,397	(D) 0.55	16,605	17,156	(D) 3.21	2,155,937	2,161,531	(D) 3.46
Per passenger car-mile.....	16.5	16.6	(D) 1.52	1.55	1.6	(D) 6.25	25.1	25.2	(D) 1.98
Per car operated.....	231,566	232,402	(D) 0.24	577,745	582,661	(D) 5.95	11,213,349	11,217,662	(D) 1.99
Per passenger car-hour.....	1060	1061	(D) 1.64	833	834	(D) 2.94	1253	1254	(D) 1.84
Total passengers.....	17,145,851,769	17,142,030,764	0.05	55,929,159	57,710,107	(D) 3.09	21,717,235,840	21,771,806,308	(D) 3.08
Per mile of single track.....	1682,888	1684,508	(D) 0.24	17,410	17,969	(D) 3.11	2,178,815	2,184,760	(D) 3.22
Per passenger car-mile.....	18.5	18.5	(D) 1.18	1.6	1.6	.....	25.9	25.9	.....
Ratio									
Transfer passengers to revenue passengers (per cent).....	28.4%	28.0%	1.43	2.4%	2.3%	4.35	12.5%	12.2%	2.46
Revenue car miles.....	868,828,647	859,048,561	1.14	46,299,079	45,753,368	1.19	322,043,262	326,793,701	(D) 1.45
Per mile of single track.....	77,887	77,170	0.93	14,412	14,247	1.16	33,149	33,682	(D) 1.58
Per car operated.....	\$36,320	\$35,908	1.15	\$6,202	\$6,202	(D) 0.93	\$44,013	\$44,352	(D) 0.76
Per car-mile.....	9.0	8.9	1.12	\$13.1	\$13.1	.....	\$39.9	\$39.9	.....
Car-hours.....	\$85,018,306	\$84,572,717	0.53	\$1,990,427	\$1,933,574	2.94	\$26,838,368	\$27,451,992	(D) 2.24
Per car operated.....	143,990	143,969	0.53	184,309	184,321	(D) 0.28	184,326	184,289	0.86

1 95 companies  
2 81 companies  
3 88 companies  
4 86 companies

5 40 companies  
6 37 companies  
7 63 companies  
8 75 companies

9 85 companies  
10 84 companies  
11 59 companies  
12 74 companies

13 76 companies  
14 77 companies  
15 32 companies  
16 60 companies

Part VII—Analysis of Income Statement

TABLE XVII—ANALYSIS OF OPERATING STATEMENT—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	42 Cos. with Revenues of More than \$1,000,000 a Year Each	31 City Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	25 Cos. with Revenues of Less than \$250,000 a Year Each	4 Cos. with Revenues of More than \$1,000,000 a Year Each	17 Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	29 Cos. with Revenues of Less than \$250,000 a Year Each	31 Cos. with Revenues of More than \$1,000,000 a Year Each	27 Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	25 Cos. with Revenues of Less than \$250,000 a Year Each
Railway operating revenue.....	0.59	(D) 0.30	(D) 1.67	1.04	(D) 1.04	(D) 2.28	(D) 1.10	(D) 1.86	(D) 3.85
Railway operating expense.....	1.44	(D) 0.15	(D) 2.06	(D) 0.32	1.66	(D) 1.21	(D) 0.95	(D) 1.34	(D) 2.12
Net operating revenue.....	(D) 1.64	2.26	0.26	6.30	(D) 14.75	(D) 12.10	(D) 7.75	(D) 3.96	(D) 31.66
Net revenue: Auxiliary operations	1.84	(D) 19.03	(D) 37.54	9.48	(D) 1.01	(D) 9.69	(D) 3.13	25.24	.....
Taxes.....	0.50	(D) 9.45	(D) 3.74	3.99	(D) 7.73	(D) 10.81	(D) 0.66	(D) 6.16	(D) 4.70
Operating income.....	(D) 2.25	2.34	1.60	7.51	(D) 18.03	(D) 13.38	(D) 9.92	(D) 2.58	.....
Non-operating income.....	7.58	(D) 0.09	(D) 26.75	18.00	(D) 16.24	(D) 61.64	(D) 0.95	14.07	63.85
Gross income.....	(D) 1.63	2.21	(D) 1.55	8.67	(D) 17.99	(D) 25.17	(D) 8.81	1.09	42.46
Deductions from gross income.....	(D) 5.41	5.51	1.38	3.94	1.16	(D) 0.63	1.19	(D) 0.33	2.21
Net income.....	8.99	(D) 6.08	.....	.....	.....	.....	(D) 50.48	.....	.....
Dividends.....	16.29	(D) 14.47	(D) 68.31	.....	4.43	.....	(D) 53.47	(D) 0.10	17.30
Operating ratio (per cent).....	0.84	(D) 0.44	(D) 0.40	(D) 1.35	2.73	1.10	2.08	0.54	1.80
Ratio: Net income to operating revenue.....	8.43	(D) 6.34	.....	.....	.....	.....	(D) 50.00	.....	.....

TABLE XVIII—OPERATING EXPENSES BY PRIMARY ACCOUNTS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	(D) 3.44	7.50	(D) 1.58	(D) 11.42	1.30	(D) 4.47	5.88	0.98	(D) 0.19
Way and structures.....	(D) 3.44	7.50	(D) 1.58	(D) 11.42	1.30	(D) 4.47	5.88	0.98	(D) 0.19
Equipment.....	3.88	1.54	(D) 2.19	14.00	3.47	1.67	1.09	2.31	0.20
Power.....	0.17	(D) 6.94	(D) 2.76	(D) 0.99	(D) 0.08	(D) 3.34	(D) 0.83	(D) 2.56	(D) 3.00
Conducting transportation.....	1.56	(D) 0.76	(D) 1.46	0.60	(D) 0.52	0.43	(D) 1.41	(D) 2.34	(D) 5.47
Traffic.....	45.05	58.85	18.23	(D) 11.90	4.31	0.31	3.29	(D) 9.41	(D) 20.94
General and miscellaneous.....	4.31	(D) 0.59	(D) 3.41	0.82	5.66	(D) 0.98	4.83	(D) 2.73	1.14
Transportation for investment—Cr.....	(D) 27.09	381.68	.....	.....	(D) 26.98	.....	122.77	12.35	(D) 82.42
Total operating expense.....	1.44	(D) 0.15	(D) 2.06	(D) 0.32	1.66	(D) 1.21	0.95	(D) 1.34	(D) 2.12

TABLE XIX—OPERATING STATISTICS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	1.18	1.64	(D) 1.07	0.08	(D) 3.23	(D) 0.24	(D) 1.66	(D) 1.99	(D) 7.17
Passenger car-miles.....	1.18	1.64	(D) 1.07	0.08	(D) 3.23	(D) 0.24	(D) 1.66	(D) 1.99	(D) 7.17
Total revenue-car miles.....	1.12	1.77	(D) 1.16	1.86	0.84	1.16	(D) 1.24	(D) 1.79	(D) 5.83
Revenue passengers.....	(D) 0.27 <sup>1</sup>	0.09	(D) 1.93 <sup>7</sup>	8.24	(D) 1.84	(D) 14.62	(D) 2.90 <sup>18</sup>	(D) 6.14	(D) 10.09 <sup>18</sup>
Transfer passengers.....	1.29 <sup>2</sup>	0.75 <sup>5</sup>	(D) 2.80 <sup>8</sup>	(D) 13.52 <sup>10</sup>	1.22 <sup>12</sup>	(D) 4.05 <sup>15</sup>	(D) 0.19	(D) 9.31 <sup>17</sup>	(D) 6.28 <sup>21</sup>
Total passengers.....	0.06 <sup>1</sup>	0.16	(D) 2.00	7.82	(D) 2.03	(D) 13.69	(D) 2.60 <sup>18</sup>	(D) 6.45	(D) 10.72 <sup>18</sup>
Passenger revenue.....	0.51	0.10	(D) 1.26	(D) 0.16	(D) 5.97	(D) 5.37	(D) 1.73 <sup>18</sup>	(D) 3.01	(D) 8.89
Revenue car-hours.....	0.53 <sup>3</sup>	1.04 <sup>5</sup>	(D) 2.36 <sup>8</sup>	6.99 <sup>10</sup>	3.21 <sup>12</sup>	(D) 0.86 <sup>15</sup>	(D) 2.03	(D) 2.15	(D) 7.91 <sup>7</sup>
Passenger car-hours.....	0.55 <sup>3</sup>	0.89 <sup>5</sup>	(D) 2.65 <sup>8</sup>	8.96 <sup>10</sup>	(D) 0.22 <sup>12</sup>	0.12 <sup>18</sup>	(D) 2.01 <sup>19</sup>	(D) 1.92	(D) 8.62 <sup>7</sup>
Miles of single track.....	0.30	0.53	(D) 4.27	0.68	(D) 0.09	(D) 0.13	(D) 0.77	4.17	(D) 2.61
Passenger cars operated a.....	0.12 <sup>4</sup>	2.15 <sup>5</sup>	(D) 1.94 <sup>7</sup>	5.44 <sup>11</sup>	3.42 <sup>14</sup>	1.03 <sup>17</sup>	(D) 1.42 <sup>20</sup>	(D) 1.41 <sup>18</sup>	(D) 10.07 <sup>7</sup>

a Average maximum number of passenger cars in service daily.

- <sup>1</sup> Reported by 41 companies.
- <sup>2</sup> Reported by 39 companies.
- <sup>3</sup> Reported by 40 companies.
- <sup>4</sup> Reported by 37 companies.
- <sup>5</sup> Reported by 25 companies.
- <sup>6</sup> Reported by 28 companies.
- <sup>7</sup> Reported by 23 companies.
- <sup>8</sup> Reported by 12 companies.
- <sup>9</sup> Reported by 21 companies.
- <sup>10</sup> Reported by 1 company.
- <sup>11</sup> Reported by 3 companies.
- <sup>12</sup> Reported by 7 companies.
- <sup>13</sup> Reported by 12 companies.
- <sup>14</sup> Reported by 15 companies.
- <sup>15</sup> Reported by 8 companies.
- <sup>16</sup> Reported by 24 companies.
- <sup>17</sup> Reported by 22 companies.
- <sup>18</sup> Reported by 30 companies.
- <sup>19</sup> Reported by 26 companies.
- <sup>20</sup> Reported by 22 companies.
- <sup>21</sup> Reported by 16 companies.
- <sup>22</sup> Reported by 17 companies.

even operating conditions and some progress was made by certain companies in improving their situation. Their future progress depends upon the general attitude of the public toward them and the degree of sympathetic co-operation extended to them. There are signs that the peak of the public enthusiasm for motor buses was reached in the latter part of 1925 and that since then there has been a lot of sober second thought on the advantages of encouraging bus operation at the risk of jeopardizing the existence of the street railways. If this means that the problems of the latter are to receive more adequate consideration in the future, the confidence of the railways in increasing their service may be justified.

**Net Income Higher.**—For the nine months period ended March 31, 1927, operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., were \$34,732,911, against \$33,295,344 for a similar period ended March 31, 1926. Total operating expenses increased from \$21,709,745 to \$22,477,848 for nine months period ended March 31, 1927. After consideration of income deductions net in 1927 was \$4,686,588 and \$4,096,251 for 1926.

**Chicago Surface Lines Report Increased Business in March**

Total rides on the Chicago Surface Lines in March were 137,027,327, compared with 131,839,632 in the corresponding month in 1926 and 123,768,252 in February of this year. Service was increased to the extent of 432,760 car-miles, or 19,127,922 seat-miles, compared with the similar month of last year, much of the increase being in the off-peak hours to meet increased demand for service in the middle of the day and in the evening. There has been an increase in riding during the first three months of the current year of approximately 2.8 per cent over the corresponding period of 1926.

Gross earnings for the month of March were \$5,334,409, compared with \$5,127,371 for the similar month last year. Divisible receipts were \$387,898, compared with \$154,141 in March, 1926. In February gross earnings were \$4,

842,125 and divisible receipts were \$304,380. The companies spent \$687,291 during March on right-of-way, structures and equipment.

**Balance in Detroit Increases**

For the year ended March 31, 1927, the total operating revenue of the Department of Street Railways at Detroit, Mich., was \$24,588,298, against \$24,009,932 for the year ended March 31, 1926. These figures included a railway operating revenue and a coach operating revenue in 1927 of \$21,999,438 and \$2,588,859, against \$22,895,754 and \$1,114,178 respectively. Total revenue from all sources was \$24,866,897, against \$24,217,265 in the 1926 period. Total operating expenses were \$19,007,825, against \$18,231,202. The 1927 expense figure included a railway item of \$16,619,335 and a coach item of \$2,388,489. The 1926 total expense figure was made up of \$17,132,113 for railway and

\$1,099,088 for coach. Net revenue from all sources was \$5,859,072, against \$5,986,062 for the period ended March 31, 1926. The net income was \$3,189,417, against \$3,319,150. Balance for the period ended March 31, 1927, was \$589,189, against \$572,038. Railway passengers numbered 471,992,768 in 1927 and 492,491,738 in 1926. Coach passengers numbered 32,576,380 for the year ended March 31, 1927, against 14,827,100 for the year ended March 31, 1926. Railway revenue car-miles totaled 51,043,152 in 1927, against 54,729,579 in 1926. Coach-miles totaled 10,312,493, against 4,817,942 in the 1926 period.

### Ohio Road Sold Under Foreclosure

J. P. Longon purchased the Cincinnati, Georgetown & Portsmouth Railroad at receiver's sale on April 25 for \$225,000, the appraised valuation. No other bid was offered. Title will not pass to the new owners until the sale has been approved by Judge Stanley Struble of the Common Pleas Court. The sale was ordered as the result of a suit to foreclose the mortgage filed by the Union Savings Bank as trustee for the bondholders after continued failure to earn interest on bonded debt.

The C., G. & P. is a 42-mile interurban connecting Cincinnati with Georgetown, Ohio. Indications are that operation will continue under control of the new owners, said to represent the bondholders.

### Disposition of Broadhead Properties Discussed

Accounting made to the court in connection with the estate of S. B. Broadhead, largely interested in the electric railways centering in Jamestown, N. Y., shows that except for two which were abandoned the lines have become self-sustaining from an operating viewpoint and now require no further advances from the estate for their operation. There have been, however, and must continue to be some substantial advances for capital expenditures such as new cars and equipment in order to render the roads successful from an operating viewpoint.

As to the Jamestown, Westfield & North Western Railroad, the report contains a large amount of operating detail but summarizes the position of the administrators as follows:

It was realized that this road was dependent upon its freight business for its future success as the passenger business was diverted by private automobile. An appeal was made to the manufacturers of Jamestown to sustain this railroad by giving it a fair proportion of their freight. This appeal met with a substantial response, the freight revenues of the road have largely increased, a new locomotive has been built entirely in the shops of the company from old materials on hand and the company is now in position to handle large quantities of freight.

It is recommended, and unless instructed to the contrary, your administrators will continue its operation until further accounting. But unless its operation yields better net results than heretofore, it will not recommend its continuance indefinitely. Permanency of operation can only follow from two things. First, substantial increase in freight patronage; second, relief from exorbitant taxation—it being assessed in nearly every tax district out of all proportion to its earning value. Effort will be directed to accomplish both.

As to the Jamestown Street Railway, the report states that the company en-

joyed an increase of \$25,778 in net revenues in 1926 as against 1925. The report recommends the continuance of the Jamestown Street Railway and of the Jamestown Motor Bus Company by the estates.

### Rockford Property Acquisitions Expanded

Milton J. Ellis and his associates, operating the local railway at Rockford, Ill., and the interurban system, have purchased the interurban line between Belvidere and Elgin, Ill., with about 36 miles of track from Bion J. Arnold and will take over the property on May 1. The Rockford & Belvidere Railway and the Elgin & Belvidere Electric companies are consolidated by the deal and offices will be established in Rockford. Negotiations are now under way with the Chicago, Aurora & Elgin third-rail system for through service from Chicago to Freeport and this deal is said to have been favorably received by the third-rail officials. A new company will be formed to operate the line, working with \$1,000,000 capitalization, which will issue \$400,000 of 6 per cent mortgage bonds and \$600,000 common stock. Rehabilitation of the line and establishment of freight service between Rockford and the eastern points are contemplated. Some of the eight new and fast interurban cars now being manufactured for the Ellis lines will probably be put in service on the Freeport-Elgin line.

### \$55,953 Added to Youngstown Value.

—Value of the Youngstown Municipal Railway, Youngstown, Ohio, was increased \$55,953 when the Youngstown City Council approved plans for a garage on Mahoning Avenue. The money is to purchase pumps, large storage tanks and equip a machine shop to make repairs on all buses.

**To Increase Capital.**—The American & Foreign Power Company, Inc., under the supervision of the Electric Bond & Share Company, has called a special meeting of stockholders for May 2 to vote on an increase in the authorized stock. This company controls railway properties in Cuba. It proposes to issue 200,000 shares of a new class of \$6 preferred stock and to increase the second preferred stock, series A, to 1,600,000 shares from 120,000 shares and to increase common stock to 8,300,000 from 1,800,000 shares. Plans are being formulated and steps taken looking to the acquisition by the company of additional hydro-electric power and other utility properties in foreign countries.

**Service in Peterborough Ceases.**—Negotiations between the city of Peterborough, Ont., and the Hydro-Electric Power Commission looking toward the sale of the Peterboro Radial Railway System failed and service has ceased. It is claimed by the Hydro-Electric that the railway is operated at a loss of \$50,000 a year. The city offered \$150,000 for both railway and gas works. The price set by the Hydro-Electric is \$575,000 for the two. It is believed an offer will be made to a private bus company. If the Hydro-Electric fails to operate cars for 90 days the fran-

chise lapses and the city may take over the system.

**Profit in Ogden.**—A profit of \$8,613 was realized by the Utah-Idaho Central Railroad, Ogden, Utah, for the period between Nov. 21, 1926, and Jan. 1, 1927, according to a report for that period made to the Public Utilities Commission of Utah. This company took over the property of the old concern, known as the "Utah-Idaho Central Railroad Company" at that time, the old company reporting to the commission for the preceding months of the year. Operating revenues of the new concern from Nov. 21 to the last of the year amounted to \$78,081, while operating expenses are listed at \$60,644. This left a net operating revenue of \$17,437, from which taxes amounting to \$8,039 had to be deducted. Non-operating income for the period was \$23, which brought the gross income to \$9,421. From this sum \$807 interest on the funded and unfunded debt was deducted, leaving the balance noted.

**Deficit in Toledo in March.**—Weather propitious for walking and increased use of private automobiles brought about a decrease in patronage for the Community Traction Company at Toledo, Ohio, in March and resulted in a deficit from operations of \$12,190 after caring for various funds set up in the Milner service-at-cost ordinance. The total deficit in the stabilizing fund is now \$960,834.

**Would Scrap Certain Lines.**—The Hudson Valley Railway plans to curtail further its lines in the district of Albany, N. Y., if the stockholders and the Public Service Commission approve. The plan is to scrap the Fort Edward-Stillwater line and to do away with the Glens Falls-South Glens Falls line and the South Street railroad station line in Glens Falls. These proposals will be submitted to stockholders at a meeting in New York City on May 25. The commission some time ago denied the application for discontinuance of the Lake George-Warrensburg line and the Greenwich-Thomson line. There has been a renewal of this petition.

**Gross Earnings Show Increase.**—For the first time since the city of Seattle, Wash., has been operating the Seattle Municipal Street Railway system a quarterly report shows an increase in gross earnings. The financial statement for January, February and March gives the total gross revenue as \$1,426,646, an increase of \$1,902 over that of the first three months in 1926. The expense of operation for the first quarter of this year was \$1,000,501, against \$1,088,040 in 1926, a decrease of \$87,539. The payroll total was \$730,725, which is \$85,705 less than one year ago.

**Net Income Lower.**—For the nine months ended March 31, 1927, passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was \$8,519,645, against \$8,462,853 for a similar period of the year previous. Operating expenses and taxes increased from \$7,226,214 in 1926 to \$7,421,084 in the 1927 period. After the consideration of income deductions the net corporate income was \$862,561, against a net income of \$1,050,388 for the nine months ended March 31, 1926.

## Personal Items

### Personnel Changes Announced in Duluth

With the recent resignation of H. H. Brown as superintendent of the Duluth Street Railway, Duluth, Minn., announcement was made by Herbert Warren, vice-president and general manager, of several changes in the company's organization. W. S. Byers will be Mr. Brown's successor and B. G. Noah will fill Mr. Byers' present position as assistant to Mr. Warren. The changes are effective on May 1.

Mr. Byers, who will take charge of the superintendency of the Duluth di-

neering at the Armour Institute of Technology.

H. H. Brown, who leaves the traction field to become associated with a large Eastern manufacturing concern, went to Duluth in 1911 as a clerk in the general manager's office. He has been superintendent since 1916 and has taken a leading part in the safety campaigns in the city. He is chairman of the statistical committee of the Chamber of Commerce safety bureau and has been on the executive committee ever since the organization of the safety division. Most of his time will be spent in Chicago.

James Ashton Greig was born in Chicago in 1892. He completed his high school work at New Rochelle and later moved to Chicago. He was graduated from Northwestern University in the course of letters and science. During his summer vacations he served as newspaper reporter.

### Herbert Tuohy Assistant Traffic Manager at Springfield

Herbert Tuohy, former traffic commissioner of the Springfield Chamber of Commerce, has been appointed assistant traffic manager of the Illinois Traction System. Mr. Tuohy has offices at Springfield and Chicago, but devotes the major portion of his time to the Springfield office, in charge of W. H. Wylie, traffic manager.

Because of an extensive and varied experience in transportation and rate



H. H. Brown



W. S. Byers



B. G. Noah

vision, has been an employee of the railway for more than 26 years. He has been assistant to Mr. Warren for a number of years and is well known throughout the city.

B. G. Noah, who is now a resident of Chicago, will go to Duluth on May 2 to assume his duties. He was in the employ of the Chicago City Railway and the Chicago Surface Lines from January, 1914, to February, 1917, as engineer of tests. The duties of this position consisted of making electrical and mechanical tests of substation transforming and converting equipment. In February, 1917, and up to July, 1917, he was engaged by the sanitary district of Chicago as testing engineer in charge of electrolysis mitigation. During the next two years he was in the aviation corps of the army and saw sixteen months service in France.

From July, 1919, up to the present time he has been with the Chicago Surface Lines as engineer of tests in charge of substation design and installation, his duties including the preparation of power statistics and distribution engineering. While in the employ of the Chicago Surface Lines he has also been consulting engineer for the Hammond, Whiting & East Chicago Railway. Mr. Noah completed his high school education in Kansas City, Mo., and in 1914 completed a four years course in electrical engi-

### J. A. Greig Resigns from Toledo Company

James Ashton Greig has resigned as sales manager of the Community Traction Company, Toledo, Ohio, in charge of the new commercial department. He will leave this post on June 1. At the time of his appointment at Toledo, Mr. Greig had been editor of *Electric Traction* for three years. His work in Toledo was to help secure the proper balance between production and marketing, for he had had many years of experience in railway and merchandising work.

In his early days Mr. Greig decided law was to be his calling and to study for this career he took a position with the Marconi Wireless Telegraph Company, now the Radio Corporation of America. His radio experience shifted his viewpoint to engineering and in 1913 he received his engineering degree at the University of Wisconsin. He later was employed by the Western Electric Company. Then the war came and he was assigned to Radio Company A, 89th Infantry Division. At the close of the war he went to Chicago and was employed by the Fred M. Randall Advertising Agency as merchandising manager.

Mr. Greig joined *Electric Traction* in 1922 as editorial assistant. Later in that year he was made associate editor and the following year editor.

matters, Mr. Tuohy is especially well fitted for the new position, which is created as part of the Illinois Traction System's plan for intensive promotion of its services. The Illinois Traction System is continually entering a wider range of transportation activities, especially in the handling of through freight shipments, which requires an augmented staff of transportation experts.

Mr. Tuohy's first railway experience was gained in Peoria, Ill., where he was associated with the Rock Island, Chicago & Alton, and Illinois Central railways. In 1915 he went to Springfield, first as rate clerk and then as examiner and transportation expert for the Illinois Commerce Commission. Since 1921 he has served as traffic commissioner for the Springfield Chamber of Commerce, in which position he has been especially successful in maintaining relations between the shippers and the railways and at the same time protecting the interests of the city from a rate standpoint. During the World War Mr. Tuohy served with the A.E.F. forces in France.

Amon Ing has been reappointed by Governor Baker of Missouri as a member of the Missouri Public Service Commission. His term will expire on April 15, 1933. Judge Ing was appointed to the board several years ago to fill an unexpired term.

## 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

### Space Applications for Cleveland Show Ready

Applications for show space at the Cleveland convention will be mailed to all members of the American Electric Railway Association on May 16. Thirty days are allowed for filing. All applications received up to the close of business on June 15 will be awarded space by the exhibit committee, which is scheduled to meet June 22 to make the official allotment. If any space remains unsold after the initial allotment has been made, it will be assigned by the director of exhibits in the order in which applications are received.

Exhibits will occupy both floors of the Cleveland Auditorium as well as the entire new west wing. The two buildings will be connected with a covered passageway in which there will be operating maintenance of way exhibits. Track space for the display of street cars will also be provided.

Railway materials, cars, buses and bus accessories, shop tools, garage equipment, etc., will be shown as well as many other items pertinent to the transportation industry. An unusually large and varied display is expected.

Hotel circulars giving rates for the convention together with application forms for reservations have just been mailed to the membership. This is the 46th annual gathering of the association. The convention dates are Oct. 3-7, inclusive. The show opens at 12 noon Saturday, Oct. 1, affording exhibitors an additional day and a half to show their wares.

### \$500,000 Car Building Program in Milwaukee

With its new Burlington-East Troy cut-off scheduled for completion by mid-summer and a still greater use of its Waukesha - Oconomowoc - Watertown Rapid Transit line looked for this year preparations are under way by the Milwaukee Electric Railway & Light Company to have sufficient equipment on hand to meet any demands made upon it by the public. For the present, plans in this direction include the addition of nineteen cars identical to those now in use on the Rapid Transit line to cost \$442,000. All of this equipment, which will comprise fourteen motor cars and five trailers, will be built in the company's Cold Spring shops, except four all-steel motor cars which are now being built by the St. Louis Car Company for delivery in July.

Completion of the present car construction program will give the company a total of 45 de luxe cars, interchangeable from one line to another. Improvements in cars provide for the installation of treadle equipment, together with new seating and lighting

equipment on 45 city cars. Conversion of these cars for one-man operation will cost approximately \$117,500. With this work completed more than half of the company's city cars will be of the one-man type.

### Chicago Surface Lines Adds New Automatic Sub

A new 4,000-kw. automatic substation, the first of its kind ever used on the system, has recently been completed and placed in operation by the Chicago Surface Lines on Grimm Avenue, Chicago. It furnishes power for three important cross-town lines in the north

and northwest portions of the city, all formerly fed from the substation at Crawford and Ravenswood Avenues.

The new substation was built at a cost of approximately \$143,000. It is equipped with two 2,000-kw., 600-volt, 60-cycle synchronous converters. The various units cut in automatically as the need for additional power is felt. The station is equipped with a high-speed supervisory control system which enables the operator at the Crawford Avenue substation, 2½ miles distant, to control both units and all feeder sections.

The erection of the substation is in line with the policy of the Chicago Surface Lines management to keep pace with demands, in spite of the handicap of an expiring franchise. The addition of 445 new cars and an increase of about 500,000 seat-miles operated in more than three years necessarily calls for a marked increase in power. Power consumed by Surface Lines operations last year was approximately 560,000,000 kw.-hr.

## Metal Prices Sag in Dull Market

COPPER, lead, zinc, tin, silver and platinum were all selling on April 27 at lower prices than last week, both in New York and in London, but the lower prices are not attracting many buyers.

Copper was held at 13½ cents Valley delivery last Thursday, but as early as Friday at least one seller was willing to book orders at 13 cents and did a fair business during the next few days at that level, as most others were quoting 13½ cents. Producers' ranks gradually weakened to the 13-cent level, however, and that price was general on April 27.

Business has reverted to the quietude that characterized the market in March and no great activity is expected until the April statistics are issued about May 10. Indications are that these will be distinctly favorable and will confirm the March trend. Companies manufacturing brass and sheet copper report a continuance of excellent business, fully up to the 1926 rate, though wire business is slack. May

copper seems to be pretty well contracted for; producers are well sold on this position and consumers do not seem anxious for prompt shipment. One good block of copper was sold for delivery as far ahead as July and August.

The export market has been lifeless until April 27, when the export association reduced its c.i.f. price from 13.50 to 13.35 cents, resulting in a little more buying. Most of the inquiry abroad is for prompt shipment.

### CURTAILMENT IN ZINC PRODUCTION

Zinc sold at varying prices between 6.25 and 6.35 cents at St. Louis on April 21, with the largest volume at the lower limit. Since then the market has gone as low as 6.10 cents for all deliveries, at which level a fair business was done on Monday and Tuesday. Sales have been at about the same rate as during the last five weeks and well below the average rate for the year to date. Further curtailment in production is likely as ore approaches \$40 a ton, \$41 being last Saturday's figure; this is the logical remedy for the situation. High grade is now offered at 8 cents delivered in the East.

A moderate volume of lead business was transacted in the St. Louis market during the week ended April 27, though at definitely lower price levels, 6.55 cents being the prevailing figure since April 25. The New York market has been exceedingly dull and except for contract sales very little lead has brought the Smelting company's official New York price of 7 cents. A price of 6.55 cents in St. Louis is equivalent to 6.90 cents in New York and this is very close to parity with London for foreign ore lead.

The speculative situation in London caused a decline in tin to a low of 66½ cents for prompt Straits on April 25. Since then both the foreign and domestic markets have recovered some of the lost ground.

### METAL, COAL AND MATERIAL PRICES F. O. B. REFINING

Metals—New York		April 26, 1927
Copper, electrolytic, cents per lb.	12.775	
Copper wire, cents per lb.	15.125	
Lead, cents per lb.	6.95	
Zinc, cents per lb.	6.46	
Tin, Straits, cents per lb.	66.75	

### Bituminous Coal, f.o.b. Mines

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.475
Somerset mine run, Boston, net tons	1.875
Pittsburgh mine run, Pittsburgh, net tons	2.25
Franklin, Ill., screenings, Chicago, net tons	2.50
Central, Ill., screenings, Chicago, net tons	2.00
Kansas screenings, Kansas City, net tons	2.50

### Materials

Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$5.50
Weatherproof wire base, N. Y., cents per lb.	16.75
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.30
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	\$0.645

### Virginia Electric Power Company Operating New Cars

As recorded in the JOURNAL for March 26, the American Car Company of St. Louis has delivered five of the ten cars ordered in December, 1926, by the Virginia Electric & Power Company, Norfolk, Va. The new rolling stock is of the closed, city passenger, semi-steel type with a seating capacity of 44. Almost immediately upon receipt the cars were put in service on the Port Norfolk and Pinners Point line of the Portsmouth division. Prior to this, the company staged a parade for the new equipment, and had as its guests City Manager Hanrahan, representatives of civic associations, and the press. The hosts on this occasion were J. Frank McLaughlin, then vice-president Norfolk division; T. Norman Jones, general manager Norfolk division, and S. J. Pope. Before the trial run and parade, an inspection was held at the intersection of High and Court Streets, Portsmouth. The trial trip was made around the Crawford Street loop, thence to Mount Vernon Avenue on High Street and return. Complete specifications are as follows:

Type of car... One-man, two-man, motor, passenger, city, single-end, double-end, double-truck  
 Builder of car body... American Car Co., St. Louis, Mo.  
 Date of order... Dec. 1, 1926  
 Date of delivery... March 1, 1927  
 Weight, total... 36,000 lb.  
 Bolster centers... 19 ft. 7 1/2 in.  
 Length over all... 41 ft. 8 1/2 in.  
 Truck wheelbase... 5 ft. 4 in.  
 Width over all... 8 ft. 5 in.  
 Height, rail to trolley base... 11 ft. 0 in.  
 Body... Semi-steel  
 Roof... Arch  
 Doors... End  
 Air brakes... Westinghouse  
 Armature bearings... Plain  
 Axles... Brill  
 Bumpers... Channel  
 Car signal system... Faraday  
 Car trimmings... Statuary bronze  
 Control... Westinghouse K-25  
 Couplers... Pocket



Front platform showing control equipment of the new Virginia Electric & Power Company's cars, five of which were delivered late in March by the American Car Company of St. Louis. These cars were immediately put in service on the Port Norfolk and Pinners Point line

Curtain fixtures... National Lock Washer ZO	Motors... Four Westinghouse, No. 510, inside hung
Curtain material... Pantasote	Safety car devices... Safety Car Devices Co.
Destination signs... Hunter	Sanders... Ohio Brass
Door mechanism... National Pneumatic	Sash fixtures... O. M. Edwards
Doors... Folding	Seats... Heywood-Wakefield
Fare boxes... Johnson	Seating material... Genuine leather
Finish... Enamel	Slack adjusters... Westinghouse
Floor covering... Linoleum	Springs... Brill
Gears and pinions... Westinghouse	Steps... Folding
Hand brakes... Peacock staffless	Step treads... Feralun
Hand straps... Rico	Trolley catchers... Ohio Brass
Heaters... Consolidated	Trolley base... U. S. No. 20
Headlights... Ohio Brass ZP	Trucks... Brill No. 177 EIX
Headlining... Haskellite	Ventilators... American Car Co., six per car
Interior trim... Mahogany	Wheels... Standard 27 in.
Journal bearings... Plain	Wheelguards... H-B lifeguards
Journal boxes... Symington	Special devices... E. Minler window cleaners
Lightning arresters... Westinghouse	



Latest city type passenger car to be placed in service by the Virginia Electric & Power Company on its Portsmouth division

## \$77,550,581 in General Electric Orders in First Quarter

Orders received by the General Electric Company for the three months ended March 31, 1927, total \$77,550,581, compared with \$86,433,658 for the same quarter in 1926, a decrease of 10 per cent.

The statement of earnings for the first three months of 1927 follows:

Net sales billed .....	\$72,474,474
Less: Cost of sales billed, including operating, maintenance and depreciation, charges, reserves and provision for all taxes .....	63,641,300
Net income from sales .....	\$8,833,173
Other income, less interest paid and sundry charges .....	2,838,557
Profit available for dividends .....	\$11,671,731
Less: Cash dividends on special stock .....	643,587
Profits available for dividends on common stock .....	\$11,028,143

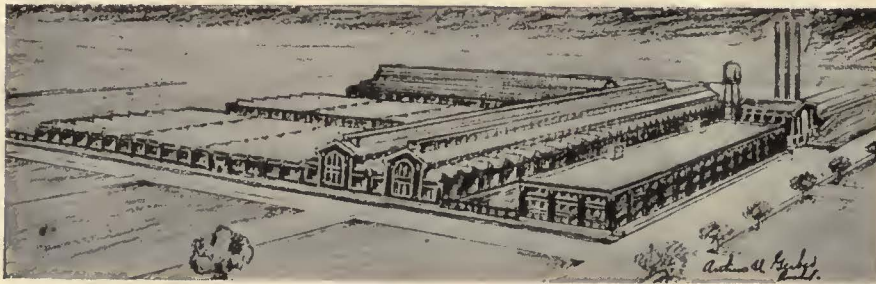
The net earnings are equivalent to about \$1.53 a share on the 7,211,481 shares of no par value common stock outstanding.

## \$4,500,000 for Shops for Chicago Rapid Transit Company

A \$4,500,000 shop construction program has been launched by the Chicago Rapid Transit Company in Niles Center, with the ultimate object of consolidating all shops in this one location.

Ten separate units covering an area of 15 acres are included in the completed project. The structures will be so laid out and connected as to afford the utmost efficiency in the handling of cars and equipment.

Construction work is now under way on the first unit of the big group, which will be one of the most complete and extensive mechanical plants in the country. This unit is the paint shop,



Architect's drawing of new Niles Center shops

which is 200 ft. x 224 ft. in outside dimensions. Present indications are that this building will be ready for occupancy some time in May.

All the buildings in this comprehensive construction program have been designed with a view to making them architecturally attractive and in harmony with other structures in this suburban community. The walls are of Old English mission brick with cast stone trimmings. B. J. Fallon, vice-president, said:

Consolidation of all the shops of the Rapid Transit lines in one convenient location is a logical step in development and expansion of our properties. When the elevated lines were brought under one management it was necessary to continue use of the various shops scattered over the city.

Present requirements, however, call for a centralized plant where all work can be done with the greatest efficiency and despatch.

The new shops will greatly facilitate the work of keeping our rolling stock in perfect condition and thereby increase our ability to give the people of metropolitan Chicago the utmost in safe, fast and reliable transportation service.

The present divisional shops will be used for inspection purposes and the making of minor repairs after the new plant has been completed. Provision is made for adequate expansion of the new shops as necessity arises.

## Track and Line

Piedmont & Northern Railway, Charlotte, N. C., is reported as considering an extension of its electric line from Charlotte to Danville, Va. Plans call for an extension from Charlotte to Lexington, N. C., and from Winston-Salem, N. C., to Danville by way of Reidsville.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been granted the right by the City Council to build a rapid transit cut-off for a distance of ten blocks in the city limits. As part of the new work the company will relocate part of its Milwaukee-Waukesha and Watertown rapid transit line for a block south of the right-of-way, instead of along Fairview Avenue. Gates will be placed at all crossings.

## Trade Notes

Chicago Fuse Manufacturing Company, Chicago, Ill., manufacturer of Union and Gem fuses and conduit fittings, announces the appointment of W. A. Wilcox as district sales manager, with headquarters at St. Louis. Mr. Wilcox will have charge of sales over southern Illinois, eastern Missouri,

Pittsburgh Testing Laboratory, Pittsburgh, Pa., to serve better its many clients in the rapidly growing Youngstown district has equipped its branch there for all kinds of physical lists on engineering and construction materials. A part of the equipment is a 200,000-lb. Universal Olsen testing machine. H. L. Christman, a resident in that section for many years and well known to the manufacturing interests there, is in charge of the plant. Mr. Christman has been identified with the testing and inspection profession for more than twenty years.

Tuco Products Corporation, 30 Church Street, New York City, announces the appointment of Carl H. Kadie as successor to Frank N. Grigg, who for the past fourteen years has represented the company in the Southeastern territory. Mr. Grigg resigned on account of ill health. His successor's appointment took effect April 1.

## New Advertising Literature

Sullivan Machinery Company, Chicago, Ill., has published bulletin 81-1, second edition, on Sullivan concrete breakers. It describes two types of tools, a 75-lb. or heavy-duty buster and a 48-lb. light buster. The bulletin is liberally illustrated to show different applications of concrete breakers in many parts of the country. In addition to the familiar uses, for breaking up pavement or building walls, etc., pictures are shown of busters digging a tunnel in hard sandstone, driving sheet piling, excavating slag under an open hearth steel furnace, used as a pneumatic spade for digging hard pan, breaking down a mountain of furnace slag, which rock drills would not handle, and trimming the walls of a trench for electric conduits.

Crouse-Hinds Company, Syracuse, N. Y., is mailing a decorative circular describing its new "Obround" condulets Form 7. An orange color scheme is skillfully employed to set off the various cuts. The new condulets are also listed in catalog No. 2100.

Martindale Electric Company, Cleveland, Ohio, issued on April 1 Catalog No. 8 describing its motor maintenance equipment. Among other things the catalog includes a center-page spread of a carbon brush maintenance and trouble chart.

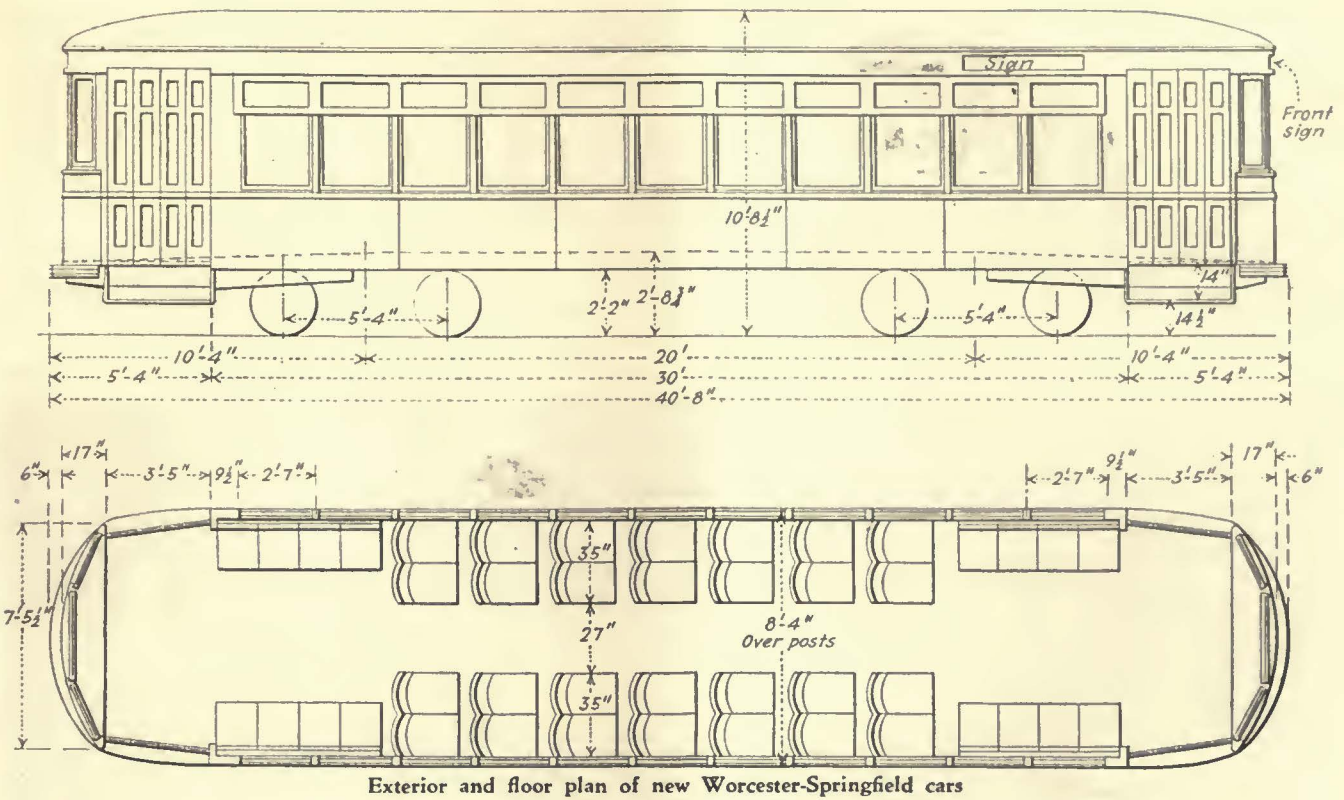
Sullivan Machinery Company, Chicago, Ill., has published bulletin 76-G, second edition, on Sullivan electric portable hoists. Sullivan single and double drum electric portable hoists are described, together with many application pictures. The adaptability and power of these small machines, having a 6½-hp. motor, is graphically shown. The single-drum hoist is used for such jobs as car pulling, erecting steel on derricks or with gin poles, decking logs from railway cars, pulling coal cars in mines, unloading box cars with a scraper, while the double-drum unit is employed for jobs requiring two ropes such as scraper loading in mines, trimming coal piles at power plants, operating conveyor systems in coal mines or hauling sawmill refuse with a drag line and power rake.

western Tennessee, Mississippi, Arkansas and Louisiana. Prior to this appointment Mr. Wilcox was associated with the Economy Fuse & Manufacturing Company for more than eight years.

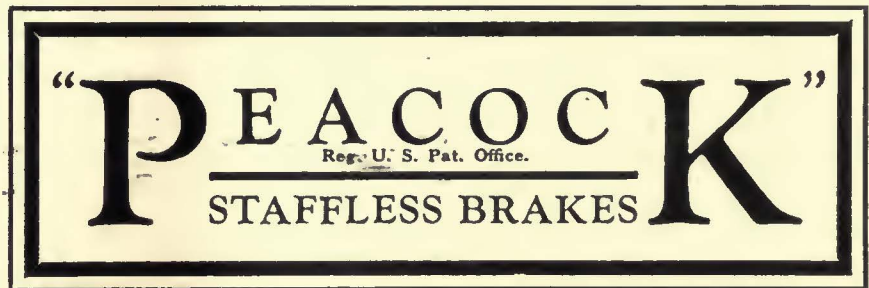
Earl E. Knox, who for twenty years has represented Bury Compressor Company in the Pittsburgh district, has been appointed general sales manager, in full charge of sales and advertising, and will be located at Erie, Pa.

Joseph V. Smith, formerly general manager of the shovel interest of Hubbard & Company, Pittsburgh, has been appointed Pacific Coast manager for the electrical materials department of the company with headquarters at the Oakland, Cal., plant.





New England Electric Railways,  
on 100 new cars, again specify—



The  
"Peacock"  
Staffless

To more completely modernize its street railway subsidiaries in Springfield and Worcester, Mass., the New York, New Haven & Hartford Railroad placed orders for 100 double-truck, light-weight, one-man, city type, semi-steel cars. Fifty of these cars will be built for the Worcester Consolidated Street Railway and fifty for the Springfield Street Railway.

This repeat order of "Peacock" Staffless Brakes follows the use of these brakes for many years on the cars of these electric railways—during which period their performance has demonstrated beyond a doubt their superiority to any other hand brake.

May we furnish you with detailed information as to why nearly all modern car specifications include "Peacock" Staffless Brakes?

**National Brake Company, Inc.**

890 Ellicott Square

Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Co., Ltd., Montreal, Canada



## What SUPERTWIST Adds to Goodyear Tires



One of the 70 motor coaches of the Kansas City Public Service Company, all equipped exclusively with Goodyear Pneumatic Cord Bus Tires

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other in-

juries. It thus insures virtually *double* the carcass life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

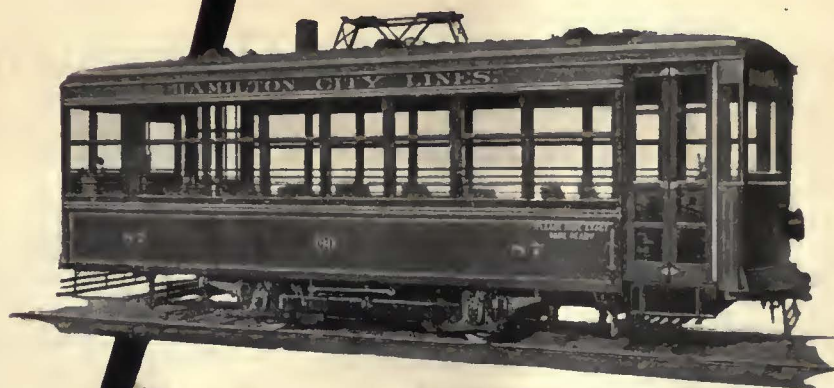
They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

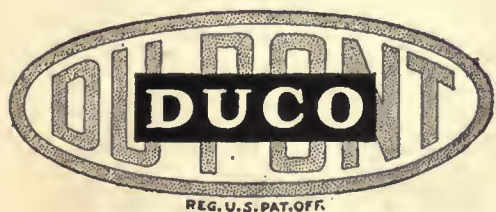
# finished in Duco..



THE photograph shows one of the six electric railway cars recently completed by the American Car Company of St. Louis, subsidiary of the J. G. Brill Car Company, for the Cincinnati, Hamilton and Dayton Railway Company. The exterior finish used on all six cars is Duco.

Duco has speedily gained popularity among operators in this section, the Penn-Ohio Electric Co. having standardized on Duco for all equipment. Endorsement of this nature is adequate testimony of the position held by Duco in the railway finishing field.

Some characteristics of Duco which particularly adapt it to this work are its fast drying properties—cutting drying time in the paint shop by 50 percent; the fact that even newly Duco finished cars can be dry-wiped without injuring the surface; and its ability to withstand sleet, alkali dust, scorching sun, flying cinders and the like without sacrificing beauty of appearance.



E. I. du Pont de Nemours & Co., Inc.,  
Chemical Products Division, Parlin, N. J.  
2100 Elston Avenue, Chicago, Ill.,  
569 Mission Street, San Francisco, Cal.

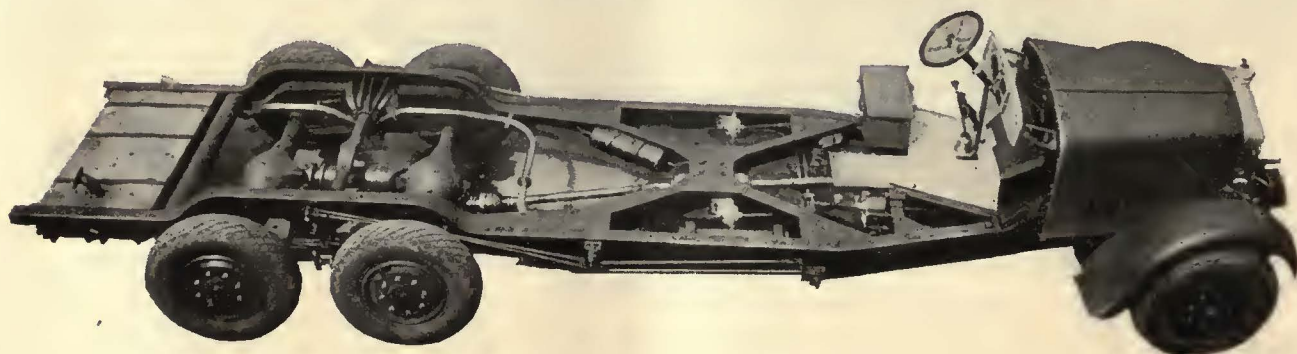
There is only ONE Duco . . . . DU PONT Duco

20 of the world's leading bus and truck companies manufacture six-wheelers.

2000 six-wheelers are in service.

50,000,000 miles have been operated by these six-wheeled vehicles.

The reason for these facts should be known by every purchaser and operator of motor busses.



2 independent power operated brake systems on service and hand brakes—locomotive type brake shoes with all wearing parts lubricated—permanent dash with instrument panel—cast aluminum transmission cover and floor boards—70 gallon gas tank.

*Full particulars on request*

## **THE SAFEWAY SIX-WHEELER**

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

*Manufacturers of De Luxe, City, and Double Deck Type Six-Wheel Coaches*

# accuracy

Long Products:  
Automotive  
Radiators  
and Clutches

Accustomed to  
manufacturing  
to close limits.

LONG MANUFACTURING  
COMPANY  
Detroit Michigan



# LONG

# Patrons are Pleased



**In JACKSONVILLE** "I can recommend Graham Brothers Bus equipment to be the best value on the market both from first cost and operation basis," writes E. Gould, Florida operator.



**In WICHITA FALLS** "Any traction line intending to install bus service will not be disappointed in placing in their service Graham Brothers Motor Coaches," writes the Wichita Falls Traction Co.

# GRAHAM MOTOR

SOLD BY DODGE BROTHERS  
DEALERS EVERYWHERE

# —Owners are Satisfied

*Records of Coaches in Service are Daily Selling More Graham Brothers Motor Coaches — There can be no Stronger Endorsement of their Value*

Patrons who ride know Graham Brothers 21-Passenger street car type motor coaches for their good looks, their comfort and their dependability—They ride—and ride again, quietly, swiftly, safely.

Operators know Graham Brothers Motor Coaches for their excellence of design, workmanship

and materials; for their low operating and maintenance costs; for their ability to stand up in this rigorous service.

Operators know, too, that repair parts and repair service is available always from Dodge Brothers dealers everywhere.

**GRAHAM BROTHERS**

EVANSVILLE — DETROIT — STOCKTON  
A DIVISION OF DODGE BROTHERS, INC.  
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

Standard 21-Passenger Street Car Type, complete, \$3815

12-Passenger Parlor Coach, complete, \$3750

16-Passenger Parlor Coach, complete, \$3995

*f. o. b. Detroit*

# BROTHERS

# COACHES



# "We have standardized on Kellys"

**ENID TRANSPORT CO., INC.**  
 BONDED CARRIERS  
 H. D. MEARS, MGR. PHONES 2059-330  
 BOX 633

ALWAYS  
GOOD  
EQUIPMENT

ENID, OKLAHOMA

G. C. NO. 567  
Said to Peace City  
Enid to Woodward  
Woodward to Shattuck

March 5th, 1927.

Jayne Dunoon Tire Co.,  
Enid, Okla.

Gentlemen:

In reply to your request for information regarding the results we obtain with Kellys on our lines, we are pleased to advise you that we are entirely satisfied with these tires. Our cars operate approximately 900 miles per day, over roads that vary from sand to rock filled gumbo, and at speeds that must be as fast as safety will permit, to enable us to compete with the privately owned car.

To select a tire for our use the cost per mile per tire is the deciding factor, and in arriving at this cost we consider the tire itself, the backing of the manufacturer, and the services rendered by the distributor.

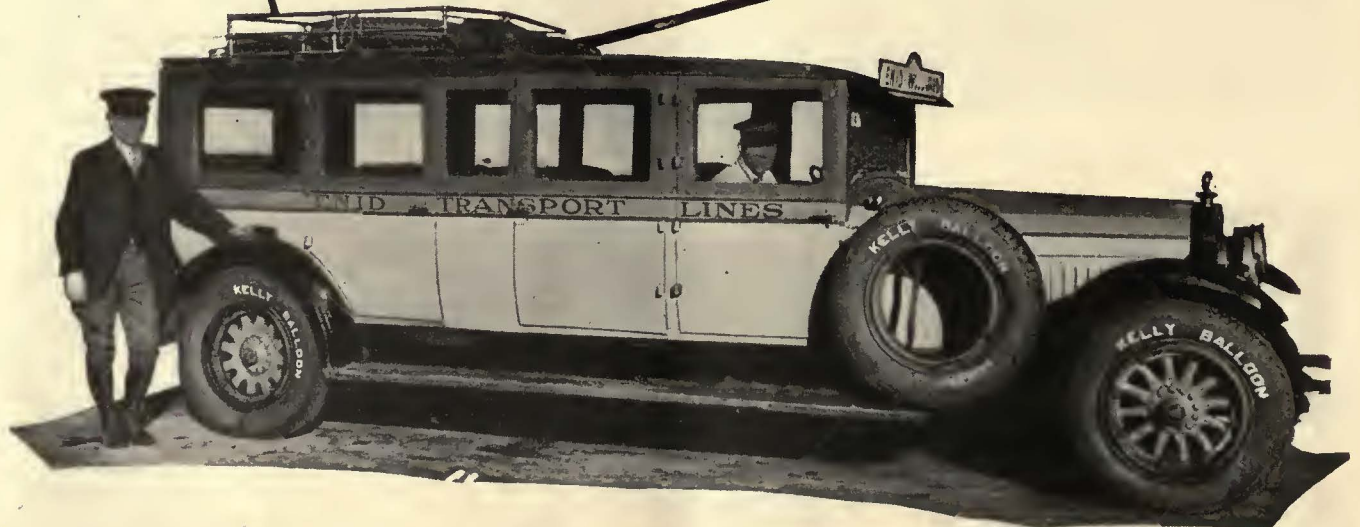
We have standardized on Kellys, and do not hesitate to express our satisfaction at the results obtained, nor to recommend them to other Bus operators.

Assuring you of our pleasure in answering your request, we beg to remain,

Yours very truly,

Enid Transport Co. Inc.

By *H. D. Mears*



# KELLY-SPRINGFIELD TIRES





**T**HE TWIN COACH represents the greatest advance yet made in highway transportation.

The chassis and body are combined in one unit. All stresses are equally distributed, the driving stresses being reduced one-half.

Two 60 H.P. motors are used, mounted midship, in each side of the body. Each rear wheel is driven direct by each motor. There is an equal distribution of the load on all four wheels and springs.

The overall length and breadth of the *Twin Coach* is available for carrying passengers. Its seating capacity is 42 and the weight per passenger seat is reduced 40 per cent. Safety is increased by driver being seated in extreme front end of coach, thereby having uninterrupted vision.

*Send for advance Booklet.*

# TWIN COACH

Patent Applied for

**TWIN COACH COMPANY**

F. R. FAGEOL, *Pres.*

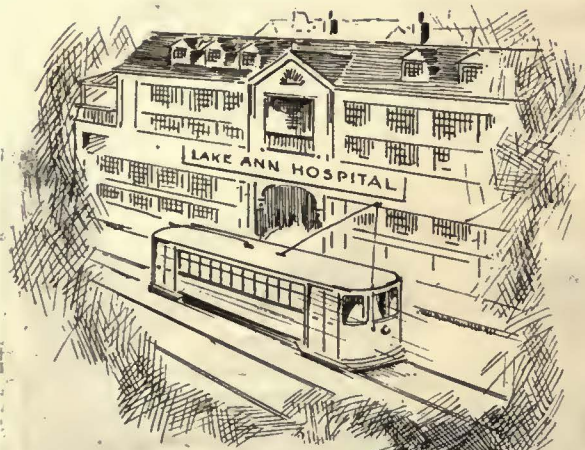
120 Broadway, New York City

*Factories:*

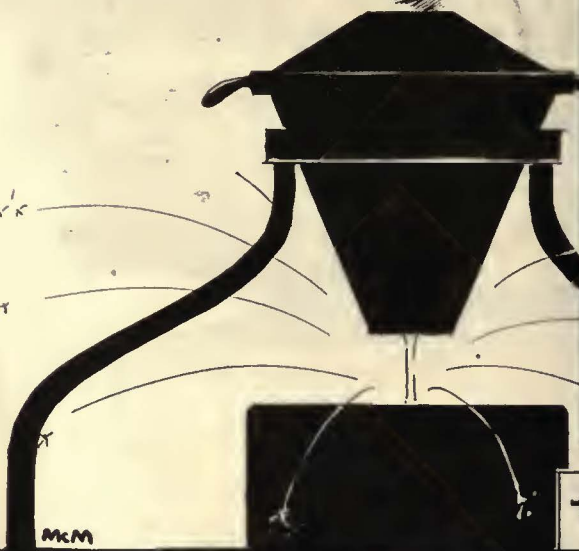
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c/o Fageol Motors Co.





**Quiet operation**  
*Bad joints cause most track noises*  
**Thermit-Welded track promotes noiseless operation**

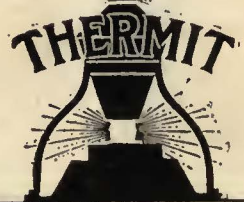


McM

**E**VEN new modern cars, if operated over rough track with broken joints, can scarcely be expected to win public approval and give satisfaction. The finest cars ever designed will not prove attractive as passenger carriers if they pound and crash at every rail joint. Neither can they be operated at their rated speed under such conditions.

Thermit-welding rails is one of the most inexpensive ways of seeking to improve public relations. It makes for quiet operation. Cars ride more smoothly over continuous rail. Chances of paving damage are greatly reduced, as there are no longer any jointed places to loosen up.

Let us show you how it can be done at no more expense than any other method of joining rails.



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Cane Webbing may be ordered through any H-W sales office.

No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.

If you have not received a copy of our new Bus Seat Catalogue, write for it.



Heywood-Wakefield  
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Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.



# "Noise and



*MR. C. A. SMITH, Superintendent of Roadways, the Georgia Power Company, with offices in the Glenn Building, Atlanta, Ga. Mr. Smith's study of electric traction problems has brought him nationwide recognition.*

# track corrugation have been substantially reduced"

"OUR efforts in track construction have been directed toward two important factors," said C. A. Smith, Superintendent of Roadways, of the Georgia Power Company.

"Corrugation is a rather annoying problem here," Mr. Smith continued. "At times in the past we have found it necessary to grind rail that has been in service only one year. Noise, too, has been quite a problem, although we know definitely that our present method of construction has greatly reduced it.

"We use concrete beam construction under ties and rails—wood ties, spaced at about 4-foot centers, 80-lb. ASCE rail, the concrete beams extending 5" below the bottom of the tie. This type of construction including concrete pavement costs approximately seven dollars per foot of track. Our method of

track insulation, we have reason to believe, has greatly reduced two of the most annoying problems the electric railway engineer encounters."

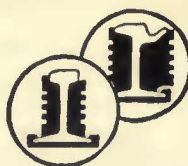
*In view of the intensive study Mr. Smith has devoted to track insulation problems, it is significant to note that Carey Elastite System of Track Insulation is being used extensively in the construction of the Georgia Power Company tracks. We shall be glad to tell you more about this efficient material—how easily it is installed and how it cuts vibration and noise to a minimum. Write for full particulars.*

THE PHILIP CAREY COMPANY, Lockland, Cincinnati, O.

*View of the Georgia Power Company Street Railway, on Hunter Street, Atlanta, Georgia. Note the interesting construction features, and the Carey Elastite System of Track Insulation in place.*



**Carey**  
**Elastite**  
TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF  
**TRACK INSULATION**



CHARLES M. SCHWAB

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# For Performance In Culverts

**I**N culverts Toncan Iron means permanence. The iron has been thoroughly refined. Copper and molybdenum are added. The resultant alloy of the three elements is a corrosion resistance heretofore unknown.

The Toncan Culvert pictured is on the Brockton-Easton Line of the Eastern Massachusetts Street Railway Company.

"Toncan on the line" the country over means freedom from trouble and expense in the particular phase of the maintenance of way problem which it serves. Its selection by the Eastern Massachusetts Street Railway Company was based upon demonstrated performance. We will be glad to present the performance story of Toncan Culverts for your closer study.



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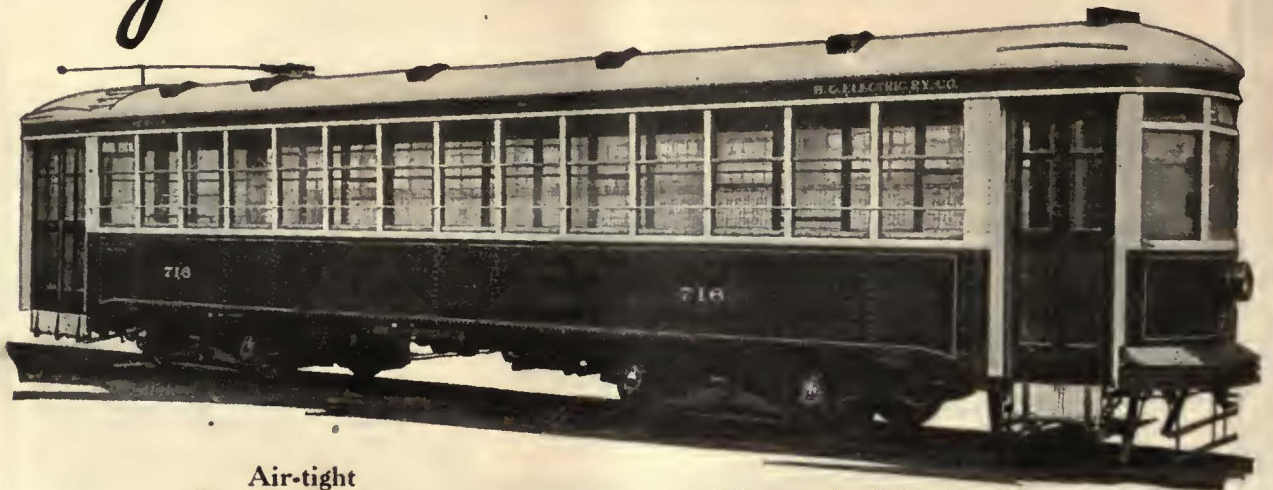
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## in *gaining* public favor



Air-tight  
Easy to Operate  
Light in Weight  
Noiseless  
Durable

*Modern cars for British Columbia Electric Railway Company, Vancouver, by Canadian Car and Foundry Company, Ltd. Edwards Metal Sash is used.*



FROM the truck wheels to the trolley wheels, no greater opportunity is open to foster good will than in the use of Edwards Metal Sash.

The public welcomes this modern, silent, light, air-tight, smooth-sliding metal sash that makes a warmer car in winter, an airier car on hot days, and a quieter car 365 days in the year.

And you, too, benefit by Edwards Metal Sash. Its maintenance costs are trifling. It makes windows easy to clean. It greatly reduces the chance of broken glass.

Specify Edwards Metal Sash on your next order and gain greater public favor. And send today for Catalog S, describing the various types of Edwards Metal Sash.

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# Edwards Metal Sash





# 66

## Street-Car Bus Operators told us what they wanted in the ideal bus

Riding comfort is the first essential of a profitable bus. We attribute our increasing patronage to the fact that we do everything possible to make our passengers comfortable.

We emphasize the importance of a husky frame so braced as to eliminate distortion; this saves bodies.

Safety demands adequate four-wheel brakes -- simple to adjust and easily relined.

Efficiency in radiation is a very important factor. Constant operation of a motor 12 to 18 hours a day in city traffic is dependent on good radiation.

"The transmission should have four speeds forward for greater driving range on hills and reducing engine strain."

... most common failure is clutch trouble and a double disc dry plate clutch of large dimension and rugged construction would correct this.

... the obvious advantages of a semi-floating rear axle with a spiral bevel gear, from a standpoint of simplicity and load carrying capacity makes it our first choice.

"... a dependable 6-cylinder motor capable of delivering maximum horse-power and maximum torque at comparatively low R.P.M. . . ."

# and here it is -

# The **75** is the answer Street-Car Bus

The Studebaker Big Six engine at 2400 r.p.m. develops 75 horsepower. Under full load it is practically vibrationless, due to the use of a fully machined crankshaft which is statically and dynamically balanced.

A heavy duty transmission with four speeds forward and one reverse permits easy operation on stiff grades with the engine at normal speed. All shafts and gears of special alloy steels. Silent at any speed.

Hotchkiss type drive. The torque and drive are taken through the extra powerful springs hung on short shackles. A 3-inch steel tube propeller shaft turns through 3 universal joints with a reduced driving angle due to low hung chassis.

A new design double-disc dry plate clutch, 17 inches in diameter is used for efficient service in this street car bus. It is smooth in engagement, easy to operate and simple to adjust.

Ignition is supplied by a vertical distributor and ventilated 12-volt, 156-watt generator with third brush regulation. Both units are gear driven from front of the engine crankshaft—positive and efficient.

Rapid deceleration and safety in traffic is obtained by mechanical, self-energizing four-wheel brakes with over-size drums. Correct leverages provide powerful braking action with light pedal pressure. Simplicity of adjustment is an appreciated feature.

A large tubular radiator rests on a box section frame which prevents weaving. Circulation is maintained by a six vane centrifugal pump. Carefully worked out passages in the cylinder block allow a free flow of water.

Semi-floating type rear axle with large Chrome Molybdenum shafts. Spiral bevel gear drive. Load carried on large roller bearings at wheel hubs and differential. Housing of heavy malleable iron, shaped to provide great truss strength.

PAST experience of actual users is the best foundation for forecasting a bus design to meet existing conditions. Therefore, Studebaker asked sixty-six street car bus operators what they considered the most essential features of an ideal street car type bus.

Then Studebaker engineers took the composite specifications as a basis and designed a heavy duty 21-passenger street car bus which would meet the requirements of the country's leading street car bus operators. The result is the new Studebaker "75" heavy duty chassis which has been thoroughly proved on Studebaker's 800-acre proving ground. Some of the outstanding features are detailed on these pages.

Characteristic Studebaker quality is the keynote of the entire structure. Rugged strength is insured by the use of special alloy steels and over-size parts. Exceptional roadability is obtained by a low center

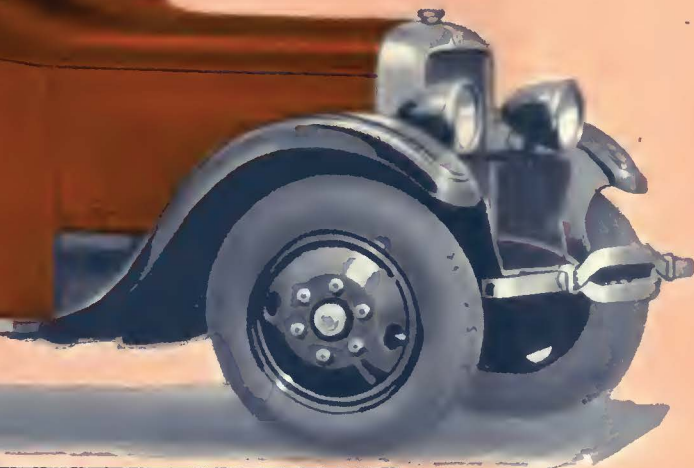
# The New Studebaker **75**

# to the requirements of Operators everywhere

## The New Studebaker "75" Street Car Type Bus (21 Passengers)

\$5895

f. o. b. factory



A sturdy cam and lever type steering gear, specially designed for use with balloon tires, with tapered roller bearings on steering pivots gives the driver ease of control at all speeds.

Cradled in a shock-proof hanger at the rear is a 30-gallon gasoline tank with a large bronze filler on the side for rapid filling. A hydrostatic gauge at the filler indicates, in gallons, the quantity of fuel in the tank.

Riding comfort is insured by the special Studebaker bus springs of the most improved design. Front, 38 inches long, 2½ inches wide with 14 leaves. Rear, 56 inches long, 2½ inches wide with 12 leaves. Extra heavy bolts and short shackles prevent side sway.

of gravity and a short turning radius. The front tires track with the center of the rear duals.

First cost is reduced to a minimum by large scale production in the huge Studebaker plants. Tests prove that this chassis averages 10 to 12 miles to the gallon of gas in city service. Greatly strengthened at all points where stress and wear occurs, maintenance expense is lower; and longer useful life is obtained, giving lower depreciation costs. For further details on the new "75" chassis write Dept. B, The Studebaker Corporation of America, South Bend, Ind.

### Prices f. o. b. factory

Studebaker "75" Chassis only\* .....\$3275  
Studebaker "75" 21-Pass. Street Car Bus\* .....\$5895

### OTHER STUDEBAKER BUSES

12-Pass. (including driver) cross-seat Sedan-Type .....\$3935  
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21-Pass. Pay-As-You-Enter Street-Car Type\* .....\$5125  
18-Pass. (including driver) side-entrance Parlor Car .....\$5300  
20-Pass. (including driver) Parlor Car DeLuxe\* .....\$6150

\*Includes dual rear wheels.

Purchase Can Be Arranged on Liberal Budget Payment Plan

21-passenger seating capacity selected for comfortable seating arrangement. Records show this size bus most profitable in street car service. Ample standing space.

Equipment: front bumper; spare wheel and tire carrier; 34 x 7.50 (all wheels and tires interchangeable); powerful two-beam headlights; traffic lights; destination sign; 6 dome lights; signal system; heater; speedometer; 8-day clock; engine thermometer; oil pressure gauge.

Proper ventilation is assured. Two screen-covered ventilators at each side of the windshield admit a volume of fresh air. Three roof ventilators maintain a circulation of air even with windows and front ventilators closed.

Frame of rigid, pressed steel channel 8 inches deep with 3-inch flanges. Secured by 9 cross members including heavy tubular units at center and torsion tubes at each end of frame, giving exceptionally sturdy construction.

Luxurious interior and wide, easily adjusted windows. Deep leather seats 36 inches wide, a 14-inch aisle, 57-inch head room and a no-ramp floor are appreciated features. Wide loading doors with safety step and grab handle. Emergency door at rear.

# Heavy Duty Chassis



# Seattle *knows* Studebaker Busses cost less to operate

THE cost figures of a fleet of five Studebaker pay-enter busses owned and operated by the City of Seattle Street Railway reveal some facts which are of interest to bus operators who contemplate the purchase of new equipment.

In Seattle, where many of the main streets have steep grades, bus operation is, of course, more expensive than in cities where the thoroughfares are generally level.

But in spite of this handicap and with the constant starting and stopping of city traffic, five Studebaker busses operated by the City of Seattle Street Railway, during the first eight months of service averaged 9 miles to the gallon of gasoline. A total of 215,138 miles was run at an average operating expense of .0454 per mile. This figure included fuel, oil, grease, tires, service repairs, but does not include depreciation, driver's wages or operating overhead.

**L**  
—first cost  
—operating cost  
—depreciation cost  
—maintenance cost

Lower  
Such examples of Studebaker economy, of which there are many throughout the country, prove the value of Studebaker busses for mass transportation.



# TRANSPORTATION NEEDS HAVE CHANGED

So have the requirements in transportation equipment. Higher speeds mean higher torques. Larger loads mean greater weight. "Standard" Steel Axles, Armature Shafts, Wheels and Springs meet modern torques and loads with the same dependability that has maintained the "Standard" reputation for so many years.



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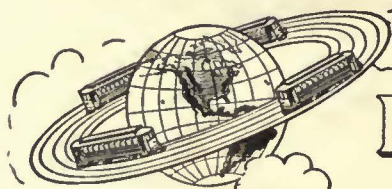
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**J**UST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



**Barron G. Collier**

INCORPORATED  
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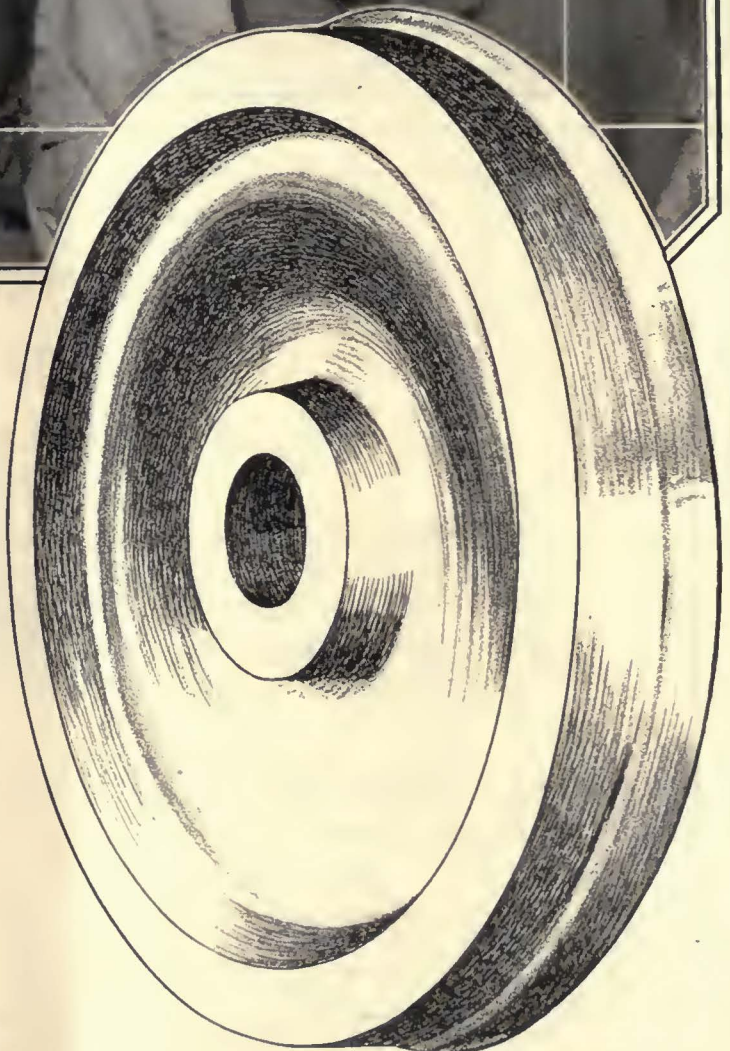


It's the *Coach* That Carries  
the Crowd . . . . . But It's the  
*Wheels* That Carry the Coach

And so, in electric railway service, with its steep peak periods and the ever recurring emergencies that heavy traffic creates, the best wheel made is only good enough.

Gary Wrought Steel Wheels are manufactured in quantity but under a system of individual attention that assures the same physical and chemical precision as if only one wheel were made each day.

Our wheel specialists are at your command,



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Interiors of the cars of the Pittsburgh Railways Company are thoroughly cleaned by the use of "Invincible" Heavy Duty Vacuum Cleaners.

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Better cleaning at lower cost is the result wherever "Invincibles" are used.

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We can help you solve them.

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Railway Products**

for Electric Railways include 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.

**BETHLEHEM  
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All materials, rails, plates, bars, forgings, castings, bolts, etc., are made in Bethlehem Plants—from ore to finished product under Bethlehem constant supervision.

Great care and attention is given to special layouts. Before shipment layouts are assembled to make sure that they will correctly meet conditions in the field.

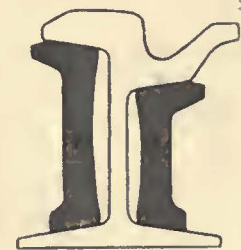
The fitting up work is done under roof where workmen are shielded from inclement weather, thus enabling them to do accurate work.



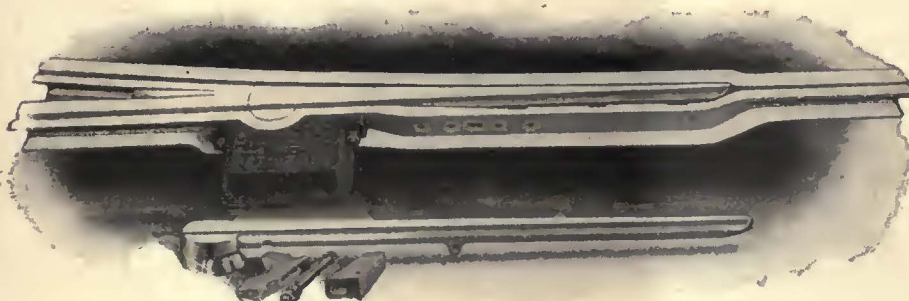
*Abbott Base Plate*



*Center Rib Base Plate*



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Design 407 B*



*Solid Manganese Tongue  
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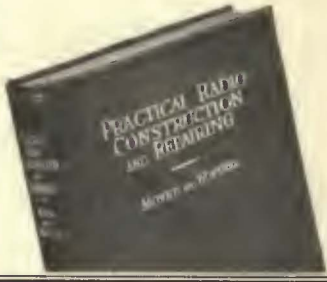
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SAYS a recent article in “Electric Railway Journal.” The public is demanding, more and more, that the conveyances in which they ride be clean, neat, attractive.

Here is a situation calling for OAKITE cleaning materials and methods in every car shop. For OAKITE cleaning is economical as well as effective. Cars are cleaned *thoroughly*, inside and out, in the shortest time possible. What is more, less labor and materials are required. Cleaning costs are cut.

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*Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada*

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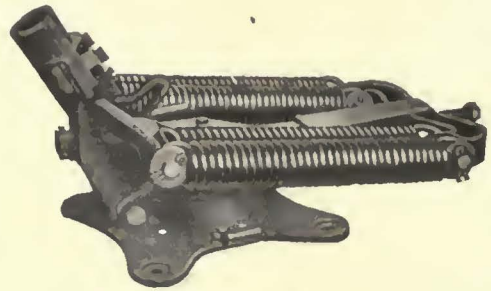


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1839



Nuttall US 20-A Timken Roller Bearing Trolley Base

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You have smiled for years at the original feller  
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 Biler"—that's *amusement*.

But if you want to wear the smile of *genuine*  
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 ductor's face—on every face around the car  
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Put on some Nuttall US 20-A Trolleys. It is  
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 in all, what could be sweeter?



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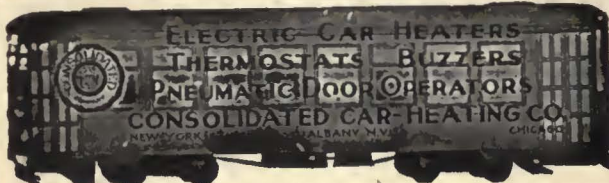
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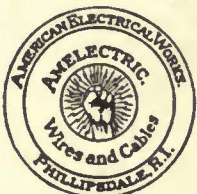
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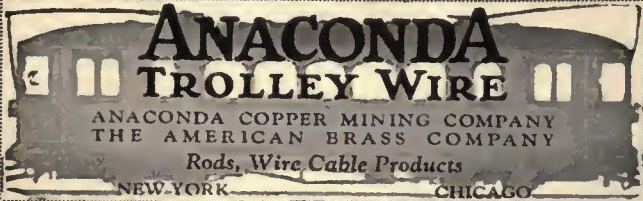
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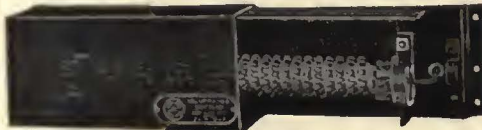
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ALPHABETICAL INDEX TO ADVERTISEMENTS

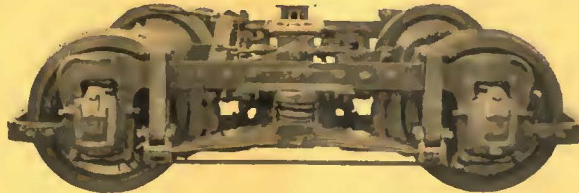
Table with columns A, E, K, R and sub-columns Page. Lists companies and their page numbers.

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Grid of items and suppliers including categories like Trolley Buses, Trucks, and various electrical components.



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## Brill No. 177-E Type Truck

Ready now to meet requirements of light-weight modern car service, this latest type of Brill city truck includes all the well-known patented features which have built up the Brill reputation for long life, low maintenance and smooth and steady riding action. Its solid-forged sideframes, Bolster Guide, Graduated Spring System, Oil-retaining Center Bearing and Half-ball Brake Hangers were developed by Brill engi-

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In the Brill 177-E truck there is available for light-weight city service a type of truck the performance of which measures up to the highest efficiency essential to profitable modern transportation service.

*Some Electric Railways which have specified Brill 177-E Trucks for their light-weight modern Cars:*

	No. of Trucks
Grand Rapids Railway Co.	2
United Electric Railways of Providence	74
Pennsylvania-Ohio Company	26
East Taunton Street Railway	4
Virginia Electric & Power Co.	60
Georgia Railway & Power Co.	140
Cia Chilena de Electricidad, Santiago	62
Potomac Edison Co.	4
Wilkes-Barre Railway Corp.	20
Dallas Railway Co.	60
City of St. Petersburg	16
Williamsport Passenger Railway Co.	10
Wheeling Public Service Co.	30
Shreveport Railways Co.	4
Houston North Shore Railway	8
Fitchburg & Leominster Street Railway	16
Cincinnati, Hamilton & Dayton Railway Co.	21
Honolulu Rapid Transit Co.	16
Eastern Massachusetts Street Railway Co.	100
Greenfield-Montague Transportation Area	4
Rockford Public Service Co.	18



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