

# ELECTRIC RAILWAY JOURNAL



There are Timken Bearings in the English Maudslay Coach. Timken plants in England and France supply Europe

**P**ROBABLY the outstanding sensation in the history of anti-friction bearings is the adoption of Timken Tapered Roller Bearings for railroad cars. . . Incidentally Germany for some time has used Timkens in street cars and interurbans. . . In self-propelled cars in this country Timkens are quite universally standard.

The greater thrust, shock, and radial capacity which enables Timken Tapered Roller Bearings to endure the pounding of steel wheels on steel rails also means unlimited wear resistance in Timken-equipped buses. That is why it is hard to find an American bus which does not have Timken Tapered Roller Bearings. And European engineers, traditionally conservative, also come to Timken for bearings.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

**TIMKEN** *Tapered Roller* **BEARINGS**



# “The Work Accomplished *is* Wonderful”

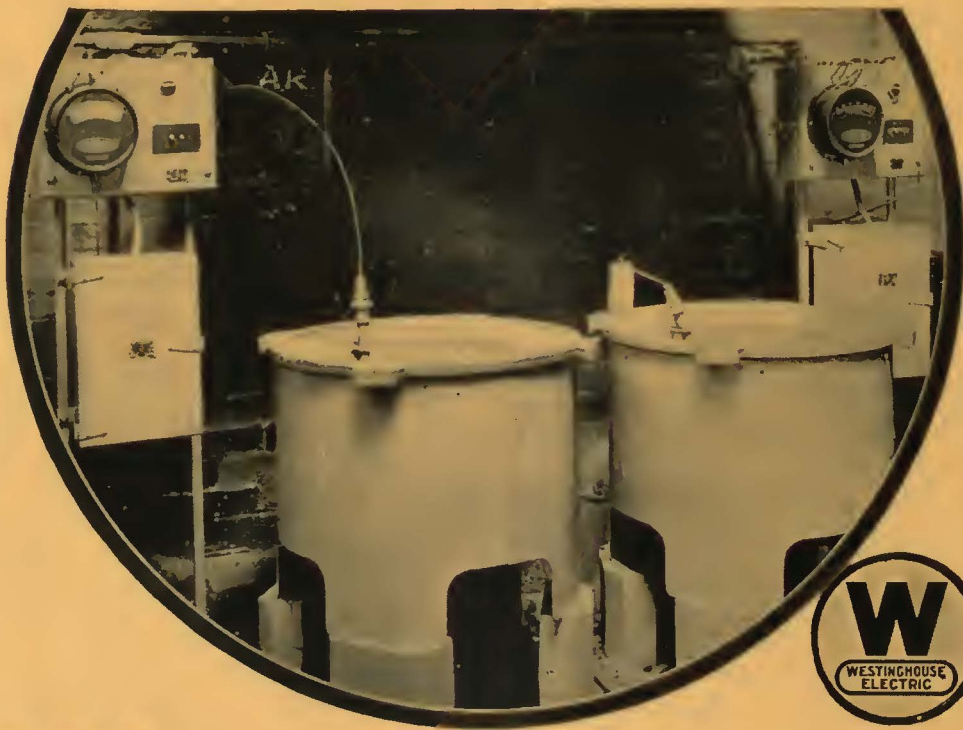
THE Monongahela West Penn Public Service Company of Fairmont, W. Va., writes, “We are very well satisfied with the electrically heated babbitt pots we have in use at present. The appearance of the new pots is appealing and the work accomplished is wonderful.”

These Westinghouse electric babbitt pots replaced two old cast-iron pots heated by gas. The workmen like the new pots, like their automatic temperature control, like the absence of gas fumes and dirt.

General all around satisfaction—and economy—leads this Railway Company to this conclusion—“Any shop not having the electrically heated babbitt pots in use are depriving themselves of a most efficient means for babbitting their bearings.”



Westinghouse Electric & Manufacturing Company  
Mansfield Works      Mansfield, Ohio  
Sales Offices in all Principal Cities of  
the United States and Foreign Countries



# Westinghouse



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# ELECTRIC RAILWAY JOURNAL

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Vol. 69  
No. 7

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## Of the Industry By the Industry

WITH the hatred and bitterness of a fratricidal war but a dim memory, the country is united in its opinion of the worth of Abraham Lincoln. Scarcely a day passes but what some political, economical, or social doctrine of this great man finds its way into the public print. To many of us, his greatest utterance was made in the latter part of the Gettysburg Address when he said: "—Government of the people, by the people, for the people." Here he laid down in a few words the salvation of those who would maintain a republic of freedom and progress, rooted in charity, courage and vision.

To the extent that is within its power, ELECTRIC RAILWAY JOURNAL has tried to apply the Great Emancipator's maxim in its relation to the printed word designed for a specific field. Upon this basis it is striving to produce a journal of the industry, by the industry, for the industry, in order that the industry may not perish from the earth, and, as the republic, may aspire to a sphere of greater development and usefulness.

### McGRAW-HILL PUBLISHING COMPANY, INC.

Tenth Avenue at 36th Street, New York, N. Y.

JAMES H. MCGRAW, President  
JAMES H. MCGRAW, JR., V.-P. and Treas.  
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6 Bouvarie Street, London, E. C. 4

Cable Address: "Maghlnal, N. Y."

Publishers of  
*Engineering News-Record*  
*American Machinist*  
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*Radio Retailing*

*Successful (Construction) Methods*  
*Electrical West*  
(Published in San Francisco)  
*American Machinist—European Edition*  
(Published in London)

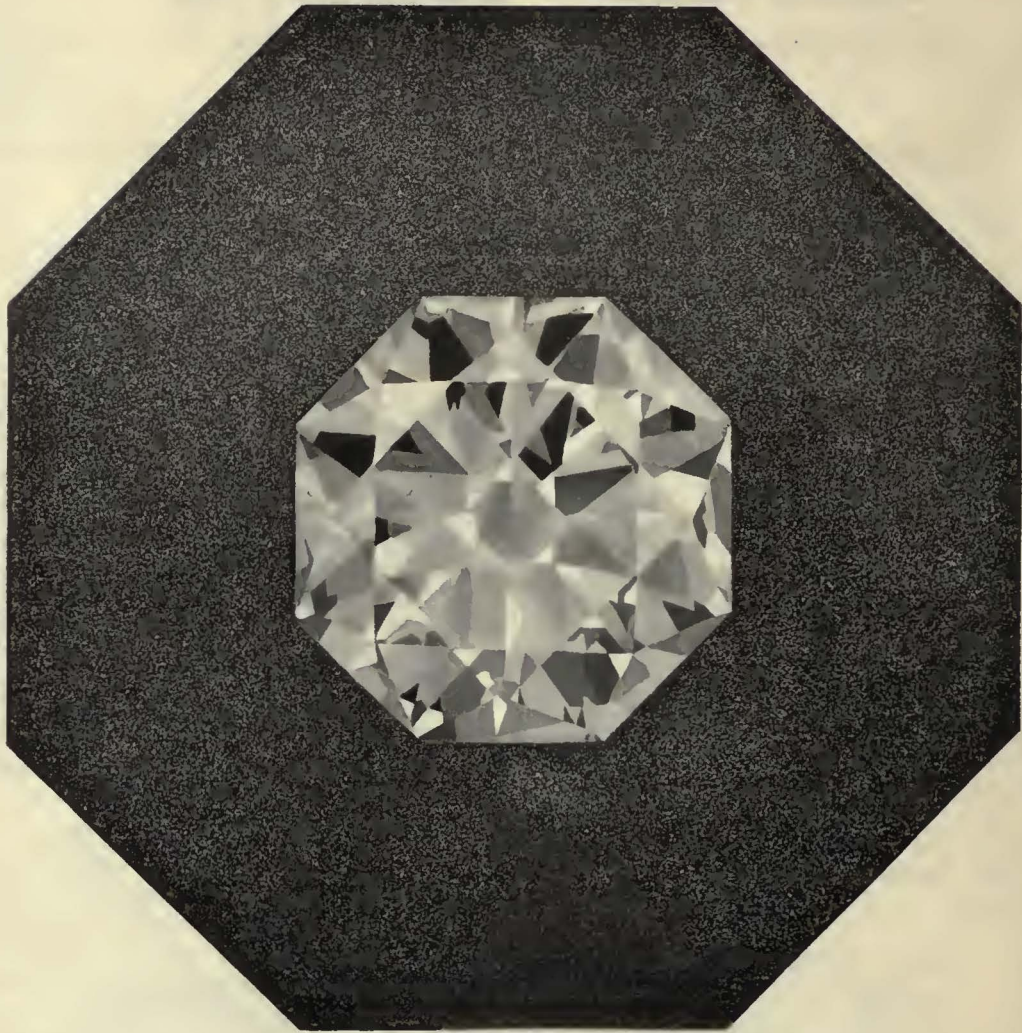


Member Associated Business Papers, Inc.  
Member Audit Bureau of Circulations

The annual subscription rate is \$4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries \$3 (total \$7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place. Copyright, 1927, by McGraw-Hill Publishing Company, Inc. Published weekly. Entered as second-class matter, June 23, 1909, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.





## Consider the Diamond!

**B**ESIDES the great beauty which distinguishes the diamond is a unique usefulness in industry. An unexcelled hardness that fits it peculiarly well for difficult cutting work is inherent in the diamond. Nothing takes its place.

Similarly the unusual qualities of the Davis "One-Wear" Steel Wheel are imparted by a special composition, heat-treated steel, that is found in no other wheel.

Mileage without maintenance is made possible by a special composition that is individual to the Davis "One-Wear" Steel Wheel.

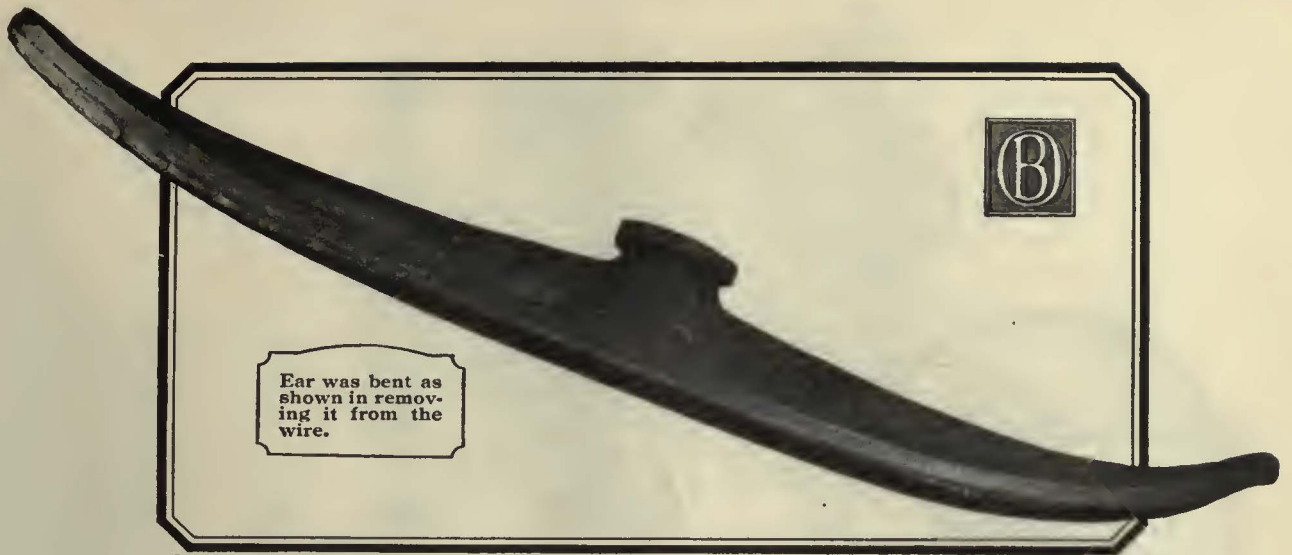
**AMERICAN STEEL FOUNDRIES**

NEW YORK

CHICAGO

ST. LOUIS





## “There Ain’t Any Such Animal”

THE RUSTIC who made that famous remark on seeing a giraffe on his first visit to the circus has nothing on a lot of electric railway men who will read this Marathon Ear record.

Who ever heard of a trolley ear that stood the gaff of 701,478 car passes? “There ain’t any such animule.” Yet that is exactly what you see pictured herewith, just as it was received by us from a street railway company in New England. (Name furnished if desired.)

701,478 car passes may seem an impossible record of service for

a trolley ear. Ordinary ears wear out after only a fraction of that number of car passes. And even for a Marathon Ear it is not an every day record. Other Marathons on the same property averaged only 541,544 car passes.

But whether you take the high figure or the average for other Marathons used on this property, the result means a saving of thousands of dollars. It means also fewer line breaks and improved service.

Before you decide “there ain’t any such animule”—try Marathon Ears on *your* property.



The Famous O-B Marathon Ear

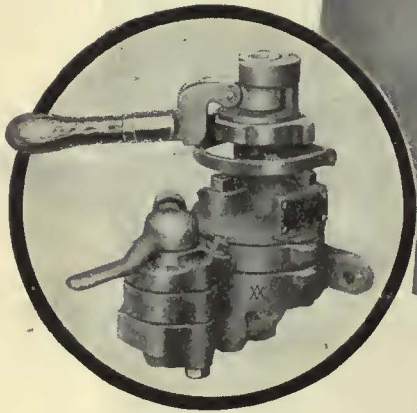
Ohio Brass Company, Mansfield, Ohio  
 Dominion Insulator & Mfg. Co., Limited  
 Niagara Falls, Canada  
 2918

# Ohio Brass Co.



PORCELAIN  
 INSULATORS  
 LINE MATERIALS  
 RAIL BONDS  
 CAR EQUIPMENT  
 MINING  
 MATERIALS  
 VALVES





## *Making each passenger his own brakeman!*



Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for your new cars.

Each passenger boarding a car adds more weight to be controlled by the brakes.

If the ordinary air brake equipment is used, this additional weight will result in a longer stopping distance than when the car was empty—particularly if the car is of the modern light weight type. The longer stop reduces the schedule speed and slows up transportation service for the passenger.

If Westinghouse Variable Load Brakes are used, however, the weight added by each passenger entering the car does not remain uncontrolled, but is used to automatically adjust the brake mechanism so that a corresponding increase in retarding force is made to assure the same stopping distance as before his extra weight was added. Each passenger thus unknowingly helps to safeguard and expedite his journey.

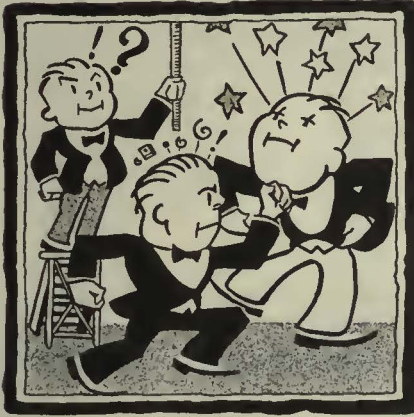
This modern brake for modern cars makes for safer and faster transportation, because uniformly short stopping distances are assured by virtue of automatic adjustment of brake cylinder pressure as the passenger load changes.

**WESTINGHOUSE TRACTION BRAKE CO.**

General Office and Works, WILMERDING, PA.

# WESTINGHOUSE TRACTION BRAKES





*There was a time when people used to ball one another with such exploitation - We haven't heard whether the matter was ever settled.*

And in the electric railway field there has been considerable discussion on the matter of paved track construction—whether the construction should be *rigid* or *flexible*.

The controversial nature of the discussion of various types of paved track construction and the lack of comparative data has led to certain indefiniteness of statement—amounting, in some cases, to inaccuracy.

The engineers of the International Steel Tie Company have worked out a scale of comparison ranging from *extreme flexibility* (open track-wood tie) to *extreme rigidity* (slot construction—under-

UU  
How high is up?

ground trolley) that will eliminate confusion of these terms.

The task of building the best paved track for electric railway use is only partly accomplished after the selection or designing of the tie. It remains to adapt the tie to the rest of the structure.

The adjustment of the tie to the rest of the track structure depends on factors often overlooked, i.e., the coefficient of expansion and contraction of *all* the materials entering into the structure—again the comparative normal life of those same materials.

This data is included in our new Paved Track Notebook. Engineers and executives should be sure to have this book—If you haven't received your copy, be sure to send for it.

The International Steel Tie Co.  
Cleveland, Ohio

20% more bearing surface  
steel <sup>C</sup> **Twin Tie** <sup>C</sup> track





The illustration above shows the Cambria Wheel Plant of Bethlehem Steel Company at Johnstown, Pa. Cambria forged axles are also made at Johnstown.

# Cambria

rolled steel wheels for  
Electric Railway Service  
insure maximum mileage  
and safety

*Other Bethlehem Equipment for Electric Railways:*

Axles	Armature Shafts	Gage Rods	Tie Plates
Bolts	Pole Line Material	Splice Bars	Tie Rods
Frogs	Special Layouts	Switches	Trackwork
Rails	Switch Stands	Crossings	Spikes
	Gear Blanks	Guard Rails	

**BETHLEHEM STEEL COMPANY, General Offices: BETHLEHEM, PA.**

Boston  
New York  
Buffalo

Philadelphia  
Baltimore  
Washington  
Atlanta

*District Offices:*

Pittsburgh  
Cleveland  
Cincinnati

Chicago  
Detroit  
St. Louis  
Seattle

San Francisco  
Los Angeles  
Portland

# BETHLEHEM





## As easy to read as a billboard!

Even at a distance clear, clean, legible billboards are easily read. The important points stand right out.

And likewise the important destinations and routes of a car or bus should be quickly readable at a glance even at some distance.

To use Hunter-Keystone Signs on cars and Hunter Signs on buses is "To tell the public where you're going." The bold white letters on black roller curtains give high visibility by day or by night.

*Let us send you a copy of Catalog No. 7. It completely describes and illustrates the full line of Keystone Car Equipment. Catalog No. 9 covers Bus Equipment.*

### ELECTRIC SERVICE SUPPLIES Co

PHILADELPHIA NEW YORK CHICAGO  
 17th and Cambria Sts. 50 Church St. Illinois Merchants' Bank Bldg.  
 PITTSBURGH BOSTON SCRANTON DETROIT  
 1123 Bessemer Bldg. 88 Broad St. 318 N. Washington Ave. General Motors Building  
 Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

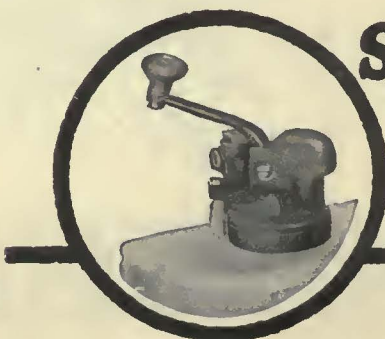






# Many types but all Safety Cars

Modern types of cars are as varied as the communities they serve. Single truck, double-truck—single end, double end—all have their place in handling the peculiar problems within their zones of operation. High cars, low cars—long cars, short cars—but all Safety Cars where the best interests of a community and a will to serve vividly and economically are given thought.



**SAFETY CAR DEVICES CO.**  
OF ST. LOUIS, MO.

*Postal and Telegraphic Address:*  
**WILMERDING, PA.**

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

*It is a Safety Car if equipped with  
our standard Safety Car Control Devices* (3100)



# So Easy to Shift

Quietness in transmission gears  
and ease of shifting are usually  
incompatible.

They are not to be attained by  
ordinary means — but Mack  
does it.









**Extraordinary design and superlative quality are required to combine the silent efficiency of truly meshed gears with the smooth, easy engagement that saves not only seconds but drivers' nerves in shifting.**

**Mack solved a hitherto unsolved problem by inventing the interrupted splineshaft and establishing new standards of precision production.**

**By separating the splines into sections divided by raised guiding lands, ground to true size and roundness, Mack for the first time provided a large-area, true ground surface to guide the ground hub bores of the gears.**

**The splines do nothing but drive. The lands do all the guiding. No undercuts weaken the shaft. The gears slip freely along the bright, even surfaces, yet are so precisely fitted that they are bound to run true and silently.**





The Third Avenue Railway  
System of New York City  
Uses Both Four and Six  
Cylinder Mack Buses

## **You can't see its goodness—but it's there**

**Bright paint and nickel plate don't make quality. You must look deeper.**

**Under Mack's painted surface are the finest steels—fabricated as no one else does. Steels and other fine materials finely wrought. Long after the paint is gone they endure for hundreds of thousands of profitable revenue miles. Then—after years of low cost, trouble-free service—owners know just what Mack Quality service means—and why it is worth-while.**

**That is why, in one instance, an operator reports that his Macks were off the route for mechanical servicing just one hour every 266 miles. The next best record of any other make of bus in his fleet lost its hour every 65 miles.**

**He says—as does The Third Avenue Railway System (N.Y.)—that Mack Quality pays. Mack's exclusive design, as shown in the interrupted spline shaft in the transmission, quiet and enduring, does its part in establishing such records.**

**Mack Trucks, Inc.**  
**International Motor Company**  
25 Broadway, New York City



# Three Objectives

## SPEED - SAFETY - COMFORT



National Pneumatic Door and Step Equipment makes every car a *faster* car, a *safer* car and a more *comfortable* car. Probably no other single item of equipment contributes to all three of these objectives in so many different ways.



### NATIONAL PNEUMATIC COMPANY

*Executive Office, 50 Church Street, New York*

*General Works, Rahway, New Jersey*

CHICAGO  
518 McCormick Building

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

PHILADELPHIA  
1010 Colonial Trust Building



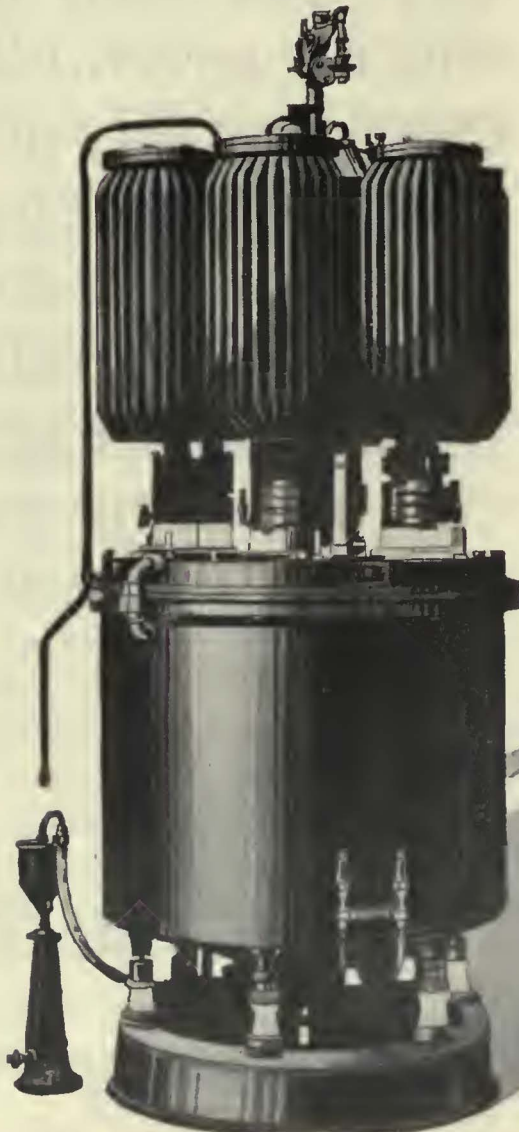
# American BROWN BOVERI

*Revenue is revenue—  
dropped in the fare-box  
or saved in the substation*

**T**HE chart tells the story.

The \$730 saved annually by one Mercury-Arc Power Rectifier as checked against a rotary converter is equal to 14,600 five-cent passenger fares.

Resulting revenue is just as profitable whether it comes in through the fare-box or the substation.



### *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.





# Mercury-Arc Power Rectifiers

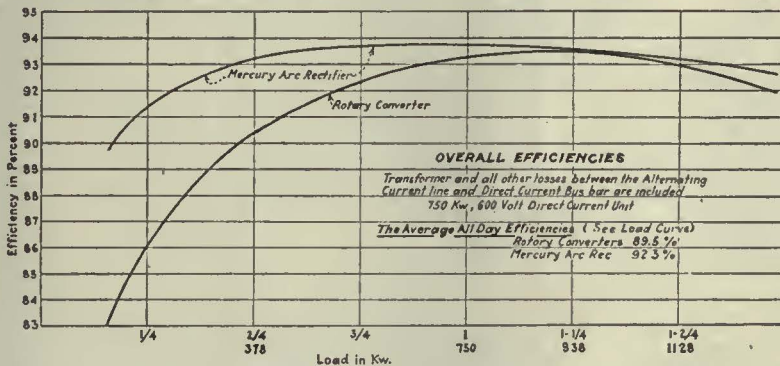
With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V.

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

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

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

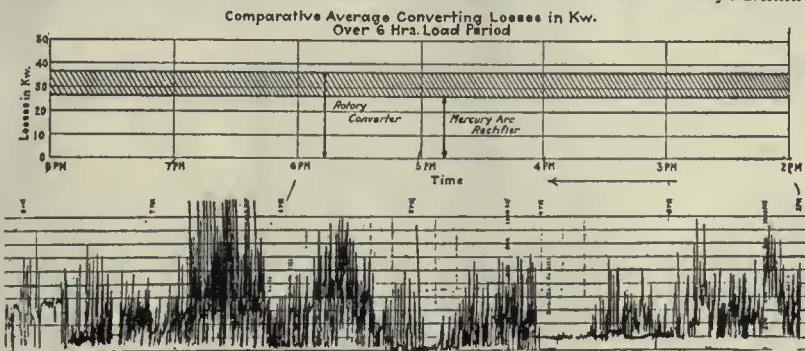
for Rotary Converters..... 89.5%  
for Mercury Arc Rectifiers..... 92.3%



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

the INTEREST on MORE THAN \$10,000.00.

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



American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y.

Camden, New Jersey

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



1927

# AMERICAN BROWN BOVERI

# LONG LIFE

**E**CONOMY BEGINS as soon as *International* poles go in. Their remarkable durability assures long life, low annual cost and added years of reliable service. Leading public utility organizations attribute a life of more than 25 years to Creosoted Pine—and know that the service the year round is dependable and economical.

*International* stands for the best in timber preservation—sound timber, correct seasoning and scientific treatment under rigid chemical control. *International* has had poles in service more than 25 years and their condition indicates they are good for many more years.

**International Creosoting & Construction Co.**  
Galveston—Texarkana—Beaumont

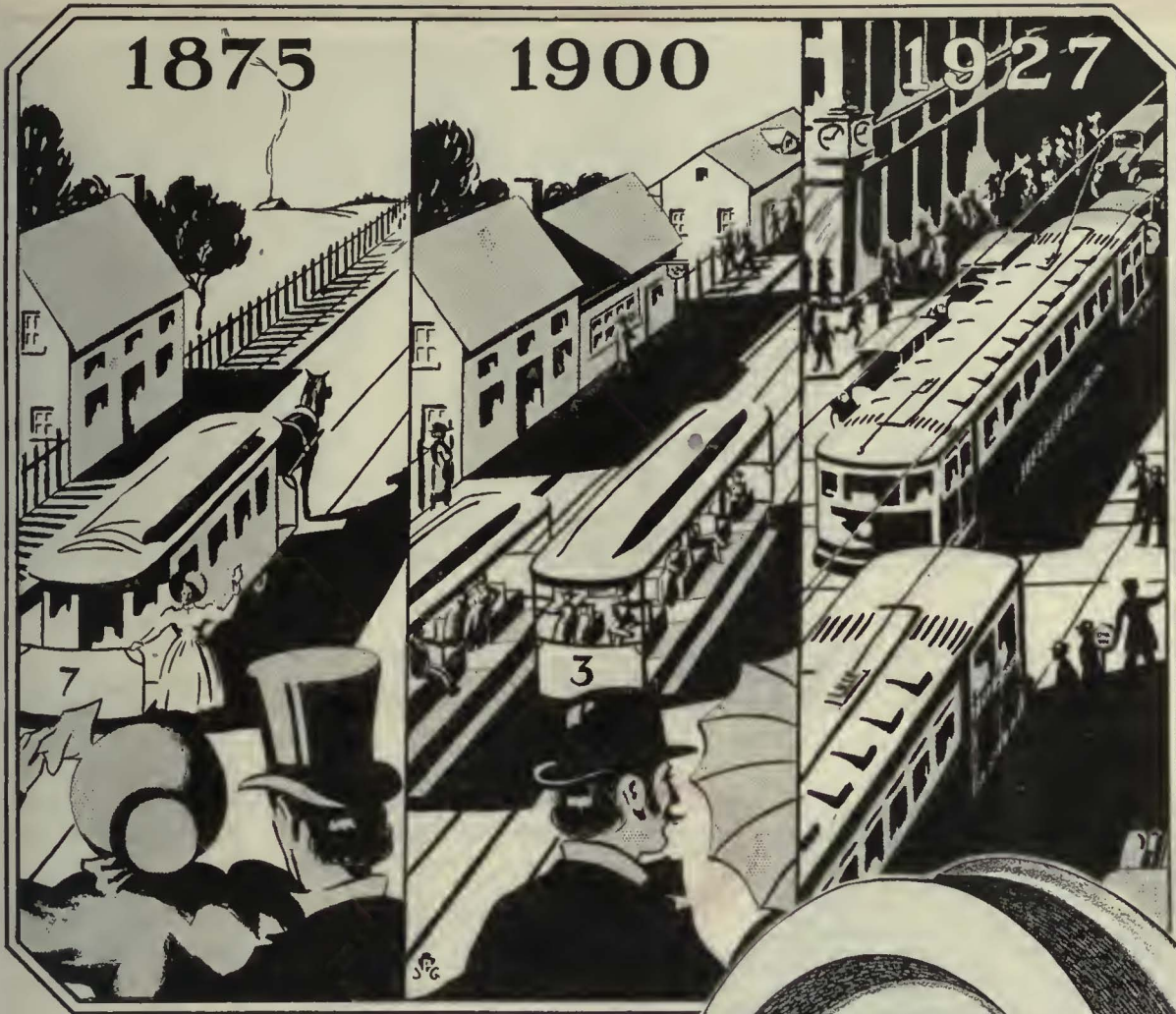
*The illustration shows International poles in service of the Southern Colorado Power Co. between Pueblo and Canon City.*



# *International*

## Creosoted Yellow Pine Poles



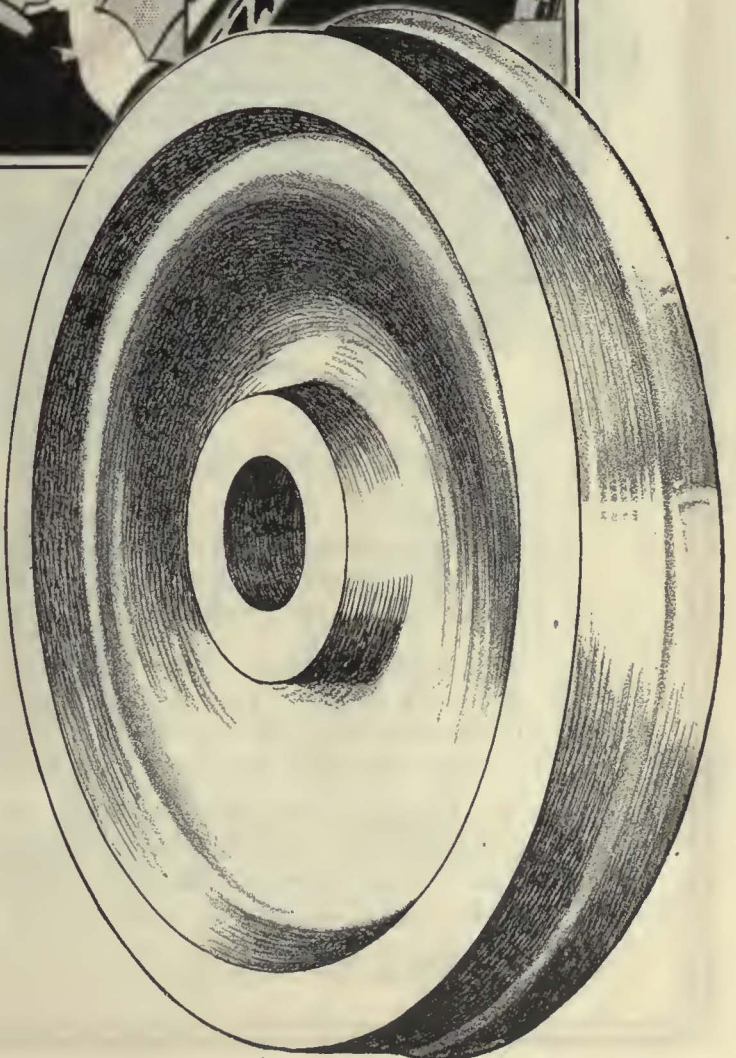


*Growing . . . Growing . . .  
Growing*

Year by year metropolitan population grows larger, more active, more congested. . . . Year by year, as a result, greater and still greater demands are made upon transportation.

How the electric railway industry has met these demands is best indicated by the rapid evolution from the horse car and cable car era to the era of the big comfortable cars of today.

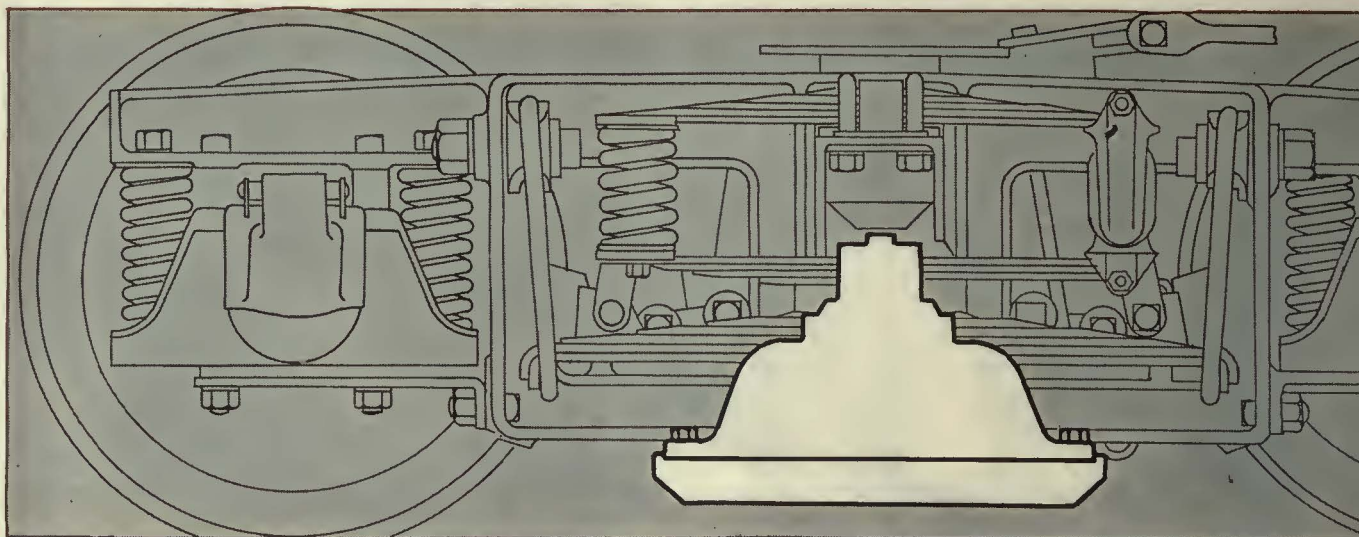
While it is the coach of the electric car that carries the passengers, it is the *wheels* that carry the coach, . . . Gary Wrought Steel Wheels are especially designed to meet the strenuous demands of present day traffic conditions.



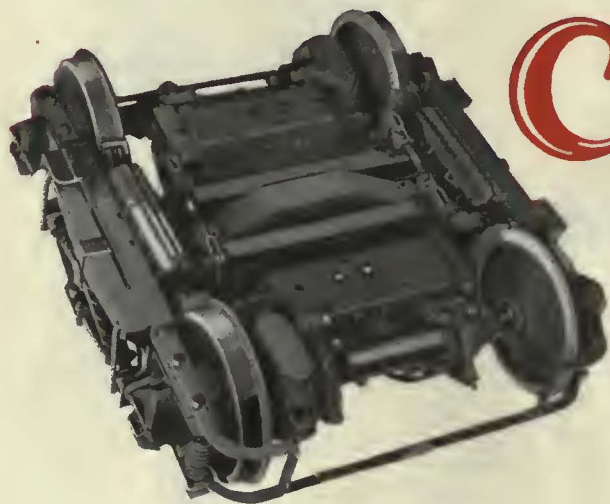
**Illinois Steel Company**

General Offices:  
208 South La Salle Street  
Chicago, Illinois





## The Magnetic Brake—as a



**C**INCINNATI BALANCED DESIGN has effected the first practical application of the Duplex Air and Magnetic Brake.

It has taken the basic units which proved so successful at the trials held on the Buffalo & Erie Railroad last summer, and incorporated them in a unique high-speed truck, accurately balanced to meet the needs of today.

Blue prints and photographs of the new truck are reproduced on this page. Note the mounting of the magnetic brake shoes *within* the cast steel side frames. Note also the arrangement of the spring rigging, to provide for the additional brake equipment and also to assure

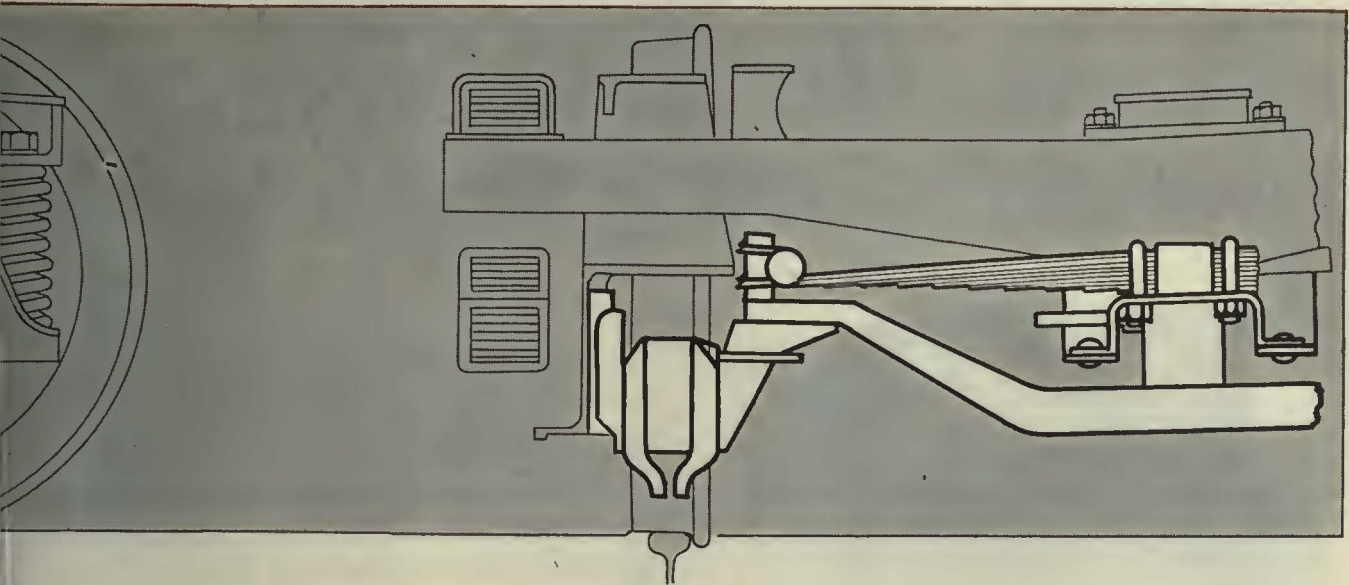
great stability of the light-weight car at speeds up to 60 mph.

An important feature of the magnetic brake as now used lies in the fact that the shoe is maintained *well above* the rails, being forced down by air pressure only during the time application is made. Thus the need for adjustment and careful rail maintenance, so necessary with earlier types of this equipment, is no longer present.

The Duplex Air and Magnetic System utilizes the standard method of brake operation with an M 28 Valve, the sander connection being used to operate the magnetic brake shoe circuits *automatically* when the brake valve is thrown to emergency. This arrangement also permits of independent operation if desired.

The Duplex Air & Magnetic Brake is presented as a part of Cincinnati BALANCED car DESIGN only after practical tests have proved its efficiency beyond doubt. The electric railways today are looking for equipment which will enable them to give faster and safer service, with utmost comfort. Certainly a braking system which



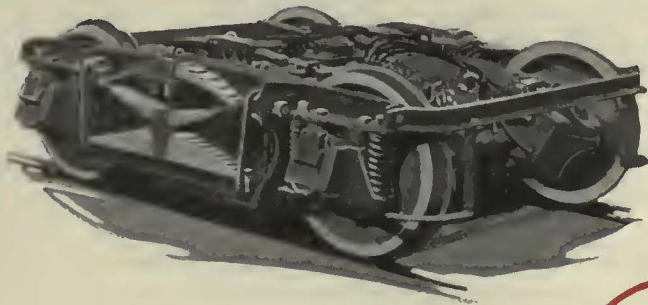


## feature of **BALANCED DESIGN**

reduces emergency stopping distance 22.5 to 46% can be utilized to these ends, . . . especially when built into trucks and cars accurately **BALANCED** to make the most of its possibilities.

We will be glad to send further data to any interested electric railway executive.

CINCINNATI CAR COMPANY, CINCINNATI, OHIO



# CINCINNATI *New* CARS

*A step ahead of the modern trend*

# A Who's Who ~ of G-E Carbon Brush Users



Berkshire Street Ry. Co.  
 Boston Elevated Railway  
 Brooklyn Manhattan Transit Corp.  
 Connecticut Company  
 Georgia Railway & Power Company  
 Hudson & Manhattan Ry.  
 Key System Transit Co.  
 Market Street Railway  
 Milwaukee Electric Railway &  
 Light Co.  
 New Haven and Shore Line Rail-  
 way Co.,  
 New Orleans Public Service Co., Inc.  
 New York Central Railroad  
 New York & Stamford Railway Co.  
 Schenectady Railway Co.  
 United Traction Company

These regular users of G-E Carbon Brushes are among the many properties that have found them an important help to the continuously dependable operation of railway motors.



Satisfied users are the best advertisers of any product. Like all other General Electric equipment, G-E Carbon Brushes have behind them the resources and engineering facilities accumulated during 30 years of manufacturing experience.



*For*  
**Original Equipment Quality**

# 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, February 12, 1927

Number 7

## Why Not Call It Popular Transportation?

IN DISCUSSING the transportation of people to and from their homes and places of business, the term "mass transportation" has come to be generally used. Unfortunately this is an apt description of transportation standards forced by the rates of fare permitted in most American cities. People are moved as masses instead of as individuals, and the standards usually applied to the treatment of the individual have been completely abandoned in the continued effort to move humanity in the bulk at the lowest possible cost.

Hope for the future lies in a gradual awakening on the part of the public and a demand for something better in transportation at an appropriate price. But even under existing conditions, the common use of the word "mass" is an unhealthy influence. Why not substitute "popular"? We use this word generally when referring to the price of a service or commodity which is in the reach of everybody. "Popular transportation" seems more appropriate and tends to create a slightly improved conception of the job we are trying to do than does "mass transportation."

## Hysteresis Is Characteristic of Many Electric Railways

STUDENTS of physics are familiar with the phenomenon of lag in electro-magnetism, known technically as hysteresis. In a different form this lagging tendency seems to afflict a considerable number of electric railways. They are just now starting to do what the leaders of the industry did several years ago. They have not yet begun even to think about the things the progressive companies accomplished during the past twelve months. Two or three years from now, if all goes well, they may consider the adoption of these improvements.

For example, the management of a certain railway recently decided that money could be saved by the use of a simplified scheme of exterior decoration on its cars—a one-color background instead of the former two-color arrangement, with less striping and lettering. This policy is completely in accord with the general thinking of the electric railway industry several years ago, but apparently disregards the recent change in outlook. Today the best thought of progressive managements is being devoted to increasing the attractiveness of the cars rather than to saving money in painting. Steam railroads and electric railways are pursuing similar policies. Cars and locomotives are being painted in distinctive designs. Dull, drab colors are being abandoned in favor of bright, cheerful hues. At Saginaw and Grand Rapids the local railways have gone so far as to vary the scheme of decoration on individual cars. To give rolling stock an attractive appearance it is not necessary to spend large sums. For a little more than the minimum, if the money is judiciously used, a pleas-

ing effect can be obtained. Those who have done this find it pays well.

The chief sufferers from the more or less prevalent tendency to lag behind the times are the companies following the policy. To some extent, however, the effect extends beyond them and hurts the standing of the industry as a whole. While it may be a safe policy to adopt no improvements until they have been tried out for several years by others, such a course shows lack of the kind of courage which leads to success.

## Syracuse Goes to a New Fare Schedule

CASH fares on the New York State Railways in Syracuse are to be raised from 7 cents to 10 cents. Ten tickets will be sold for 75 cents. In so deciding the Public Service Commission has ruled on a case that has been before it for some months. As the commission sees it the company exhausted every reasonable expedient in endeavoring to effect economies so as to continue operations at the rates fixed by the commission in 1921.

There was no formal fixation of valuation, but the commission ruled that the rates asked by the petitioner would in no event be unreasonable. It estimates the increased revenue due to the increase in fare at \$346,023, based on the figures for the year ended Sept. 30, 1925. This estimate took into consideration the possibility of a 2 per cent decrease in the number of car riders due to the change in the fare schedule. There is no note of censure in the comments of the commission in rendering its decision, but the chairman refers to the complex and involved corporate consolidations which culminated in the formation of the present company. This matter is not easy to follow in its ramifications. It is apparently a case in which the recent recommendations of the A.E.R.A. committee on finance might well be heeded.

Fares have been changed a number of times in Syracuse since 1918. Prior to Nov. 26 of that year the fare was 5 cents. It was then increased by the Public Service Commission to 6 cents and in 1921 it was made 8 cents with four tickets for 29 cents and children's fare of 4 cents. On application of the city the fare was reduced on Oct. 1, 1922, to 7 cents. The commission says that the earnings now represent less than a 4 per cent return and that the new rate authorized is likely to return considerably less than 8 per cent.

The opinion of the commission may well be perused with profit by managers elsewhere, but the principal interest in the decision would appear to lie in the fact that the case represents an apparently sincere effort of a company operating 98 miles of line in a city of 170,000 population to make its lines self-supporting under the economic conditions changed materially from those which prevailed as recently as 1918. There is no question about the right of the company to a fair return upon the value of its property dedicated to public use,



but it will be interesting, in view of previous fare changes in Syracuse, to follow the course of earnings under the new scale.

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### Cutting the Cloth Too Close Produces a Dissatisfied Customer

**E**XCESS service—cars too lightly loaded—is properly considered a sign of inefficient railway management under ordinary circumstances. To correct such a condition schedules are trimmed. That, however, is a job for an expert and evidence is not lacking that some railways employ unskilled cutters.

For example, take the case of a railway which some time ago lengthened its Sunday headways on certain lines. Every car now carries a small standing load. That may be a source of gratification to a management hard pressed to make both ends meet, but it is a source of much annoyance to the passengers. In the end it will surely prove to have been poor economy.

Probably every passenger who has to stand spends his time thinking dark thoughts about that railway. Next time he goes out on Sunday, he says to himself he will use some other means of transportation. If he carries out this resolve, and very often he does, he may be lost permanently as a railway patron. In any event he is a dissatisfied customer and an easy convert to the doctrines of the demagogues who rant against the traction interests.

In general, the public understands that in rush hours electric railways cannot be expected to provide a seat for every passenger. Those who do not have to travel at such hours have the choice of putting up with the crowding or travel at some other time. Those who must, continue to ride despite crowding. In the middle of the day and on Sundays and holidays, on the other hand, there is little excuse for making passengers stand. At such times the railway patrons ride from choice rather than necessity. Unless the service is reasonably frequent and comfortable, they will be discouraged from riding. The money saved by cutting schedules will go to pay the high cost of short rush-hour peaks, and the last state of that railway will be worse than the first.

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### Adopting the Manner When the Spirit Is Lacking

**C**COURTESY, co-operation and like actions which depend for their effectiveness on the personality of the individual are keynotes of policy in the transportation industry today. To some men politeness and helpfulness come naturally; to others they do not. Yet it is imperative that the public be treated with courtesy at all times—not merely when dealing with a man who is polite by nature. It behooves the management of a transportation company, therefore, to devise means of inculcating a spirit of courtesy and co-operation in all its employees.

Where and how to begin is a problem. Speaking particularly on "co-operation" at a recent meeting of the Metropolitan Section, American Electric Railway Association, G. T. Geer, secretary of the Third Avenue Railway, New York City, suggested the adoption of the proper manner, even when the real spirit is lacking. Going through the motions of co-operation or being courteous gets to be a habit, he said, and in time begets a sincere desire to co-operate and to be courteous. Undoubtedly there is a good deal of truth in this theory,

and it furnishes a tangible starting point for training. If a man who is otherwise a valuable employee lacks a naturally courteous manner, he can at least be taught to adopt its outward form. Later, it is to be hoped, he will catch the genuine spirit.

Danger lurks in this plan, however, as it is possible that the man's development may stop with the mere adoption of the outward form. Courtesy that is only skin deep is little better than none. As a beginning, it may be said to be a step in the right direction. But before it really can count for much it must come from the heart.

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### Service at Cost— or at Less than Cost

**E**NLIGHTENING in that they illustrate the wide range of thought possible on the economics of service at cost are two communications published elsewhere in this issue. They followed from an article in a St. Louis newspaper purporting to be an interview with delegates attending a convention of some seven economic societies meeting in that city early last month. Unfortunately the article presented only the views of those apparently antagonistic to the theory on which is based the franchise now being negotiated between the city and interests attempting to reorganize the United Railways of St. Louis. Diametrically opposed views from equally capable economists were omitted.

In his communication Prof. James C. Bonbright of Columbia University corrects certain misstatements in the newspaper article and then advances a theory that a contract once entered into relative to the rates for service must survive, even though one of the contracting parties be financially wrecked. From the arguments advanced by him it would appear that the cars and rails of the system were in some peculiar manner a party to the contract, rather than the corporation owning the physical plant. Many of the present troubles of electric railways are due to politicians holding the same view.

On this theory, the greater portion of the investment would cease to have any value in case a contract proved unprofitable. It is not sound economics to insist on the last pound of flesh in requiring the fulfillment of a contract which common sense shows cannot be carried out. The successful issue of both mortgage bonds and stocks depends on earning power over a period of years, and this is subject to changing conditions that cannot be prognosticated accurately long in advance. But to attract capital and provide a satisfactory service rates must be such as to give an adequate return on the money prudently invested in the enterprise. On Professor Bonbright's theory the purchaser of either bond or stock must for his own protection demand a higher margin of safety or a larger rate of return lest the fixed rates prove unprofitable and destroy the earning power. It is on a basis such as this that he believes a cost-of-reproduction valuation is too high on general principles.

L. R. Nash, on the other hand, contends that both the city and the company entering into a contractual relation bear definite responsibilities. The company renders a service that the community wants. If the community is not willing to bear its share of the cost of service, then "what it seeks is not service at cost, but service at less than cost."

That regulated utilities must be permitted to earn adequate returns in exchange for good service is a



principle so generally accepted today that expressions of opinion such as that typified by the Bonbright letter, similar in many respects to the opinions of Prof. Robert Hale and John Bauer, who also contributed to the St. Louis newspaper article, seem to savor more of miraculously attempting to extract the "pound of flesh" than of expounding real economic theories.

Aside from the ill effect on a community arising from the expressed views of economists such as those gentlemen visiting in St. Louis, it is alarming to realize that the young men of our colleges, studying the rudiments of business, may be exposed to such unsound theories that cannot stand the acid test of practice. Such views are not in accord with the preponderance of evidence evolved from successful business methods, and they run counter to the many Supreme Court decisions that have been the milestones that have guided the industrial growth of our nation.

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### Car Replacement Awaits Manufacturer Initiative

GROWING interest in the improvement of equipment is evident throughout the electric railway industry. Better appearance, reduced noise, more comfortable seating, streamline painting, use of floor coverings, easier riding trucks and other elements which add to the attractiveness of an electric railway ride are being actively discussed by operators both individually and in committees. The general tendency to experiment with the rebuilding of old cars is merely another indication of the widespread conviction that car improvement is an essential and necessary requirement of the industry.

In many cases, unwise expenditures are being made for rebuilding old and heavy equipment, when the difference in cost for new cars could be financed out of the savings which new cars would make in operating and maintenance costs. But in the very fact that so many old cars are being rebuilt there is a challenge to the ingenuity, courage and business foresight of the car builders. Electric railways are genuinely interested in the advantages of improved equipment. In many cases, however, the advantages of new equipment are not sufficiently evident to overcome the attachment which some properties seem to have for their old cars. In some respects this hesitation is justified by the fact that manufacturers have failed to foresee the need of the times or adequately to interpret this in the development of their product.

The days of just building cars to meet the ideas of the customer are going rapidly. The customer has ideas, of course, but in the past the car builder has dodged the full responsibility of a manufacturer by merely operating as a contractor to build according to the customer's ideas. The plea in defense of this practice has been that the customer insisted on having his own way. That may all well be true, but there is ample basis for concluding also that the manufacturer has not been reluctant to yield to the customer's views, even when he knew better, as a means of dodging the responsibility which every producer should assume as to the performance of his product and its suitability for a particular service.

Discussion of this subject with many operators who have had the reputation of insisting on their own designs shows no widespread belief in the wisdom of this practice. The usual view expressed is that the manu-

facturer has had little to offer, except possibly a design developed by some other railway property, and that consequently the operator has had no choice but to accept another operator's design or to specify his own. In some cases, railways which have been in the habit of building their own equipment point out that they do not believe in this practice as a sound business policy, but have built their own cars because the manufacturers had nothing better to offer.

Doubtless there are things to be said in defense of the car builder's viewpoint. The subject is a critical one to the industry and is deserving of the fullest and frankest discussion. The foregoing is not intended as a full analysis of the situation from both sides. It presents primarily the railway viewpoint. But the responsibility for bringing about improvement in car building and car merchandising practice rests with the manufacturer. The present widespread tendency for railways to spend money in rebuilding heavy, awkward cars is a challenge to the advantages of new equipment. It is up to the manufacturers of the industry to push ahead with such a program of car design improvement, that the advantages of replacement instead of rebuilding will be evident to even the most precedent-bound executive.

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### Co-operation with Police Means More than Mere Friendliness

JUSTIFICATION often is lacking for the claim that a fine spirit of co-operation exists between the local police department and the operating personnel of the street railway. Actions, rather than words, are the true evidence of a desire to be mutually helpful. Traffic officers and platform employees may outwardly be on a very friendly basis, without the existence of any real co-operation.

As far as it goes, it is a fine thing for the police commissioner to be on good terms with the general manager of the railway; to sit in his office, smoke his cigars and talk over the traffic problems. Similarly it is a fine thing for Bill, the motorman, and Jim, the traffic officer, to exchange pleasant greetings at the beginning of their day's work. But this friendliness, if it stops there, really fails to facilitate the movement of street cars or other vehicles.

At a busy intersection the expeditious handling of traffic depends largely on the skill of the individual policeman on duty. Automatic signals have not eliminated his influence. Establishment of traffic regulations is beyond his control, but enforcement of them is equally important, and in that he stands supreme. Whether a street car crosses at the end of one movement or must wait for the beginning of the next depends on a gesture of the traffic officer. Left-hand turns of vehicles can be so controlled that little interference with other movements is caused, or they may be allowed to block the entire intersection for the time being.

Back of this work of the individual policeman lies the attitude of the department and the municipal authorities. There, too, the need exists for more than a spirit of mere friendliness. Railways do not seek favors, but only fair treatment, based on a true concept of the relative importance of various vehicles in the general transportation scheme. By all means let friendly relations be fostered, but let the matter not stop there. Let the co-operative spirit be transmitted into active co-operation.



# Our Primary Interest Lies in the Upbuilding of Our Communities\*

Greater Co-operation Is Needed Within the Industry—Transportation Will Prosper and Progress Only as It Plays a Proper Part in Civic Development—Better Facilities and Service at Adequate Rates of Fare Benefit Both the Transportation Companies and the Communities They Serve

By *W. H. Sawyer*

President American Electric Railway Association

**N**O ONE can question but that an industry like ours needs and must have a national association. There is no question in my mind but that there is a definite need also for the Central Electric Railway Association. No one at the end of such a meeting as you have had today can doubt this. It has been a real inspirational meeting, and I say, more power to you. You get really closer to your definite local problems than we do in the national association. The stronger you make the Central Electric Railway Association the stronger should be our national association.

I happen to be temporarily—for one year only—the president of the American Electric Railway Association. I have certain definite thoughts as to what might be done to make this association an even stronger organization than it is today. I have asked the proper committees to review all of the activities of this association. Immediately, however, there is a thought to preserve inviolate past practices and traditions. If what is proposed to be changed is wrong, I want it to stand or fall on its merits. I am not content to continue certain practices just because they have been the past procedure. I believe I would not be faithful to my trust if I did not ask for a thorough review and analysis of all the acts and doings of this association. This is a business association, to be operated on business principles, and changes are naturally necessary in any business organization. I do want it thoroughly understood, however, that the discussion of any such changes is purely impersonal. When we get all through with our studies we may make few changes, but at least we will be able to assure the industry that all work of the association is on an effective and economical basis.

## OPPORTUNITIES FOR IMPROVEMENT ALWAYS EXIST

It is my belief that by reduction of duplication and by co-ordination of all facilities of the industry, we can have an association which will do better work on a more economical basis. In that thought I may be wrong, but when next October comes around and the American Electric Railway Association goes before the industry for increased dues, I want it to be as nearly as practicable on a co-ordinated, economical and unassailable basis.

Between now and next October the finance committee, the policy committee and the committee on revision of constitution and by-laws will make their reports.

It appears now as if all three of these committees would recommend changes. I recognize, as I said before, that I am only temporarily president and that this association is your association. All I am doing is giving advance notice, as it were, that I am one of those who believe we can do a better job than we have been doing. I consider this no criticism of any past official or past action of our association.

All of us on our own properties are looking over our hands and are doing things differently today than we did even one year ago. All I am asking is that we do the same thing with our American Electric Railway Association. On our own properties we sit around the board and discuss changes. We at times differ widely, though honestly. Eventually we come closer to one accord and take a progressive step. That is all I expect in connection with the American Electric Railway Association. I want to have its activities analyzed and discussed openly, freely and frankly, and then let us all be of one accord, working together for the industry which means so much to all of us.

## CLEVELAND CONVENTION PROMISES TO SURPASS LAST YEAR

Now, just a word about the Cleveland convention and our friend Colonel Alexander, because I cannot think of one without thinking of the other. The colonel is giving us real co-operation. I have his word for it, and I believe in him when he says that he will give us a street car exhibit far better—both as to quality and quantity—even than the street car exhibit of 1926. Your own Harry Brown has charge of the program and it is to be of the conference-discussion type, rather than set speeches.

Some of you felt that it was a mistake when we came back to Cleveland. I appreciate that Atlantic City is one of the best convention cities, if not the very best, in the world. But Atlantic City this year could offer us practically nothing except the pier, as we had it in 1925, and a temporary building. We could not have held in Atlantic City this year a real street car exhibit, and such an exhibit is at this time, I believe, essential and necessary.

## CAR EXHIBIT WAS INSPIRATION

It was an inspiration to me; it was an inspiration to many at Cleveland actually to see all those modern cars, which had been purchased by hard-headed business men who considered them essential in merchandising

\*Abstract of address before the Central Electric Railway Association at Toledo, Ohio, Feb. 3, 1927.



their service. We had talked a great deal and had read about companies that had been successful in modernizing their equipment, but here we had actual examples before us of what had been accomplished. I do not believe that any man went away from that convention without something closely akin to an inspiration and a conviction that modernized equipment does pay, is worth while, and, in fact, is necessary to meet today's conditions. That is the primary reason why the convention will again be held at Cleveland, and I hope that those of you who will miss your stroll on the boardwalk will bear that in mind and line up with us to make this street car exhibit a further inspiration and a greater success.

Right in this connection, in 1926 there was one street car manufacturing company that built one street car on its own initiative and sent it to Cleveland at its own expense. Just compare this situation with the bus manufacturer. True, they are not fairly comparable, but there is more than an opportunity for thought as to the necessity for initiative on the part of the car and equipment manufacturers.

#### EQUIPMENT IMPROVEMENTS ARE NEEDED

These manufacturers are my brothers, as it were, and I feel closely akin to them, but owners, operators or manufacturers cannot be successful if we are to continue along lines which were prevalent ten or more years ago. We operators are attempting to meet the changed conditions due to privately owned automobile competition by making our service so appealing to automobile owners that more of them will of preference take our street cars. Our manufacturing brothers appreciate our situation and are endeavoring to satisfy us, but we need every ounce of help that they can give us, every ounce of initiative.

A short time ago I looked over some drawings of an axle with its accessories, which at first thought is almost revolutionary in the street car industry. I do not know whether the axle is practicable, but the manufacturer's representatives told me that they believed in it and proposed to give it a thorough test and demonstration, and I do know that I felt encouraged by the initiative shown by them and this evidence of their faith in the future of the electric railway industry.

#### TRANSPORTATION EXECUTIVES HAVE RESPONSIBILITY TO COMMUNITY

There are today only comparatively few communities which are not to a greater or lesser extent handicapped by the fact that they have not as good transportation service as the needs of the community warrant and it is the duty of every electric railway executive to do all in his power to remove that handicap so that his community may grow and prosper. Transportation executives have a definite responsibility to their community to a greater extent, probably, than the executives of any other industry.

We discuss the competition from the privately owned automobile. It is real competition, which will continue to become more severe, nationally speaking. This competition makes it more difficult for the electric railway company properly to take care of the needs of the community, but public transportation still remains a necessity. Some one is going to continue to operate electric cars and buses as a part of our public transportation systems. Don't ever get away from that thought: Public transportation still remains and will continue to remain a community necessity.

You know the situation; I know the situation, but we have not yet sold to our public, our customers, the facts regarding the problem. We are a part of the community, an essential part, a life-giving part. We understand and recognize that fact, but too few of us have as yet convinced our communities of the necessity of actual, real, helpful co-operation with their electric railway companies.

I have not accomplished my own desires in this respect; I could do much more for the communities in which I operate than I am doing, if I could only win real co-operation. I have not yet sold to these communities the thought that by co-operation we can both merit and achieve success. It is one of our primary duties to sell ourselves and our companies to our communities. We know the needs of our communities from a transportation standpoint better than anyone else. We know what we can do for our community if given the opportunity.

How are we going to fulfill our duty to our community? If we expect justice to prevail with only a nominal effort on our part, we will be sadly disappointed. The community must eventually pay the cost of transportation service. Eventually it will see the light and eventually transportation will be brought up to the needs of the community. But the longer that "eventually" is put off the more we will suffer and the more our communities will suffer. We must meet this community problem more than half way. We cannot be content with simply stating the facts. We must prove to our communities in a manner more forcible than most of us have done, that in spite of all the handicaps of the day we can and will give them satisfactory service if we can but have their co-operation. To continue to give the same kind of service and to use the same kind of vehicles that we did fifteen years ago is not very convincing. Street car lines which are to continue to function as community enterprises must be modernized. Transportation practices must be on a merchandising basis. We must have a pride in the service we have to sell, and the community which buys our service must have a pride in it.

#### IMPROVED FACILITIES PAY

What companies are making the most distinct headway as to this community problem? Is it those companies that are staying in the rut and are not meeting

### *Pride Goes with Proper Service*

STREET car lines which are to continue to function as community enterprises must be modernized. Transportation practices must be on a merchandising basis. We must have a pride in the service we have to sell, and the community which buys our service must have a pride in it.



the changed conditions of today with changed methods and changed equipment? Which of our companies are showing the greatest improvement in their balance sheets? Look over the list of Coffin Prize awards and Coffin Prize contestants and there is emblazoned the answer: The North Shore Line, the Northern Texas, the Pittsburgh Railways, the Penn-Ohio, Dallas, Grand Rapids, Buffalo & Erie, Interstate and many others. It is among this class of companies that you find men who are succeeding in their duty to their communities. It is this class of companies, owned and operated by men with vision, that are making better showings in their balance sheets.

Let me speak even more bluntly. I know that an appreciable portion of the present electric railway trackage is going in the discard. I personally know right where some of those lines are, but I also know that there is nothing to be gained by drilling our hard-luck stories into each others' ears. I also know that a continuance of past practices is not going to save our investments. I do not know just what should be done, but I do know that a large number of us must do differently than we have been doing or we are not going to save these investments. I also know that those companies that have been the most progressive in their changed methods are, as a class, making the best financial showing and stand out definitely in a class by themselves. Give heed, ye doubting executives, to the facts and figures so forcefully arrayed by Charlie Gordon.

#### GOOD SERVICE MORE IMPORTANT THAN LOW FARES

There is one other phase of our community problem requiring not only salesmanship but courage. Good service is of far greater importance than low fares. I have pointed out that the elimination of public transportation service is unthinkable. Poor service means community stagnation. The community will eventually pay for no service or poor service the highest price of all—its very life. But let us take the average case of today where the community pays 7 cents for what should be 8½ cents service and progresses even though thus handicapped. There is no question in my mind but that the community would be the gainer if this service, economically and progressively administered, was appreciably increased in quality and quantity, and the fare also increased to meet the cost. The charge must equal the cost of the service. That is true of any business anywhere, but the particular point I am stressing is that the community, if it is to grow and prosper on a sound economic basis, needs even better transportation than is on the average being given today—and therein lies another duty of our industry to our communities. I believe in a 10-cent fare and in a 10-cent service, because I believe that under the conditions of this day and age the few extra pennies spent for car fare would contribute many-fold to civic development and prosperity.

#### TOO MUCH LOOSE TALK ON BUSES

Now, just a few words about buses. There has been entirely too much loose talk about the bus eliminating the street car. I have in mind particularly the Chicago situation, which is local unto itself, political and chaotic. Nothing new, supernatural or mystical has happened within the last few months to warrant those who

previously definitely advocated co-ordination completely to reverse their position and now advocate wholesale substitution; that is, there is nothing except selfish, mercenary motives. I have no hesitancy in saying that I do not believe that any thinking man who is familiar with the situation believes that the Chicago settlement is going to be on the ridiculous basis of eliminating the electric street cars. That would not be building up a community. Such a thought is not only contrary to all transportation experience, both here and abroad, but is particularly contrary to the experience in Chicago itself, where during 1926 the street cars showed an appreciable increase in passengers while the buses showed an appreciable decrease. In St. Louis the bus is not holding its own. Few responsible bus companies anywhere are making money from operation. There have been too many buses sold under high-pressure methods and used for blackmailing purposes. The use of a bus as a novelty and for joy-riding is wearing off. The glamor and air of luxury are short lived.

In spite of these facts, I want to say again, as I have said for a number of years, that we want and need the bus; that there will be many more buses used in the future than there are today, and that those buses will be co-ordinated with electric railway service by the community builders.

The electric railway operator has in the past used the word "co-ordination" with too little meaning. We have not a co-ordinated bus service simply because we are operating some buses. Neither the bus manufacturer nor the electric railway operator has been building for the future to the extent that it behooves us both to build. These large electric railway investments cannot be further jeopardized without definite loss to the communities. The electric railway executive cannot welcome the bus manufacturer who undermines those electric railway investments just for a temporary sale of today.

What I am saying is that although during the past few years we have shown definite progress toward co-ordination and co-operation, we see a clearer picture today than we did even a year ago and we should now get down to real co-operation and real co-ordination. We men who were primarily electric railway operators are perhaps slow moving and peculiar unto ourselves, but the bus manufacturer can afford to be patient with what appear to be our shortcomings.

#### REAL CO-ORDINATED TRANSPORTATION NEEDED

You bus manufacturers are here tonight because you are a part of this industry, and I believe it is essential and necessary for the prosperity of your business, of our business, and of our communities that we really work co-operatively.

Now, I have talked about the need for more buses, and have in a friendly way made suggestions to the bus manufacturers. I have also talked about the need for modernized car equipment and have in effect made suggestions to the electric car and equipment manufacturers. These two thoughts are not opposing. They are both included in the thought that we all owe a duty to our community and that we can best serve its development if it will but give us the needed co-operation toward a really co-ordinated, modernized electric car and bus transportation system, such as we can give it if we all work together.



Part of the fleet of 23 Mack six-cylinder gas-electric buses operated by the Capitol District Transportation Company (United Traction Company) on the 3½-mile Albia route, Troy, N. Y. This view was taken in front of the Albia Garage, formerly the carhouse, near the outer end of the route.



## Buses Meet Severe Operating Conditions in Albany and Troy

Experience with Successive Types of Buses Prove the Adaptability of the Six-Cylinder Gas-Electric Type for Frequent Stop Service and Heavy Grades

**E**XPERIENCE of the Capitol District Transportation Company in Albany and Troy, N. Y., has led the management of this bus operating subsidiary of the United Traction Company, Albany, N. Y., to a number of conclusions regarding the basis for successful operation of such vehicles. Ernest Murphy, general manager of the United Traction Company, is a believer in the possibilities of the bus. He insists, however, that the basis for successful operation cannot be found by relegating the bus to thinly settled territory in the outskirts, where it is impossible to show a profit with any form of transportation.

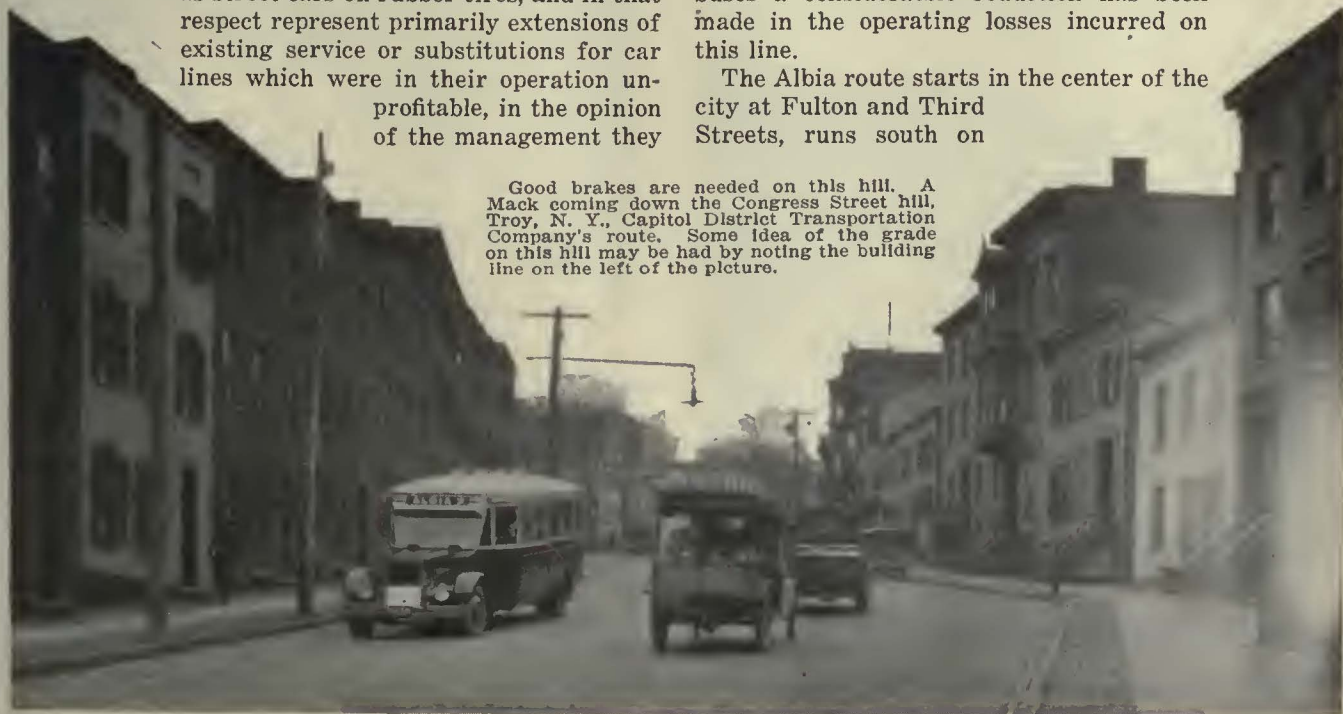
Although the buses in Albany and Troy are operated as street cars on rubber tires, and in that respect represent primarily extensions of existing service or substitutions for car lines which were in their operation unprofitable, in the opinion of the management they

have permitted a substantial improvement in service. They have been the means of cutting down the losses incurred in the rail operations which they have replaced and of avoiding heavy and unjustified expenditures for track renewal and street paving.

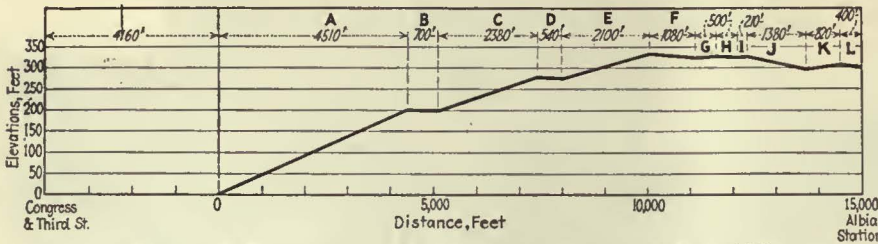
On the Albia route in Troy 23 Mack six-cylinder, gas-electric buses have replaced the former trolleys and the rails have been removed. In this case the rail service was abandoned primarily because of a prospective heavy paving expenditure. The type of paving used here—cut Vermont granite block—costs between \$5 and \$8 a foot of track. At the present time the obligation to pave is fixed by state law. As the result of the substitution of buses a considerable reduction has been made in the operating losses incurred on this line.

The Albia route starts in the center of the city at Fulton and Third Streets, runs south on

Good brakes are needed on this hill. A Mack coming down the Congress Street hill, Troy, N. Y., Capitol District Transportation Company's route. Some idea of the grade on this hill may be had by noting the building line on the left of the picture.







Graphic Diagram of Grade Problem Encountered by Buses on Albia Route of Capitol District Transportation Company, Troy, N. Y.

Section	Ft.	Average Grade, Per Cent	Section	Ft.	Average Grade, Per Cent	Section	Ft.	Average Grade, Per Cent
A	130	5	C	450	2.38	F	380	0.6
	150	6.13		750	3.87		700	0.87
	60	5.0		420	6.30	G	1,080	0.77
	200	7.75		250	3.60		500	0.64
	425	9.17		510	0.5		H	500
	315	7.84	D	2,380	3.29	210		0.65
	230	5.87		540	0.5	I		100
	220	4.32	E	260	1.0			275
	420	3.73		300	1.37	365	4.0	
	730	3.38		270	2.43	640	2.5	
	370	1.60	300	4.40	K	1,380	2.4	
200	2.70	150	5.40	520		1.93		
100	1.43	320	4.32	300	0.40			
400	5.10	200	2.40	L	820	1.4		
260	3.27	300	0.6		400	1.0		
310	1.43	B	2,100	2.7	Total....	2,865 mi.	1.96	
4,510	4.5		400	1.0				
300	0.4	700	0.74					

Third to Congress, east on Congress to Pawling Avenue and from there out Pawling Avenue to the Albia Station, a distance of 3½ miles. The average grade over the entire route is 1.96 per cent. On Congress Street the maximum grade is 9.17 per cent. A profile of the line is shown in an accompanying illustration.

Bus equipment of the Capitol District Transportation Company consists of three Mack four-cylinder, gas-electric city type buses on the Oakwood Avenue route in Troy, 23 Mack six-cylinder gas-electric buses of special body design on the Troy-Albia route, two of the same type in Albany and two more in Rensselaer. There are nineteen Fageol gas-electric buses operating in Albany.

The company first began its experiments in Cohoes with four Brockway trackless trolleys. These were followed with two mechanical-drive buses operated in

determined that mechanical-drive buses could not stand the service demands on the very steep hills encountered in Albany and Troy.

SIX-CYLINDER EQUIPMENT SHOWS IMPROVEMENT

The six-cylinder gas-electric buses are able to maintain an average speed of 7 m.p.h. on the Congress Street hill in Troy. The company feels that it now has a vehicle which provides practical transportation equipment for this service.

Mr. Murphy expresses the company's views on bus equipment as follows:

"We use gas-electric buses because they give us better service than mechanical-drive buses. They are time-savers on hills, as the acceleration is more rapid. Gears are slow enough under normal conditions, but on these hills they are practically impossible. Another reason is that they eliminate the expense of installing new gears and clutches in the buses periodically. The Albia route is up-grade practically all of the way in one direction and patronage demands at least eight stops to the mile or an average of 23 per trip. On our grades clutches won't stand very much of that kind of severe service.

"An operator cannot mix gas-electric and mechanical-drive buses in the same fleet. After driving gas-electrics, a chauffeur will not touch a clutch-driven bus if he can help it, and if he does drive one he often will abuse it.

"Another reason for gas-electrics here," Mr. Murphy declared, "is to relieve drivers of all duties not absolutely essential. Through experience it has been found that on grades such as ours much time is lost in shifting gears. There is also the question of safety. A driver can maintain control of his bus with one hand and both feet while collecting fares and making change. This saves time as well, in that not a moment is lost by collecting fares before starting the bus. I might mention that it takes considerable driving skill to get going in the middle of these grades with a gear-driven bus. A gas-electric takes hold easily and maintains headway without visible effort."



One of the Capitol District Transportation Company's Buses Negotiating the 9.17 Per Cent Grade Up Congress Street Hill, Troy, N. Y. Although This Illustration Does Not Indicate Clearly the Pitch of This Grade, Some Idea of It May Be Gained by Looking at the Building Line



# Co-ordinated Study of Rail Corrugation Made in Europe

International Union Committee Believes that Rail  
Quality and Track Condition Are Important Factors—  
Influence of Rolling Stock Is Now Being Investigated

By D. D. Ewing

Professor of Electric Railway Engineering, Purdue University, Lafayette, Ind.

**R**EAL progress in the solution of the problem of rail corrugation can be made only by co-ordination of individual efforts and centralized direction of research work, according to a report presented at the recent Barcelona Congress of the International Union of Tramways, Local Railways and Public Transportation Automobiles by a sub-committee of the International Committee on the Standardization of Rails and Track Apparatus. The sub-committee, which consists of three railway operating officials assisted by an associated technical staff, was appointed at the Paris Congress of the International Union in 1924 and since its appointment has been devoting much time and thought to the corrugation problem. While the committee arrived at a number of tentative conclusions, it prefaces its report with the statement that it is not attempting, as yet, to present final conclusions, as such conclusions should be based on exhaustive tests and observations.

The initial work of the committee consisted of a careful historical review of past studies and observations on the subject. Its summary of these studies shows that there exist two principal current opinions on the subject:

1. The phenomenon is due to mechanical causes inherent in the rolling stock, track and methods of operation and maintenance. The undulatory wear is caused by an intermittent sliding of the wheels and a hammering of the rail. The length of the waves, being a function of the frequency of vibration of the materials involved, is proportional to the speed.

2. The rail contains within itself as it comes from the mill the germ of corrugation, and the external mechanical actions only develop still further the incipient waves. The length of the waves does not depend on the speed of the cars but does depend on the variations in hardness in the rail.

The majority of adherents to both opinions consider that track rigidity and dirt on the rails are aggravating causes.

As a second step in its work the committee sent a detailed questionnaire to member companies of the International Union. From the answers to this questionnaire a large amount of useful data were compiled and the analysis of these data resulted in the following conclusions by the committee:

1. Undulatory wear is encountered on light traffic lines as well as heavy traffic lines. However, it develops more rapidly on heavy traffic lines.

2. While no clear relation between type of rolling stock and corrugation has been found, the committee believes that cars whose ratio of wheelbase to total length is low and cars in which the body suspension is fairly rigid or stiff are more likely to cause corrugation than cars with a high ratio

between wheelbase and total length and cars with a more elastic spring suspension.

3. Corrugation is found on narrow gage as well as on normal gage track and on elastic track as well as on rigid track. However, the general experience is that paved track is more likely to corrugate than open track. The committee suggests, however, that rather than being a matter of rigidity or elasticity it is a matter of the natural period of vibration of the rails that is involved.

4. Corrugations ordinarily do not develop on track where the car speeds are below 10 or 12 m.p.h except where caused by braking in the immediate vicinity of stops.

5. Corrugations usually occur: (a) On the outside rail in curved track; (b) on both rails in straight track in spots separated by a distance dependent on the amplitude of the nosing motion of the car.

6. In length the corrugations vary from 0.8 in. to 5.1 in. and the length depends on the car speed. It also seems to be a function of the car axle diameter; the weaker the axle the longer the wave.

7. Corrugation seems to be the result of a purely mechanical phenomenon which causes irregular wear by intermittent rubbing and hammering of the surface.

8. Corrugations will develop with either conical or cylindrical wheels.

9. The nature and quality of the rail are of capital importance. The metal should be of such character as will enable it to resist the irregular strains to which it is subjected. The elastic limit and per cent elongation should be as high as possible. Data so far available seem to show that rails whose product of breaking strength and per cent elongation are high are less susceptible to corrugation than others, providing also that the elastic limit is high.

10. Rails of large cross-section are more susceptible to undulatory wear than rails of light cross-section, probably because the metal in the lighter rails is worked better.

11. While surface hardening of the rails by the "in situ" or other process seems to retard corrugation, the available data are insufficient to justify definite conclusions.

12. Micrographic studies have developed nothing new in the way of conclusions as yet.

13. Type of rail joints *per se* does not influence corrugation, however defective joints may aggravate it.

14. Defective track condition is a common aggravating cause of undulatory rail wear.

15. While corrugations may be removed by grinding, experience has shown that sooner or later they usually return and the best preventive remedies seem now to be: (a) Use semi-hard steel of good quality and high elastic limit, and which requires a large value of total work to cause rupture by tension; (b) build the track very carefully and design the substructure to fit the sub-soil conditions; (c) use cars whose ratio of wheelbase to total length is as great as possible and whose suspension is conveniently elastic.

The committee commented at some length on the report presented at the American Electric Railway Association convention last year by the American committee on rail corrugation. In general it agreed with the tentative findings of this committee.



As a third phase of its work the committee has set up a research program. In introducing this program the committee makes the following interesting comment:

"The divergencies which are found among the different theories of undulatory wear are not so great as they might at first be thought. A retrospective examination of the question shows that it is possible to extract from the whole a mean opinion, susceptible of bringing all answers together, and which can be summarized as follows:

"Due to imperfections or to the nature of the track and rolling stock and due to speed certain forces result, which tend to cause the cars to deviate from the trajectory assigned to them by the track. The various reactions which result therefrom affect the rolling contact and make it irregular. Moreover, there are produced vibrations of the rails the character of which depend on the constitution and condition of the track.

"The irregularity of the rolling stock and the rail vibrations submit the metal of the rails to stresses which are of a nature to create undulatory wear. This being true, the undulatory wear is or is not produced according to whether the nature and quality of the metal will or will not allow it to give way under the stresses which are set up."

With this in mind the committee developed its research program to include the following three important elements:

1. An investigation of the qualities which rails must have in order properly to prevent undulatory wear.
2. A study of the influence of track condition on rail corrugation.
3. A study of other causes of corrugation, especially those which are inherent in the rolling stock.

The investigation of rail quality has been proceeding along several lines. Laboratory tests on specimens cut from rails taken up from tracks show that the total work of rupture ranged from 152 kg.-m. (1,100 ft.-lb.) to 175 kg.-m. (1,265 ft.-lb.) for corrugated rails. For undamaged rails the total work of rupture in every case exceeded 201 kg.-m. (1,450 ft.-lb.). The total work of rupture is determined from the area under the force-elongation curve which is plotted from tension test data.

Service tests which consist of placing rails of known physical qualities in locations where severe corrugation occurs in ordinary rails are under way but as yet have not been under observation long enough to yield definite results.

As a result of its work on rail quality, however, the committee submitted the tentative recommendation that rails should be preferably of semi-hard quality with high elastic limit and with a high per cent of elongation.

A further specification to insure that the total work of rupture shall be high is that  $R + 6A \geq 175$ , where  $R$  is the ultimate strength in kilograms per square millimeter and  $A$  is the per cent elongation.

The studies so far made on the relation between track condition and rail corrugation have developed the conclusion that it is necessary to attend particularly to the details of track construction and maintenance as slight track imperfections aggravate the undulatory wear on the rails.

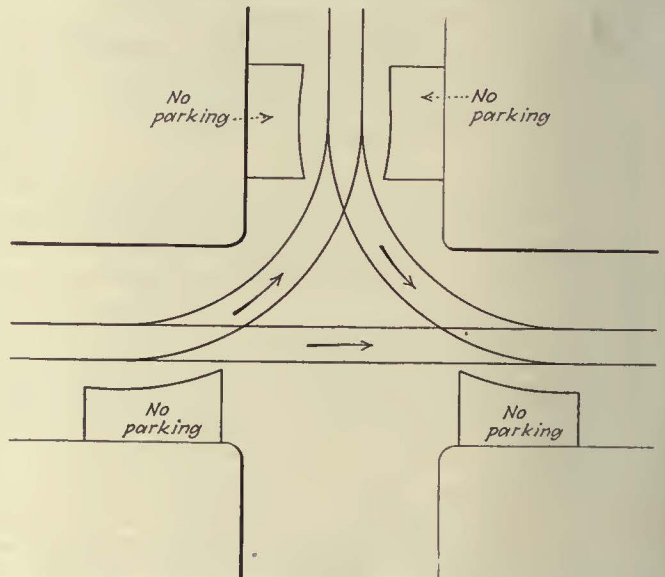
The committee's work on the third phase of its research program is just getting under way and no conclusions were reported.

## No-Parking Areas Established Opposite Railway Curves

WHITE curved lines have been painted on the pavement at street intersections in New Bedford, Mass., where the street car overhang or swing is sufficient to overlap part of the street used for parking automobiles. These lines have eliminated parking in places which would interfere with street car movements due to a lack of sufficient clearance. While the Union Street Railway paints the white lines, the police department enforces the no-parking regulations.



No Parking Area Opposite Curve in Railway Tracks



In New Bedford White Lines Are Painted at Street Intersections Where the Car Overhang Is Too Great to Clear Parked Automobiles

ment enforces the no-parking regulations. The municipal governing body has assisted by passing effective regulations. One ordinance reads: "No vehicle shall be allowed to stand within the intersection of any street, nor within 10 ft. of any street corner, crosswalk, fire hydrant, pole, post or place designated as a stopping place for street cars or street railway buses except in cases of emergency or when directed to do so by a police officer in uniform."

Car stopping places in the traffic center of the city have been designated by city ordinances as no-parking areas, varying from 35 to 135 ft. in length. This ordinance has not only made street car entrances accessible to patrons but has materially speeded up traffic movements through the down-town section.



# Effect of Abrasion and Compression on Rail Corrugation\*

Energy That Is Stored by Elastic Deformation of the Axle Causes De-Torsion and Consequent Abrasion—  
Compression Causes Structural Changes in the Rail Metal

By *Ch. Fremont*

Paris, France

FOR a long time engineers have been studying rail corrugation and numerous explanations have been given, which partly contradict each other. Hypotheses have been established, but the experimental study of this subject has been somewhat neglected.

In the year 1920 we began to make some experiments in regard to the wear of rails, due to abrasion. It is believed that if slipping follows suddenly the rolling of a wheel on a rail, a tangential shock will be exerted on the tire of the wheel, due to sudden and excessive friction. Such a shock cannot be counteracted by an equal counter shock. It represents an amount of energy which is absorbed by an elastic deformation of the mechanical parts connected to the wheel, and which is generally taken up by the axle in the shape of a torsional twist.

This elastic deformation, which is proportional to the intensity of the shock, stores an amount of energy that, when released, causes the wheel to turn rapidly in the opposite sense, causing a de-torsion of the axle. This will cause a grinding of the tire against the rail, accompanied by local friction. Additional shocks will follow the first one for the same reasons, and these will cause undulatory wear of the rail, due to a number of successive jerks of the wheel.

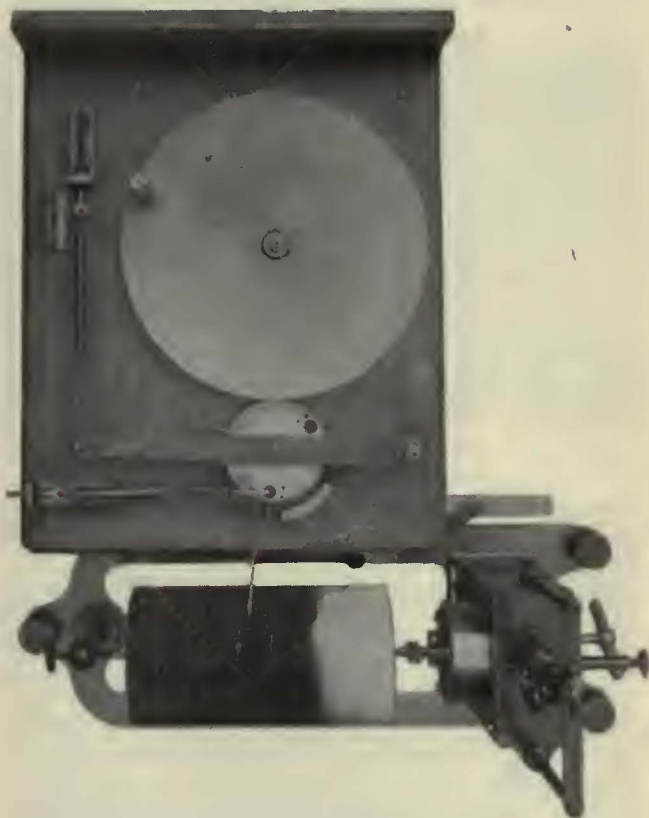
## DEMONSTRATION OF TANGENTIAL SHOCK

In order to demonstrate the tangential shock on the wheel of a car, we have built a mechanism which is shown in an accompanying illustration. In this mechanism the rail moves while the wheel remains stationary. In order to give the rail a continuous motion of sufficient speed, it has been replaced by a large disk with central horizontal axis, and a small handle near the periphery by which it may be turned. Above this disk, and in the same plane, is placed a small disk representing the car wheel. In order to show the effect of changing the weight on the wheel, the small disk has its axle in a lever, at the extreme end of which is fastened a heavy spring the tension of which can be regulated at will.

If the large disk is turned by hand in a clockwise direction the small wheel will try to revolve counter-clockwise; but it is prevented from doing this by a spring near the uppermost point of its periphery, which exerts a tangential pull on this wheel.

If the pressure of the small wheel against the large wheel is moderate, and if the speed of driving the large wheel is small, the sliding friction between the two

exerts a slight tension on the tangential spring. This spring tension remains constant as long as the speed with which the large disk is revolved does not change. If the force which presses the small wheel against the large wheel is gradually increased and the driving speed



Mechanism to Record Tangential Shock Produced by a Wheel

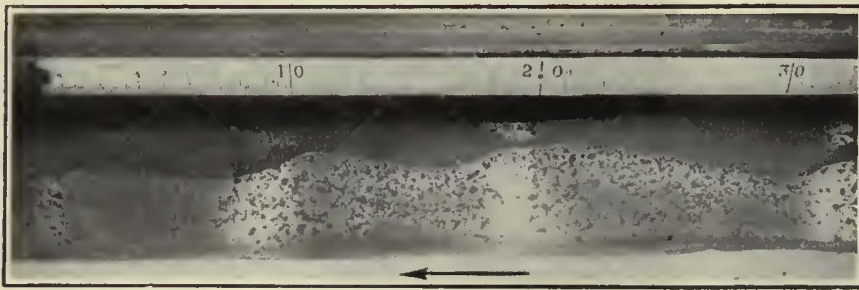
rises, the sliding friction will be increased, and the upper wheel will pull strongly on the opposing spring.

At first it will be found that the pull on the upper spring rises continually and proportionally to the sliding friction. At a certain instant, however, when the pressure on the upper wheel and the speed of rotation is constantly increasing, the sliding friction suddenly becomes erratic and tangential shocks will appear, which subject the upper spring to sudden tensions, and it will be seen that the spring rebounds quickly after each tension.

A stylus fastened to the upper wheel inscribes upon a revolving drum its movements. The oscillations of the upper wheel, produced by the tangential shocks, are the cause of undulatory wear of the rails.

\*Abstract of an article published in *le Génie Civil*, Nov. 13, 1926.

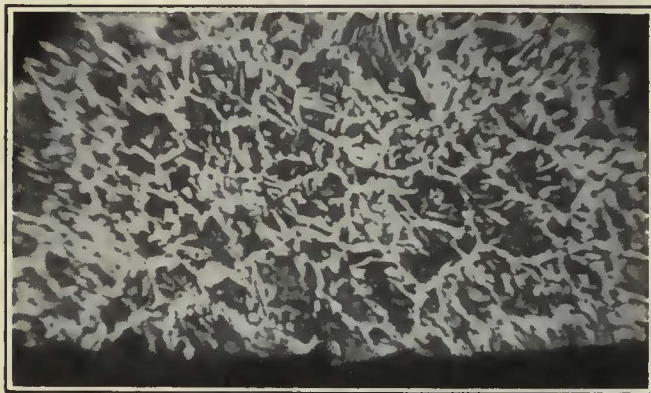




**Rail Corrugation Caused by a Conical and a Cylindrical Wheel Tire**

The undulations of unequal length are superimposed. The surface is locally deformed, particularly on the side of the groove. Arrow indicates direction of motion of the car.

Abrasion, however, is not the only cause of undulatory wear. In certain cases we have observed on the rolling surface of rails enlarged surface spots of considerable lateral width, which indicate local crushing effects. In an accompanying illustration the rolling surface of a corrugated rail is shown. The individual undulations are not equal in length, and have been pro-



**Transverse Cut Through the Head of a Rail Passing the Crest of a Corrugation—60 Diameter Enlargement**



**Transverse Cut Through a Rail Head, Passing the Depression—60 Diameter Enlargement**



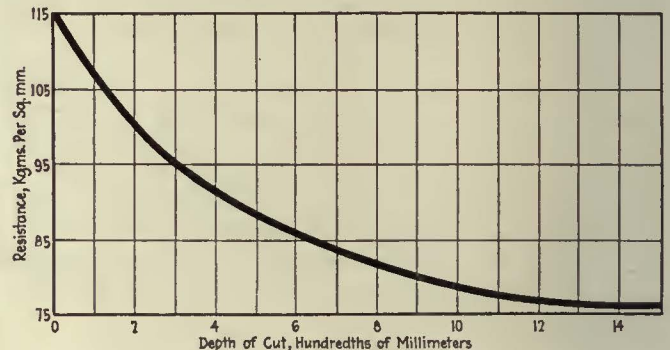
**Transverse Cut Through a Rail Head, Showing Distribution of the Displacement and the Side Deformations on the Rolling Surface**

duced by both conical and cylindrical wheel tires. The undulations produced by either of these two types of wheel tires are corresponding.

In this illustration the light portions represent the tops, while the darker portions represent the recesses, of the undulations. In the recessed portions, due to the crushing effect, a widening of the metal sideways can be noticed. We have to deal in this case, therefore, not with undulatory wear but with a spreading of the metal due to compression.

A microscopic investigation bears out this assumption. A transverse cut through the top of one of the undulations, enlarged 60 diameters, is shown in an accompanying illustration. In this figure the steel grain is not noticeably deformed at the surface of the rail. Another view shows a transverse cut through the metal of the adjacent hollow. It indicates that the metal therein is greatly crushed near the surface, and it shows a distinct side flow of the metal, which would not be caused by frictional wear. A transverse cut through the head of the investigated rail shows the side flow of the metal near the rolling surface, which is indicated plainly by the very apparent sidewise displacement of the metal.

While it is being deformed at the rolling surface of



**Hardness of the Rolling Surface of the Rail, as Shown by a Weighted Cutting Wheel**

the rail, the steel is hardened locally. It is therefore important to ascertain the effect of this local hardening upon the resistance of the rail. In order to determine, at least in an approximate way, the degree of this hardness, we have measured the length of the indentation caused by a cutting wheel 60 mm. (2.36 in.) in diameter pressed under a weight of 50 kg. (110 lb.) into the head of the rail. The arrangement for this test is shown in an accompanying illustration. The impression caused by this wheel into the rail head was measured for every 100th mm. (0.0004 in.) depth, beginning at the surface of the rail, and disclosed the relative hardness of a great number of layers of steel near the rolling surface.

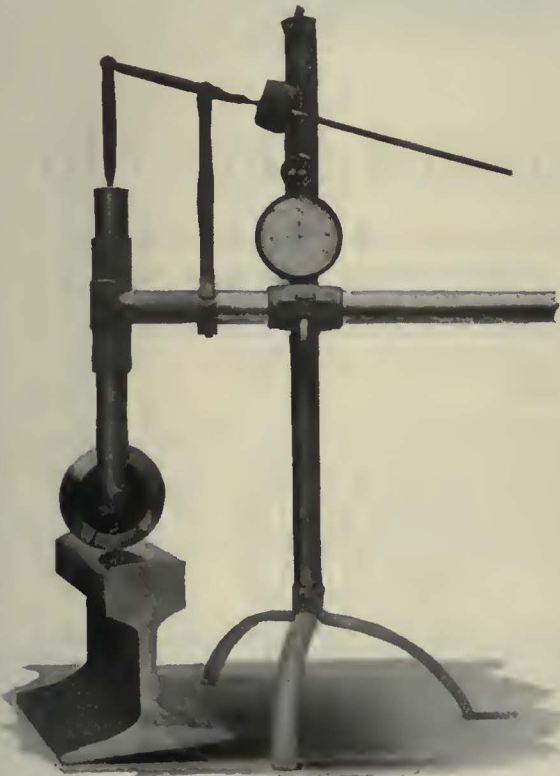
The chart is a representation of the results so obtained on a steel rail covering a range of 3 or 4 mm. (0.12 or 0.16 in.) below its rolling surface. The rail itself was made of steel with 75 kg. per square millimeter (105,500 lb. per square inch) rupturing strength. The rail was worn a few millimeters, but its surface was regular and not unusually deformed. In this curve the abscissas indicate the thickness of the hardened



steel, while the ordinates indicate the corresponding hardness. The curve shows that the hardened skin has a thickness of just about 0.14 mm. (0.0055 in.), and that, on its very surface, its hardness corresponds to a tensile strength of approximately 115 kg. per square millimeter (162,000 lb. per square inch). On a softer rail with a deformed rolling surface we have found the thickness of the hardened skin to be approximately 0.23 mm. (0.009 in.).

#### DISTRIBUTION OF PRESSURE IMPORTANT FACTOR

There is one more absolutely necessary detail which must be known for the study of corrugations. That is the distribution of pressure upon the rolling surface of the rail when the wheel of a vehicle passes. We have found good success in determining this local pressure with the following method: a small piece of paper is placed on the rail, and after the car has passed over this paper a certain impression-design will be found



Arrangement for Testing the Strength by Means of a Weighted Cutting Wheel

thereon. This method of obtaining an impression sample on the surface of the rail while a car passes over it is shown in an accompanying illustration. After having chosen his location, the operator holds a piece of paper on the rail surface with a pair of specially made long-handled tongs and awaits the passage of a car at a certain speed over it. After the first wheel has passed the operator pulls the paper out quickly in order to prevent a second wheel passing over it.

Other illustrations show reproductions of two pieces of paper so obtained. On these impressions is seen the local distribution of the compression caused by the wheel upon the rail, and to a certain degree the varying intensity of this pressure. The higher the compression per surface unit, the more the paper becomes squeezed, the more transparent it becomes, and the whiter its photographic image.



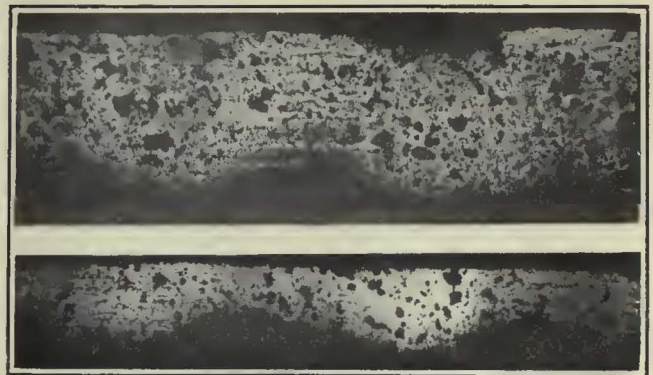
Method of Obtaining Impressions on Paper, Showing the Pressure Effect of a Passing Wheel Upon the Rail

For example, in the upper view we may readily see that in the places where the surface contact was greater, the compression also was greater. Between two maximum spots of crushing, indicated by either intensity or by surface, the impression shows a darker tint, indicating a smaller unit pressure and a reduced contact surface. We find, therefore, that the wheel has pressed upon the rail in an irregular manner, without, however, being itself the cause of the varying compression noted.

This method of registering the effect of wheels upon rails is of considerable exactness. It reveals also surface faults of the rails, such as small corrosions, striæ from friction caused by the wheels, etc.

All the methods described herein of studying certain phenomena of rail deformations have given us already considerable data, and we expect to make additional new tests which we hope will give us all causes of undulatory wear.

A second part of this investigation, which is to follow,



Examples of Impressions Upon Paper on Undulated Rails

will show the relation which exists between varying compressions of the rail and vibrations of the rail, in conjunction with certain oscillations of the car itself. These future data will be obtained by means of a special car which is equipped with recording apparatus and which will move on special test rails.



Exterior of snow plow recently constructed by Chicago Surface Lines. Both center shears and side shears are operated by compressed air.



## Chicago Builds an Improved Snow Plow

Double-Truck Unit Built in Shops of the Chicago Surface Lines Is Arranged for Double-End Operation and Carries a Central Shear at 45 Deg. Under Each End—Two Wings Clear Side Area—All Four Shears Are Operated by Compressed Air

*By W. C. Wheeler*

Engineer of Equipment Chicago Surface Lines, Chicago, Ill.

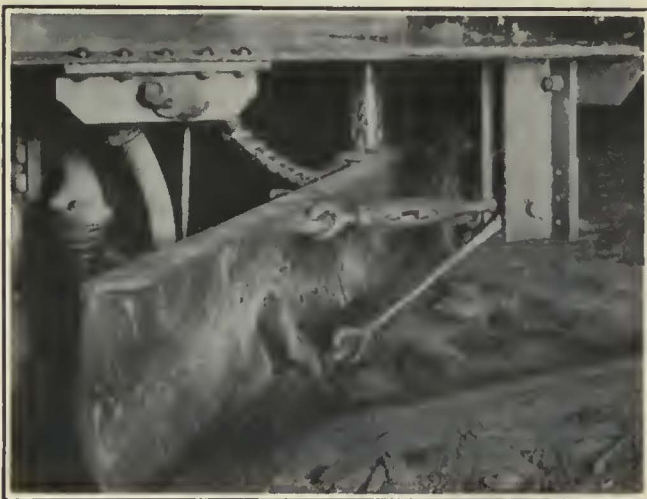
**O**N JAN. 14 of this year the new snow plow completed last fall in the West Side shops of the Chicago Surface Lines had its first real test. Snow fell during the day, finally reaching a depth of 9 in.\* This new unit operated continuously, clearing many miles of track. At the same time it avoided delays by maintaining its place in the schedule. The air-operated wings and shears were easily adjusted and shifted to avoid street and traffic obstructions.

Experience gained in Chicago during a heavy snow storm during the latter part of March, 1926, showed the difficulty of handling snow by means of sweepers. Snow that fell during that day was packed by auto trucks faster than the sweepers could remove it, and before the heavy wings could be put in service the limitations of the equipment used in keeping the track open were obvious. As a result of this experience the new plow was designed and constructed by the Surface Lines under the direction of H. H. Adams, superintendent of shops and equipment, during the summer and fall months of last year.

The plow is arranged for double-end operation and, as shown in the accompanying illustrations, carries four shears, two for clearing the track surface and two for clearing the street area. Only one pair of these shears is operated at a time.

Two men operate the plow; one, a motorman, devotes his attention to running the car, and the second controls the shears by means of compressed air, his position being by the side window in view of the wing.

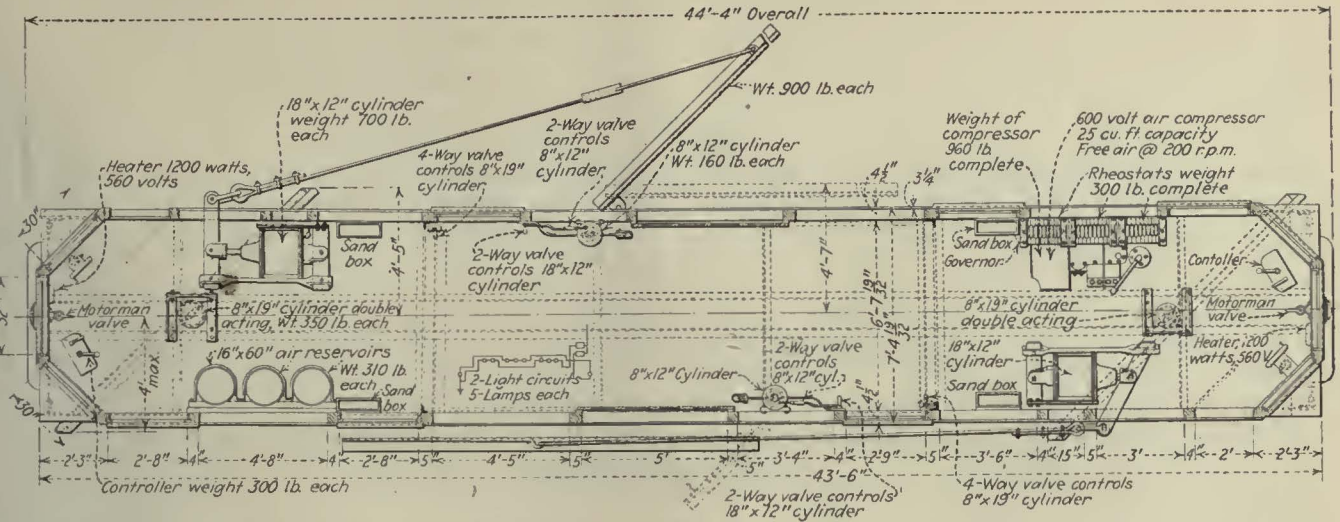
This plow has been so satisfactory that it is believed possible to clear away a snowfall much faster and with better results than with a sweeper. The combination of air-raising and lowering of the front shear, the ability to provide pressure by means of the double-acting air cylinder to hold down the front shear and the air operation of the side wings are points of marked superiority in the design. The front shear is also pulled rather than pushed, so that it automatically lifts in case it strikes a paving brick or other rigid obstruction.



Close-Up View of the Center Shear Set Ahead of the Front Trucks at an Angle of 45 Deg.

\* This shear is supported so that it drags, thus being able to raise and clear in case paving stones, manhole tops or similar obstructions are encountered.



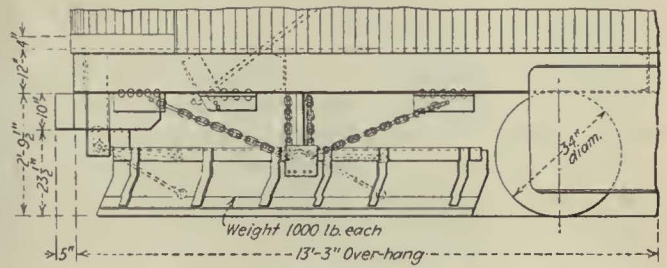


**Floor Plan, Showing the Dimensions and Arrangement of Equipment in the New Snow Plow Recently Placed in Service by the Chicago Surface Lines**

This is a double-truck, double-end, steel-framed car that is capable of performing the work of snow removal on Chicago city streets and maintain its place in the operating schedule.

Until recent years the snow-fighting equipment has been divided into two general classes, sweepers and plows. Often the sweepers were able to handle all the snow. Due to heavy automobile traffic, especially in congested centers, the snow often becomes packed into the flangeways so that plows have become increasingly valuable. Sweepers are often unable to remove this hard-packed ice and snow. Many plows constructed in the past were not flexible enough to permit rapid operation in congestion. If they were heavy enough to do the work, they were cumbersome and it was difficult to manipulate the wings and shears.

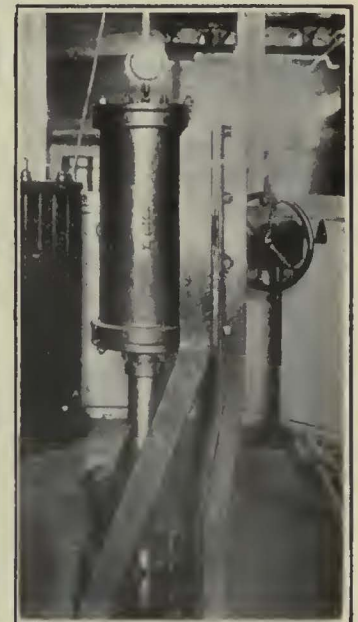
The bare steel frame constituting the structure of the plow weighs 10,000 lb. The various pieces of equipment used increase its weight to 62,150 lb. without the use of dead weight. The general floor plan and side elevation detail are shown in accompanying drawings. Most of the equipment used was taken from spare stock



**Partial Side View Showing Method of Support of Front Shear on New Snow Plow Built by Chicago Surface Lines**

and was arranged in the car body in such a manner as to leave a roomy interior. This is indicated in the interior view.

Each center shear has a dead weight of 1,000 lb. and is supported at an angle of 45 deg. One is located in front of each truck. These shears are arranged to drag, since the points of support are ahead of the shear edge. For this reason the shear will free itself if it meets a solid obstruction. Each shear can be raised by means of the air cylinder mounted behind the motorman's



**Interior of Snow Plow Showing the Air-Operated Cylinders for the Side Shears Hung on the Side Wall**

At left—In the center of the car just behind the motorman's position is a vertical double-acting air cylinder used for raising the center shears or for applying additional downward pressure. To the right is the cylinder used for holding the side wings

in place, or releasing them, so that they may swing against the sides of the body. The plow is operated by two men, one a motorman, who concentrates his entire attention on driving the car; the other, standing at the side window, operates all of the

cylinders that are controlled by means of air. At right—Close-up view of the double-acting air cylinder controlling the center shear. The mechanical device shown at the bottom of the cylinder locks the shear in the upper position.



position in the center of the car, as can be seen in two of the views reproduced. The shears are made of  $\frac{1}{2}$ -in. steel plate, 18 in. wide by 12 ft. 3 in. long, reinforced with a single angle at the top, and a double angle at the bottom. Six angles placed vertically on the back of the shear stiffen the blade. The edge of each shear is reinforced by a 1-in. x 6-in. steel wear plate fastened to the lower edge, which in turn is supplemented with two tool-steel bits set so as to follow the rail and clear the flangeway.

The cylinder that operates each center shear has an 8-in. diameter, with a 19-in. stroke, and is double-acting. It will either raise the shear and hold it above the street surface, where it may be locked mechanically, or with the air above the piston the downward pressure on the shear can be increased by 4,275 lb. In case of striking an obstruction the shear will always be readily raised against the air cushion of the piston. This extra downward force is useful in cutting hard-packed snow and ice.

**SIDE WINGS OPERATED BY COMPRESSED AIR**

Originally the plow was equipped with 10-ft. side wings weighing approximately 675 lb. each. Due to the experience gained in the first trial of this plow, these were replaced with 14-ft. wings weighing some 900 lb. In this way a sufficiently wide roadway is cleared along the side of the track for vehicular traffic. The plow had ample power and weight to operate the longer wing successfully.

Each side wing is fastened by a 2-in. bolt to a 1-in. plate bent in the shape of a U and arranged to slide up and down on a  $2\frac{1}{2}$ -in. pin supported at the pivot fastening. This U plate allows the wing to swing out from the side of the plow in an arc with the pivot as a center. The bolt allows the wing to swing in a vertical plane around it as a center. The combination makes a very flexible joint, and the wing cannot stall as it will lift at the outer end and clear itself when pulling in very deep or hard snow.

This side wing is made of  $\frac{3}{8}$ -in. plate 36 in. wide and 14 ft. long. It is curved at the bottom on a 12-in. radius and reinforced with 4-in. x 3-in. x  $\frac{3}{8}$ -in. L-shaped steel members the entire length. The plow is pulled by a 1-in. steel cable attached to two points of the shear. A chain connection made at two other points, as shown in one of the illustrations, is used for raising or lowering the wings by the vertical 8x12-in. brake cylinders inside of the body.

Provision is also made for locking the wings in the raised position when the snow plow is moved about not in active service.

**New Bus and Truck Repair Shop for the Los Angeles Railway**

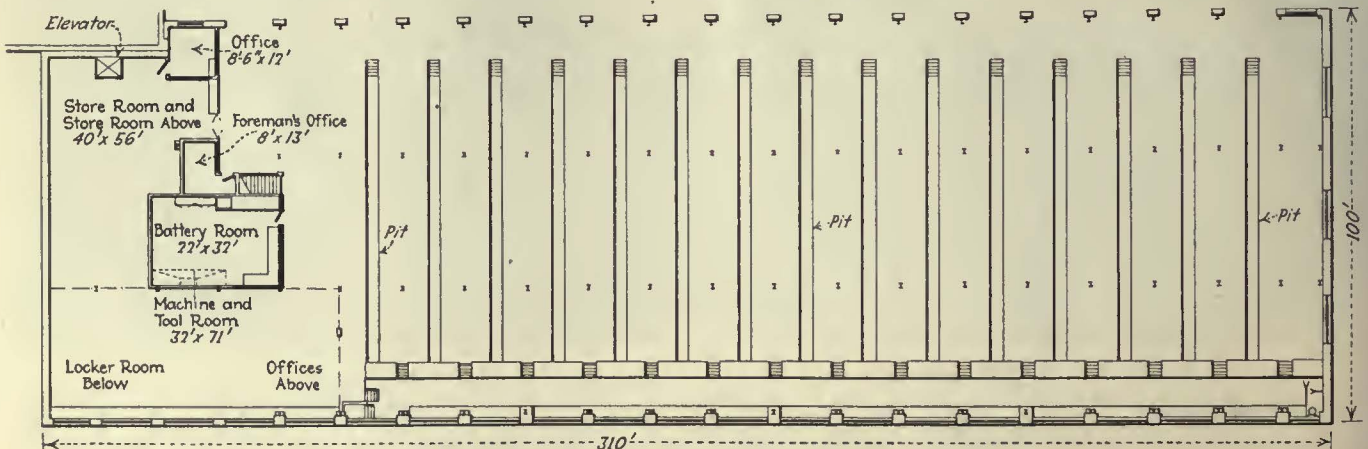
GENERAL bus, truck and automobile inspection and repair work are provided for by the Los Angeles Railway in the recent award of a contract to the Willard Brent Company for the erection of a modern brick, reinforced concrete and steel structure. The building will be erected along the Fifteenth Street frontage of the property of the railway company known as the Sixteenth Street yard. It will be 310 ft. long and 100 ft. wide and will provide pit accommodations for 30 buses. It will also contain store room, machine shop, battery room and offices for the superintendent of automotive equipment. There will be three floor levels, a depressed area, ground or main floor level and the mezzanine floor at the east end of the building.

The stores department will have quarters both on the ground and the mezzanine floors. The two floors are connected by a hydraulic elevator. The machine shop and battery room are to be located immediately below the mezzanine floor. The machine shop will be equipped with lathes, milling machines, cylinder grinders, etc., although no heavy or production work will be done here, as that is all done at the company's main shops. Plans call for three traveling cranes the length of the shop.

The buses can be driven in from the Sixteenth Street yard directly from the ground level over the pits. Along the northerly side the floor is on the same level as the bottom of the pits. The main benches are to be located along the northerly wall, where the greater part of the bench work will be done. On the southerly side of this depressed area there are benches which will accommodate men working in the pits. This permits the men to walk directly in and out of the pits without climbing in and out, as is the usual custom.

All lights in the pits are to be recessed, and convenient recesses will also be provided in the pits for the mechanics' tools. On the main or ground level floor work benches are to be constructed directly over the benches used by the men at work in the pits. The upper tier of benches are for the accommodation of mechanics working on the ground level.

The basement located at the east end of the building will be devoted to locker rooms and toilets. The locker rooms will be equipped with full-length steel lockers, spray wash basins and showers. All plans for the structure were drawn by the engineering department of the railway. The contract price does not include the lighting system, which will be under the control of the engineering department.



Plan and Elevation of New Bus Repair Shop in Los Angeles



## The Readers' Forum

### *Cleanliness a First Requisite*

HUDSON & MANHATTAN RAILROAD  
NEW YORK, N. Y., Jan. 19, 1927.

To the Editor:

Stimulated interest in the important subject of improving car appearance is desirable. Personally, I believe cleanliness is the first requisite, and if the proper spirit is instilled into an organization to desire that all cars, equipment, stations and shops be clean and be kept in a tidy condition, many troubles will be overcome and the public will feel that it is being served properly. Next to cleanliness I believe that a pleasing lighting of cars should receive consideration.

R. R. POTTER,  
Superintendent of Car Equipment.

### *Old Cars Should Be Replaced as Fast as Possible*

DEPARTMENT OF STREET RAILWAYS  
DETROIT, MICH., Jan. 20, 1927.

To the Editor:

There seems to be a general realization that the appearance of street cars should be improved and made more comfortable and inviting to the traveling public. This is merely the following out of general principles. An evil of any description will usually run its course, then eventually be corrected. The longer the duration and the greater the evil, the more drastic will be its correction. This particular evil has run for many years and has been particularly bad. Therefore it is not surprising that considerable excitement is being manifested in some instances at this time.

The big majority of cars have been dirty, unpainted and noisy. Little attention has been given to passenger comfort; therefore the traveling public shows good judgment in turning to an automotive conveyance that is comfortable, quiet and clean. The logical thing, then, is to build a quiet car, put in good seats, and keep it well-painted and clean. Car riders are not hard to please; if they were, they would have raised a riot along these lines years ago. My observations indicate that all they demand is good horse sense.

Streamline bodies and like things are all right to incorporate when the car is being built, if not carried too far. To be consistent and enduring, from the standpoint of appearance, it must look like what it really is—a trolley car. Neither is it necessary to paint it all the colors of the rainbow in fantastic design. Dolling up old equipment must be done with sound judgment, otherwise considerable money will be wasted on cars that don't warrant the expense, and taking an old car in and giving it a coat of many colors, and this and that, will help little.

Probably on many properties some of the best, most modern cars may be improved by reducing noise, adding more comfortable seats and repainting economically with the regular color design. If they are kept clean 365 days a year they will prove satisfactory. The very old cars should be replaced as fast as possible with new, quiet, comfortable cars, but not necessarily an extravagantly dolled-up affair.

A. C. COLBY,  
Superintendent of Equipment.

### *Speedy and Attractive Cars Needed*

ERIE RAILWAYS

ERIE, PA., Jan. 22, 1927.

To the Editor:

From the tone of many articles that have appeared, one might infer that the railway industry was looking forward to a day when some genius would think of a plan to create a desire on the part of the public for more car rides per capita. It seems to the writer that no great wizardry is required, at least to those who have been in the business for the past twenty years, to know that the people have grown accustomed to doing all things more rapidly than they did ten years ago, and in the matter of transportation over comparatively short distances the matter of expedition is outstanding in their minds, even though they may have nothing to do after they have reached their destination. This appeals to the writer to be the first requisite in serving the people in competition with their own private transportation system.

Secondly, the character of vehicle plays a most important part in the psychology of making their trip as agreeable to them as possible. Although the auto has brought changes in the habits of the riding public, human nature remains the same and there is still the feeling that one does not desire to be associated with anything that appears to be unsuccessful. Therefore, it is not to be wondered at that during those trying days which are passing, the public generally became imbued with the idea that street railways were about to break down, for in many instances, in order to overcome burdensome franchise and fare conditions, that kind of a picture had to be painted. We now have the reaction which we unfortunately brought upon ourselves.

The very fact that the railways have passed through the most trying period of their existence and are proving their necessity should give us the greatest courage in attacking the problems in the future. The public is learning fast of this necessity, and in order to accelerate their inclination to resume patronage the operators of every road that expects to profit by this attitude must show to them that they are alive to the situation. There is no clearer way of doing this than by providing vehicles that will not only make the best scheduled time but that will be most attractive. In this, we do not mean that all present cars must be replaced, but they must be modern in their appointments and kept in a clean and attractive condition.

On all sides evidence is found of properties that have not always enjoyed the best of relations with their patrons, that have since made an attempt to give the community service and equipment commensurate with the requirements of the city in which they operate and that have made themselves a strong factor in the community life and are profiting thereby.

While our property has no aged or recently purchased equipment, we have attempted to keep our cars equipped with modern devices, have several times changed painting schedules, so that we now have a color scheme that is outstanding. Every effort is made to keep the cars attractive, and we believe it has had a material effect in making for good relations with the community. We also feel that the money expended in this manner is more productive of return than any other investment we can make.

A. R. MYERS,  
President.



## Wide Range of Thinking on Service at Cost

### EDITOR'S NOTE

During the recent meeting of some seven economic societies in St. Louis a reporter of one of the local newspapers wrote an article purporting to be comments on the service-at-cost franchise now being negotiated between the city and reorganizers of the United Railways of St. Louis, which is now in receivership. Unfortunately not all of the comments were used. Only those statements were included in the article that opposed the plan now well under way.

Two of the men interviewed were James C. Bonbright and Robert Hale of Columbia University and the third John Bauer of New York, identified with New York transit affairs under former Mayor Hylan.

As reported, the St. Louis interviews were in error on important details, as explained in the communication from Professor Bonbright, and by the others in interviews by a JOURNAL editor. The discussion was one of theory and not of specific fact as applied to the particular situation.

The St. Louis newspaper article was opposed to certain principles of public utility regulation as defined by practice developed during the last ten to fifteen years guided by frequent court decisions. Considerable comment has been provoked relative to the article. Two communications that represent the wide range of thought possible on this subject are herewith reproduced. One is a letter from L. R. Nash, vice-president of Stone & Webster, an economist of great experience, and the other is from James C. Bonbright of Columbia University in clarification and amplification of his reported views on service at cost.

COLUMBIA UNIVERSITY  
SCHOOL OF BUSINESS

NEW YORK, Jan. 20, 1927.

To the Editor:

My attention has just been called to a recent article in the St. Louis *Post-Dispatch* which purports to quote a statement of mine as to the proposed "Service-at-Cost" plan for the St. Louis street railway system. In this article I am quoted as saying that the valuation of \$58,000,000 agreed upon between the city and the company, as the rate base on which to inaugurate the plan, is an excessively high valuation. I wish to state that this article misquotes the statement which I made to the reporter of the paper. In view of the fact that I am not familiar with the basis on which the valuation of \$58,000,000 was reached I am not in a position to know whether this figure is too high or too low. What I did say, and what I am ready to repeat, is, that in my opinion any valuation of street railways on the basis of present reproduction cost is excessive. Whether or not the \$58,000,000 in question represents such a valuation is a matter on which I have not been informed.

I think it wise to add that the whole problem of valuation as applied to street railway enterprises that have previously been under a franchise agreement to charge a 5-cent fare is different from the situation which applies to an electrical company or to any other utility that has not been under a franchise obligation to make a limited rate of charge. Most of the street railway companies of this country accepted as a condition of their franchise an agreement that they would serve the public at a rate of 5 cents per passenger. This was a contractual agreement which promised to turn out very favorably for the investors, and there is nothing to indicate that the courts would have set it aside in favor of the public even if the 5-cent fare had yielded an excessive rate of return.

It so happens, however, that the 5-cent charge is grossly inadequate to yield a reasonable return on the invested capital, but it does not follow that street railway investors have a just claim to relief from this

onerous contract any more than it follows that a speculator on the Stock Exchange has reason to complain if his agreement with another speculator involves him in a financial loss. According to accepted business principles the only claim that investors can fairly make as a matter of justice rather than expediency is that any revision of their franchise should preserve whatever earning power might have been realized under a 5-cent fare. It is true that reasons of expediency may justify the public in relieving street railway investors of some of the evil consequences of their original franchise agreements, but this expediency is dictated by considerations of good public service and not by considerations of fair treatment to utility investors. I am inclined, therefore, to be highly suspicious of any valuation of the St. Louis street railway system which reaches the figure of \$58,000,000, as I do not believe that any such property values could be realized under a 5-cent fare, but in fairness to the company I should add that this opinion is tentative rather than final and that I did not express, and am not ready now to express, any positive conclusions on a matter to which I have been able to give very little attention.

JAMES C. BONBRIGHT.

BOSTON, MASS., Feb. 4, 1927.

To the Editor:

During the recent annual convention in St. Louis of national organizations of economists certain views were expressed regarding the future of service-at-cost operation of electric railways which invite further consideration. Among these views was one holding that to insure satisfactory service and fares the valuation embodied in a service-at-cost railway franchise must be low. Cleveland was cited as an illustration of long operation of this character under a valuation about 25 per cent less than the claimed fair value of the property, so fixed because the city "had the company at its mercy." It is claimed that similar operations in other cities under more liberal valuation standards have been less satisfactory.

Cleveland fares have unquestionably been low, but well-known favorable operating conditions and efficient administration have been important factors in the result, and at times the ability of the Cleveland company freely to make extensions of its facilities and service has been hampered by its lack of credit due to low capital value and correspondingly low authorized return thereon.

Simple computations will show that under normal conditions the difference between a fair valuation and a niggardly valuation will affect the rate of fare by a minor fraction of 1 cent. General experience with public utility properties in this country indicates that prosperous companies, not unduly restricted in their operations, have given the most satisfactory service and maintained the most friendly relations with their customers. The reason for this is the well-recognized fact that most people in this country are seeking commodities and services on a basis of quality and are willing to pay without question a reasonable price therefor.

Even the humble working man, for whom certain citizens have perennially expressed a profound sympathy, is more and more resenting the thought that he cannot afford quality. Illustrations, of which the number is countless, are not necessary to corroborate this statement. There is no reason to think that the average citizen, uninfluenced by political or newspaper agitation,



will consider his payments for public utility service in any different light from those for other services or commodities. The view of the economists who are contending for cheap utility service is, therefore, not sustained.

Furthermore, service-at-cost operation is not in any essential respects different from regulation by the state commissions which is now in effect in more than three-fourths of our states. Service-at-cost agreements merely define in advance the pertinent factors upon which rates are based instead of having them fixed intermittently in rate cases, with the result that there is an automatic and prompt adjustment of rates to cost rather than a spasmodic and delayed adjustment. If, therefore, the contention of the economists is correct, that service at cost is successful only when a low valuation is involved, it must follow that regulation can be successful only on a similar basis. As has already been stated, such a contention cannot successfully be sustained in the light of extended experience.

The value assigned to electric railway property must in the long run be consistent with that placed on other property in order that credit may be maintained and new capital, necessary for expansion in keeping with community growth, secured in competition with similar needs in other industries.

There was also expression of opinion at the St. Louis convention that further service-at-cost agreements, such as are now under consideration in St. Louis, should be made, if at all, with extreme deliberation. It was contended that urban transportation is in a critical period, with the possibility that within a few years surface cars will be replaced largely by overhead or sub-surface rapid transit lines with bus feeders, and that any service-at-cost agreement which provides for amortization of investment in street-car facilities should be avoided because of the heavy burdens which might thereby be imposed on the riding public through rates of fare.

This is a rather surprising doctrine to emanate from an economist, implying that the public should be willing to pay a certain price for transportation but should not assume the burdens of any unusual costs logically incident to changes in methods or character of service which community or economic developments may require. Apparently it is expected that the investors in transportation facilities should have a limited moderate return on the investment (6 per cent being proposed in St. Louis), out of which they would provide for all unusual risks of the business. Why investors should assume such risks when they can obtain a return of 6 per cent or more from investments in bonds and other obligations which involve no such risks has not been made clear.

Under service at cost, as ordinarily defined, a community elects to be served by certain transportation facilities existing when the agreement was made, and stipulates that new facilities, whatever their character, shall be acquired only after full investigation and approval. Unless the community under these circumstances is willing to assume the responsibilities for such unusual amortization as changes in transportation methods may from time to time require, what it is really seeking is not service at cost but service at less than cost. Few communities and probably fewer real economists will admit that such basis of a franchise is equitable. We are living in a period of exceptional industrial and technical development. Old equipment and methods are being discarded for others in keeping with the demands of our unprecedented prosperity. When

we buy current models of automobiles we do not demand of the manufacturers a guarantee that they will continue in fashion until worn out. Similarly, in all ordinary developments the ultimate consumer expects to bear the burdens as well as share the advantages of economic progress. There is no sound reason why the public utility field should be an exception to this rule.

Electric railway officials will not agree with the thought that the days of the street-car business are numbered or that the delays to street-car service caused by traffic congestion should be permitted to decrease to the point of extinction the usefulness of a form of service for which no suitable substitute has been found. Traffic congestion in our large cities is caused largely by automobiles, which make up about 80 per cent of the street traffic and carry an average of less than two persons (including the driver), whereas street cars, ordinarily constituting less than 10 per cent of the street vehicles, each carry more than fifteen times as many passengers. It is not clear why a minor group of vehicles performing a major and essential public service should be cast aside to make way for other vehicles performing a minor and, to a large extent, wholly unnecessary service.

The consensus of opinion of careful students of the problems of urban transportation, many of them having no connection with the electric railway industry, is that street cars offer an economical and essential form of transportation upon which the larger cities depend and will depend in the future until a size is reached where rapid transit lines, with their much greater investment, can be supported. It is not clear that even then surface cars will not be the most economical feeders. No city of more than 50,000 population has yet been able to find a satisfactory substitute for rail transportation, although a number have tried to do so.

It is, therefore, apparent that the danger or injustice in accepting this form of transportation as a factor, and ordinarily a major factor, in a new service-at-cost franchise is remote. Such a franchise may well provide for any form of bulk transportation that may from time to time be economical or expedient, and no community can fairly divest itself of the risks or costs which the future may develop incident to change in type or character of transportation consistent with the growth and progress of the community itself.

L. R. NASH.

### Underwriters' Label Placed on Many New Cars

**D**URING 1926 the Underwriters' Laboratories inspected and approved 446 new cars and one that was rebuilt. Following the approval the Underwriters' label was placed on the car, thus entitling it to a lower insurance rate.

Because of several changes made in the Underwriters' standards and the development of new material for electrical insulation on street cars, it is now possible to obtain cars constructed fully within the requirements of the Underwriters' Laboratories standards with little or no additional cost. There is a nominal charge for the inspection and label of \$5 per car.

At least in the eighteen states under the jurisdiction of the Chicago Actuarial Bureau the charge for defective cars is being prorated in the rolling stock fire insurance rate. As the number of inspected cars increases this rate will be reduced.



# Maintenance Notes

## Adjustable Collar Increases Axle Bearing Life

SHIFTING of motors along the axle has been eliminated, and excessive axle-bearing flange wear caused by dirt and brakeshoe dust has been decreased by the design and adoption of an adjustable, cast-iron axle collar by the Danville Traction & Power Company, Dan-

ville, Va. This collar was cast locally in accordance with the company's specifications and all machine work was performed in the shop.

It is claimed that this feature has doubled the life of the bearing flange. These adjustable dust-deflecting axle collars are rapidly replacing the small non-adjustable, non-dust-deflecting axle collars furnished with the motors. The clamping bolts of

the old type of collar worked loose very frequently and permitted the motor to shift and very often caused considerable damage. Not being provided with a recess space dirt and brakeshoe dust could enter the space between the flange face and the collar recess base, causing excessive wear with resulting short bearing life.



Old Collar on Left and New Adjustable Dust-Deflecting Collar on Right

ville, Va. This collar was cast locally in accordance with the company's specifications and all machine work was performed in the shop.

The axle collar is cast in two pieces and bored accurately to obtain a tight axle fit. Lugs drilled for  $\frac{3}{4}$ -in. bolts provide a means for solidly clamping the collar to the axle. Similar drilled lugs cast at one end of each section of the collar provide for the installation of  $\frac{3}{4}$ -in. machine bolts to be used for maintaining the proper relationship between the wheel hub and the axle-bearing flange. These bolts are provided with locknuts to lock the adjusting bolt in any desired position.

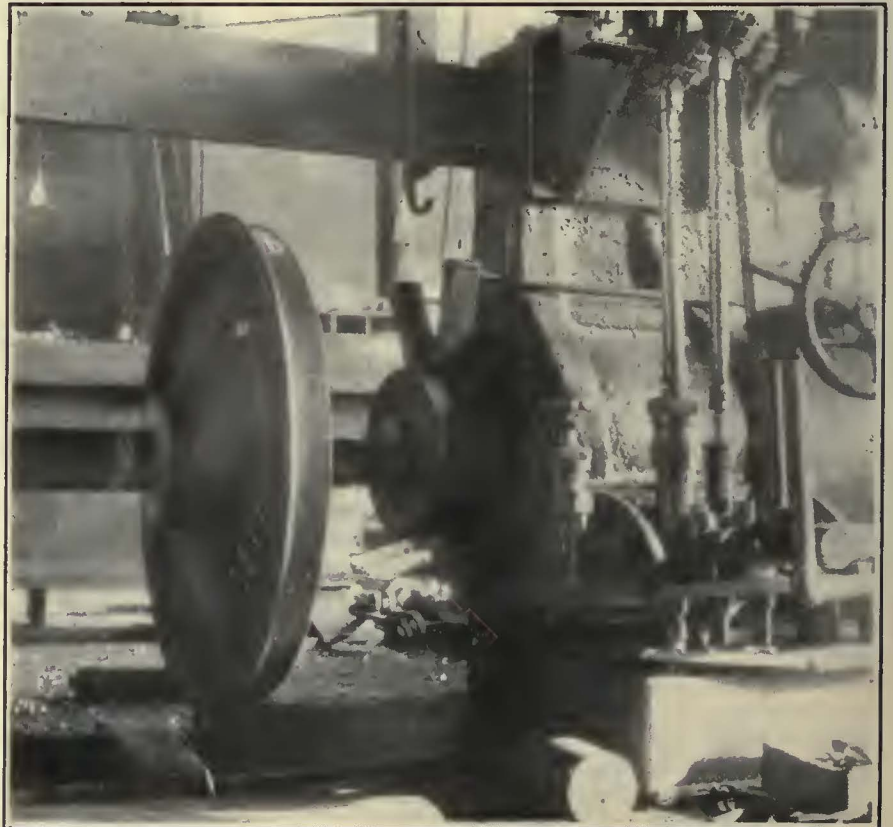
The face of the collar adjacent to the axle bearing is bored out  $\frac{3}{8}$  in. deep and of a diameter to permit the entrance of the axle-bearing flange. A  $\frac{1}{4}$ -in. fiber washer between the face of the axle-bearing flange and the bottom of the recess minimizes the flange wear. With this arrangement the clearance between the fiber washer and the axle-bearing flange face is underneath the recess wall and is protected from the ready en-

## Axles Tested for Trueness on Wheel Press

CONSIDERABLE trouble and delay was experienced in the shop of the Capital Traction Company, Washington, D. C., in testing axles for trueness after wheels had been pressed on, until W. H. McCarty, master mechanic, devised a method for doing this testing in the wheel press. This consisted of installing an axle center on the wheel-press ram housing and another on the tail-stock casting. After the wheels are pressed on, the completed axle is moved to these centers, revolved,

and observations made as to trueness. Where defects are detected the axle is then removed and transported to the axle-straightening machine.

Prior to the installation of these centers it had been the practice to lift the axle from the wheel press and transport it across the shop to the wheel lathe, where the necessary tests were made. Every axle was tested in this manner and the loss of time at the end of a year for transportation alone amounted to a con-



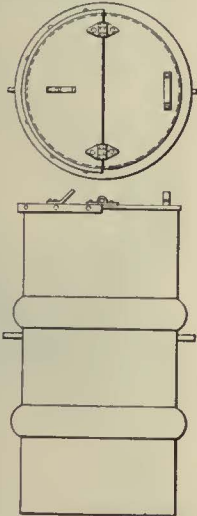
Centers Installed on the Wheel Press at the Capital Traction Shop Makes Testing for Trueness Easy. The View Shows Axle Installed on Center Ready for Test



siderable number of hours. Often the lathe was engaged on other work and the axle could not be tested immediately, so that there was a still further delay. This system has afforded a means of immediate testing at the press and has resulted in increasing production by eliminating unnecessary handling and shop delays.

### Refuse Container Made from Gear Grease Drum

**S**UBSTANTIAL and safe shop waste containers for inflammable refuse have been made from empty gear grease drums by the Interborough Rapid Transit Company. In many cases these drums are not accepted for credit by the manufacturers. They have therefore been converted to this use at small expense. One head of the drum is completely removed and in its

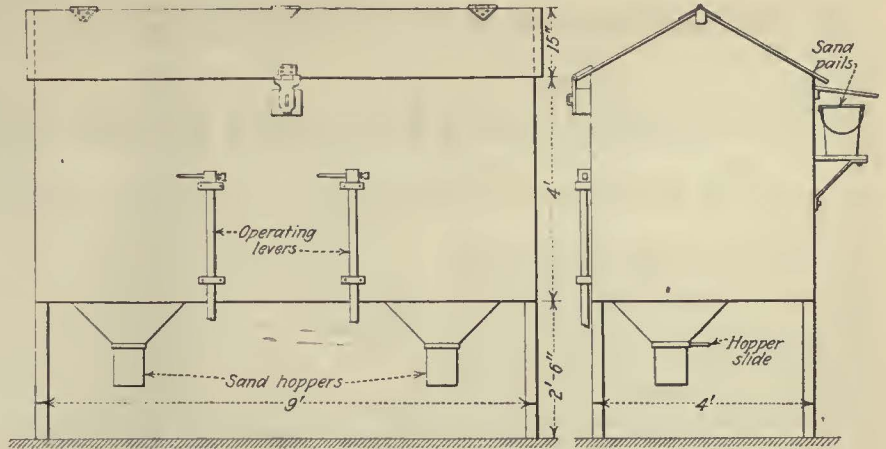


Refuse Container Made from Empty Gear Grease Drum

place is installed a self-closing cover with necessary hinges, stop and handles as shown in the accompanying sketch.

### Handy Sand Storage Bins Prevent Failures

**W**ATERPROOF sand bins located conveniently in the inspection barn and storage barn as well as outside of the buildings of the Virginia Electric & Power Company, Richmond, Va., insure a ready supply of dry sand for the carhouse organization or the motormen of passing service cars for the car sand boxes. These bins were designed and constructed in the company's shops, under the supervision of the master mechanic, W. J. Hicks. They are of pitched roof design and are built with 2-in. x 4-in. oak framing, to which is spiked 1-in. yellow pine planking. Two-ply tar paper covering the sides and top of these bins thoroughly protects the sand from rain and moisture. One side of the pitched roof is hinged for filling. These bins have a capacity of 5 cu.yd. of dry sand. Two Brill sand hoppers located in the bottom of each bin



General Appearance of Sand Bins Used by Virginia Electric & Power Company at Richmond

with hand levers on the front at a convenient height from the ground permit of quick and easy withdrawal of the sand. These levers, connected to the sand hopper slides through a series of bell cranks and rods, open the hopper slides. They are returned to a closed position by means of heavy coil springs. A shelf on the

back of each bin, protected from the weather by a slanting roof, provides storage place for one or more pails for carrying the sand to the car sand boxes.

These bins are inspected and filled twice a day by the maintenance of way organization.

Since the installation, the number of cars reported for empty sand boxes has been considerably reduced. A marked decrease has resulted in sand box failures, ordinarily caused by partial filling.

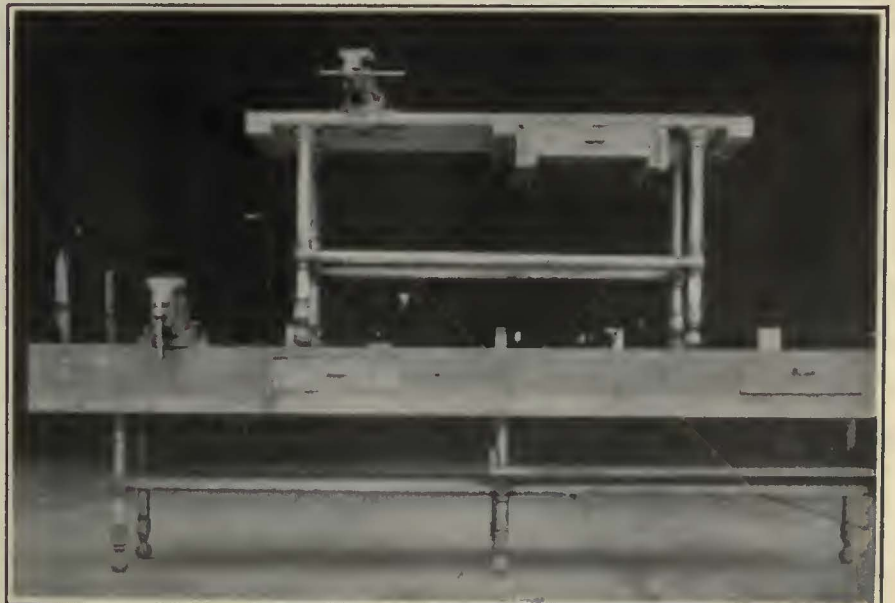
*Modernize, as you can well afford to retire your "Tin Lizzie" car equipments.*

## New Workbenches Improve Working Conditions

**B**ELIEVING that the old workbenches in the shop of the North Carolina Public Service Company, Greensboro, N. C., had served their usefulness and were a detriment,

Master Mechanic Seawell scrapped them and designed and built up-to-date benches.

Each department of the shop is now equipped with one or more



Neat and Rugged Pipe-Frame Benches Used in the Shop of the North Carolina Public Service Company



benches with pipe framework of a design similar to those shown in the accompanying illustration. The framework is made of 1½-in. galvanized iron pipe threaded carefully and screwed into extra heavy long, round-bodied tees, crosses and flanges.

The various fittings are provided with right and left-hand threads to permit of complete assembly without the use of running threads or right and left-hand couplings. The assembled framework is strong and attractive in appearance. The top of each bench is made of 1½-in. oak planks assembled upon and fastened securely to cross members of 2-in. x 4-in. oak.

Spacious oak drawers provide for the storage of materials and tools. An iron ball foot is screwed into the bottom of each leg.

The bench top is mounted upon the cup-shaped flanges on the end of each leg and is held in position by means of through bolts, the heads of which are installed flush with the bench surface. Each bench is provided with a 6-in. vise.

These benches are all 36 in. wide and the heights vary from 34 in. to 40 in. and the length from 6 ft. to 12 ft., depending on the location and the character of work to be performed.

## New Equipment Available

### Portable Chain Saw

MEETING a demand for a mechanical portable saw to cut lumber and timber at the job, the Reed-Prentice Corporation, Worcester, Mass., is marketing the Wolf portable chain saw. The equipment is provided with a 24-in. saw and is supplied with reversing and foot-controlled switches so that it can be handled by one man.

The saw blade is made of two pieces of selected saw steel with spacers to form a groove in which the diameter teeth travel. Provision is made for an oiling groove and reservoir in the spacers. Gears are of steel and the gear case is packed with heavy grease. All shafts are hardened and ground and run in ball bearings. The machine weighs 83 lb. and is driven by a 1½-hp. motor, this being supplied in any voltage desired.

## Chrome Vanadium Socket Wrenches

DETACHABLE head socket wrenches made of CV chrome vanadium steel are among the new products of the Bonney Forge & Tool Works of Allentown, Pa. The sockets are forged from solid bar stock and should not be confused with sockets cut from bar stock or stamped from tubing. The manufacturer claims that the forging process retains unbroken the grain of the steel and this process plus the use of chrome vanadium makes an exceedingly strong, detachable head, socket wrench. This exceptional strength also makes it possible to manufacture these wrenches with very thin walls, which proves of decided advantage for close corner work.

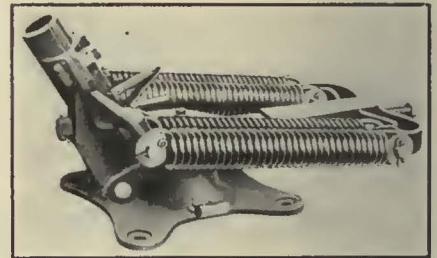
In addition to the line of sockets, this company has also developed a complete assortment of handles, which are forged from chrome vanadium steel. These include solid offset handles, ratchet offset handles with reversible lugs, "T" handles in various lengths, sliding "T" handles, ball bearing "brace type" handles of various lengths and extension bars for reaching inaccessible places.

A ½-in. square lug, which has become practically standard for all detachable head socket wrenches, is used by the Bonney Forge & Tool Works. This makes it possible to use the new socket wrenches in con-

nection with any detachable head socket wrenches which a mechanic may already have. Adapters are also provided so that the handles may be used for the very large size sockets, many of which use a ⅝ in. square.

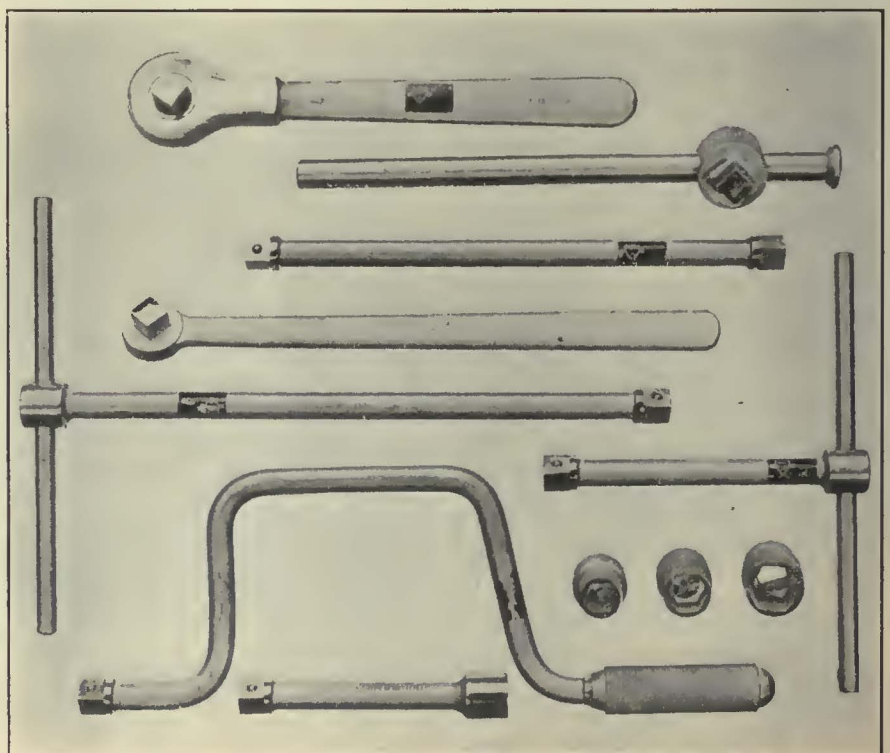
## Sensitive, Lightweight Trolley Base

BY PROVIDING parallel double-Brace bearings a trolley base which is extremely sensitive, light in weight and free from friction has resulted. This is being introduced by the General Electric Company, Schenectady, N. Y., and designated as type US-20. The bearings, of



New Lightweight Trolley Base

tapered roller construction, cause pressures to be spread evenly over the entire bearing surface, as the pressure at the top and bottom of the swivel is practically perpendicular to the roller. The base hangs on the roller bearings, giving the swivel greater freedom and reducing wear.



Line of Chrome Vanadium Sockets and Detachable Handles



# Association News & Discussions

## Optimism Pervades C. E. R. A. Meeting

Necessity of Replacing Old and Heavy Cars by Up-to-Date Equipment Emphasized—Marked Success Has Attended Modernization of Many Properties in Central Territory

STILL another milestone in the recovery of the electric railway lines in Michigan, Indiana, Ohio and Kentucky was marked by the annual meeting of the Central Electric Railway Association held at the Commodore Perry Hotel in Toledo on Feb. 3 and 4. Growing passenger earnings were reported by many of those in attendance. As a result, a distinct note of enthusiasm and optimism pervaded the meetings and the discussions taking place. The value of improved equipment and facilities in winning reduced costs, increased business and a friendly public was pointed out and emphasized over and over again by those who had successfully turned the corner toward decidedly improved conditions, by the application of modern merchandising ideas to the transportation business.

### PRESIDENT JEFFRIES SOUNDS KEYNOTE

"Notwithstanding the continued competition of rapidly growing numbers of automobiles, owners and managers of electric railways feel more optimistic than they did last year," said President G. K. Jeffries in his opening remarks. He attributed some of the improved traffic experienced by railways to the increased difficulties attending the use of automobiles together with a growing realization by the public of the cost of using automobiles for ordinary transportation purposes. But he also pointed out that the convenience of the private automobile is such that improved facilities and higher class service on the electric railway lines are necessary to win any appreciable part of the increased demand for transportation created by the coming of the automotive vehicle. "This," he said, "can only be given by a line in first-class physical condition. Some electric railways have good equipment but a roadbed in poor condition. Others have first-class track but old, out-of-date cars. Very few have both track and equipment of high grade."

Mr. Jeffries called attention, however, to the fact that those properties that have put both their track and cars in good condition, and that have taken advantage of the service improvements which this makes possible, are the ones that have been successful in building up a profitable business. Since the alternative of using an automobile is always present, people will not put up with discomforts and inconveniences to which they were formerly accustomed.

"The traveling public must be put in such a state of mind by improved equipment and facilities," said the speaker, "that they will look forward to a trip over electric lines with pleasurable anticipation instead of regarding it as a necessary evil to be endured. The day is gone when a line of rails, some vehicles with wheels under them and motive power, but without any of the refinements demanded by the public, can long exist; the competition by more attractive agencies is too great, regardless of the cost."

Combined with these material things which can be seen and examined, the speaker held that the attitude of employees toward their work and their company and the reflection of this attitude in their dealings with the public represent factors which spell ultimate success or failure for a given operation. Here again he called attention to the important part played by the condition of the physical property. If the employee has pride in his company and in its service, he can be trained much more easily and successfully as a salesman of its service.

### IMPROVED EQUIPMENT IS PAYING INVESTMENT

In a symposium on the results accomplished by new rolling stock, railway managers who have had sufficient experience with improved equipment on their properties testified to the permanency of the improvements effected. George MacLeod, vice-president and general manager Buffalo & Erie Railway, opened this part of the program. From the experience on his property Mr. MacLeod held that there is little question but that more comfort and better appearance in equipment will give increased revenue. Here, however, the speaker insisted that operating income rather than revenue is the all-important figure to be considered. When the question of equipment is approached from this angle, the type of car used by a given property becomes one of the most important factors that determine the final result accomplished.

Taking the experience of the Buffalo & Erie property specifically, Mr. MacLeod cited the results accomplished by the complete replacement of former heavy equipment with new light-weight, high-speed interurban cars operated by one man, and that weigh only 19 tons. Combination air-magnetic brakes permit quick stops to be made despite the high operating speed. These cars were first placed in operation in February,

1925, and have since shown a reduction of 50 per cent in power costs in comparison with the old equipment. An attractive saving in track and roadway maintenance was made, tie spacing was increased and at the same time a longer life of the tie structure is expected than was formerly obtained with closer spacing under the old equipment. It is also expected that rail and special work life will be doubled as the result of the lighter cars. Equipment maintenance costs have been reduced 50 per cent. It costs approximately one-third as much to rewind armatures and fields on this car as on the old equipment.

For the twelve months of 1925, as compared with 1924, there was an increase in passenger revenue of 7.5 per cent. Despite an increase in car-miles operated of 14.4 per cent, operating costs were 12.8 per cent less than in 1924. This represented an actual decrease in car-mile cost of 23.3 per cent. Due to very unfavorable weather conditions in 1926, revenues during the summer were less than in 1925. The riding for the year, however, was 3.8 per cent higher than in 1924, and the months of November and December showed increases of 4.2 per cent and 5.2 per cent respectively over the corresponding months of 1925.

L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, testified to the permanency of the results accomplished there with new equipment, in a written discussion that was read by J. W. Knecht, general superintendent of the property. "After seven months of operation of our new cars I am as enthusiastic as ever over them and over both their tangible and intangible value to the property," said Mr. DeLamarter. Figures were cited to support the statement that the new cars have brought actual revenue increases. These show that during each month since the Grand Rapids rail coaches were placed in service the proportion of increase in passenger revenue on the three lines so equipped has been considerably higher than the increase shown on the balance of the lines in the city. During the seven-month period from June to December, 1926, passenger revenue increased 3.21 per cent over the corresponding period in 1925 on the three lines upon which the new coaches are operated, while the passenger revenue for the same period on all other lines increased only 1.91 per cent.

### BRINGING BACK PATRONAGE TO THE INTERSTATE

L. M. Brown, general superintendent Interstate Public Service Company, described the equipment improvements that have been made on that property during recent years. Since 1920 there had been a gradual decrease in total passenger revenue on this property each



year from the preceding year, he said. In 1926 the condition changed, with a substantial increase which brought passenger revenue to only 8 per cent below the figure for 1920. Since the installation of parlor-buffet and sleeping car service a check of the longer-haul travel—that is, passengers traveling 100 miles or more—shows an increase of 40 per cent in this class of business. This has not been erratic but has consisted of a steady, constant growth. It is attributed very largely to the character of the equipment operated and the consequent improvements in service that have been made. The speaker expressed the opinion that new cars alone will not bring permanent increases in revenue; that satisfactory results can only be obtained by combining with new equipment such improvements in service as will meet the demands of the present-day traveling public.

W. R. Power, general manager Appalachian Electric Power Company, expressed his thoughts on the subject of increasing passenger revenue in a letter which was read by H. L. Brown, chairman of the program committee. R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company, talked extemporaneously on the results of Youngstown's experience with modernization and with bus operation. Mr. Graham held that there is no mysterious rubber urge in transportation. He cited results obtained on parallel car and bus lines serving the same territory to show that careful analysis of the transportation situation under each specific combination of circumstances encountered is necessary for intelligent appraisal of the measures which will bring best results from a financial standpoint.

#### INDUSTRY PAYING FOR 12,000 CARS

The electric railway industry is paying annually, in the form of excessive operating costs, for 12,000 new cars which it is not receiving, according to Charles Gordon, editor *ELECTRIC RAILWAY JOURNAL*. Mr. Gordon again showed lantern slides which have been presented before other sectional association meetings to illustrate the heavy cost which the industry is paying for the operation of heavy and obsolete equipment.

Further discussion of the present car situation in the industry, and of the importance of equipment improvements, was included in papers prepared by J. H. Alexander, president Cleveland Railway, and M. B. Lambert, transportation sales manager Westinghouse Electric & Manufacturing Company. Mr. Alexander's paper was read by R. W. Emerson, vice-president Cleveland Railway. He urged the importance to the industry of improvements in cars and car equipment and called on all manufacturers and operators as well to do their part in helping to make the car exhibit at the Cleveland convention next fall a real inspiration to the entire industry. Another point which was strongly stressed was the value of the work which has been done by the American Association committees on essential features of modern cars and on unification of car design.

H. H. Adams, who has been chairman of the latter committee for a number of years, extended an invitation to any company faced with the problem of selecting the proper equipment for a given service to confer with the committee.

An abstract of Mr. Lambert's discussion of the car situation is printed elsewhere in this issue. This complete session on the subject of rail equipment was followed by an afternoon devoted to the bus. Walter Jackson, railway and bus consultant, New York, took as his subject the proper use of buses by electric railways. T. W. Noonan, general manager Pittsburgh Motor Coach Company, discussed the new 25-cent express service which has been developed in that city to attract automobile riders who formerly used private cars in daily travel. An abstract of his paper is printed elsewhere in this issue.

Mr. Jackson cited the experience of more than fifty electric railway properties which have operated buses for some time in cities ranging in size from 25,000 population and less to metropolitan conditions. In practically all such situations, he found that the operation of buses as street cars on rubber tires, while in many instances serving as a stop-loss measure to eliminate heavy track and paving construction and reconstruction charges, fails to show any really substantial revenue building possibilities. The speaker held that the most attractive field offered for the extension of bus operations at a profit, particularly in large cities, is in the direction of a quasi-rapid transit service to places more than 4 or 5 miles from the business district. He held that success in such operations demands a rate of fare at least double that of the car fare, with a character of service so superior that it will draw largely from the ranks of persons using personal motor cars, with whom

expense is secondary to character of service. To this end short headways, speedy operation, seating comfort, adequate lighting and ventilation and other conveniences are important. The need for high schedule speeds, for the elimination of stops and for working in and out of congested traffic dictates, according to Mr. Jackson, a small vehicle of comparatively limited seating capacity and limited width.

An unusual feature of the program was a general conference of operating executives devoted to the subject of building more profitable business for the interurbans. In this meeting, which, in the absence of J. P. Barnes, was presided over by W. H. Sawyer, president American Electric Railway Association, a high pitch of enthusiasm pervaded the discussion. Various speakers from properties which have already accomplished notable results in recovering traffic formerly lost to automobiles, and in generally improving their financial showing, testified to the wisdom of spending money for improvement of facilities and modernization of operation. Mr. Sawyer was also the principal speaker at a dinner on Thursday evening. An abstract of his remarks is printed elsewhere in this issue.

The subject of maintenance occupied most of the final session on Friday. Papers by H. S. Williams, assistant superintendent of equipment Department of Street Railways, Detroit, and by W. T. Rossell, general manager Pittsburgh Railways, will appear in abstract in a later issue. Another paper of general interest on the experiences of the Indiana Service Corporation in reshaping its financial structure prepared by R. M. Feustel was read by H. E. Vordermark.

M. Ackerman, general manager Lake Shore Electric Railway, Cleveland, Ohio, was elected president for the ensuing year.

## Financial Reorganization Saved the Original Investment\*

BY ROBERT M. FEUSTEL  
President Indiana Service Corporation

THE chairman of your program committee is responsible for the thought that the plan of the Fort Wayne reorganization, consummated in 1920, might be of some interest to association members. To those actually engaged on the plan, the path seemed very clear, not because there was any unusual foresight used but because there was only one way out. It was the case of a fair-sized utility finding itself broke, with no banking and very meager merchandise credit. Like all utilities, there was some reasonably fixed lower limit to gross earnings, and to find this limit, pay merchandise creditors and start anew on what history had taught was the fair earnings to be expected was the rather simple task. The only difficulty was to persuade bondholders and general creditors that you might settle these problems

more promptly and at less cost out of court.

The Fort Wayne & Northern Indiana Traction Company was the result of a reorganization in 1911 of the properties of the Fort Wayne & Wabash Valley Traction Company. This predecessor company had been the result of consolidations made in 1903 of the Fort Wayne city line, light and power properties in Fort Wayne and a 114-mile interurban line from Fort Wayne to LaFayette. By 1917 about 60 miles of additional interurban lines had been built and light and power business developed in 25 small communities adjacent to the interurban lines.

#### COMMON STOCK ISSUED AS BONUS

The gross revenue in 1917 was, in round figures, \$3,000,000. The actual investment in physical property was \$14,000,000, of which \$10,000,000 was in city and interurban lines and \$4,000,000 in light and power property.

\*Paper presented before Central Electric Railway Association, Toledo, Ohio, Feb. 4, 1927.



Against this property were outstanding \$9,000,000 of underlying bonds of four issues and \$3,000,000 of Fort Wayne & Northern Indiana first mortgage and collateral trust issues. In addition, there were \$2,500,000 of preferred stock and \$4,000,000 of common stock. The total was \$12,000,000 bonds and notes and \$6,500,000 of preferred and common stock, making a total of \$18,500,000 of securities against \$14,000,000 of cash actually invested in the properties. I suppose that some years ago it would have been rank heresy for a utility operator to have admitted that more face value of securities were outstanding than there was actual money invested in physical property. With the considerable experience that the writer has had in investigating the history of utility properties for utility commissions it has always seemed to him that the utility operators had failed to make the most before utility commissions of the very natural and logical history of the growth of their financial structures.

The property under discussion had been financed in the commercial days of unrestricted competition when limited franchises in cities and expensive private right-of-way lines in the rural districts afforded all the investor had in the way of protection of his investment. City councils and county boards were the political wasters and they were changing at least every four years. The franchises, many of which contained burdensome provisions, were usually good only for the life of the bonds; that is, 25 to 30 years. For traction properties the automobile had not come into real commercial use and the interurban gave promise of being a splendid field for investment.

One of the common methods in the past for providing construction money for the traction systems was to sell a \$1,000 bond, \$1,000 of preferred and \$1,000 to \$2,000 of par value common stock for, say, \$2,500 to \$3,500. Just what cost to assign to the different classes of securities in a transaction such as this depended upon the opinion of the purchaser.

A certain amount of the common stock was, of course, taken by the promoters, and some was, no doubt, used in obtaining help from local influential citizens in obtaining necessary grants, rights-of-way and franchises. The resulting financial structure was that the bonds and preferred stock at par usually represented the cash in the property and the common stock represented about 25 per cent additional for promotion and cost of establishing the business. If the enterprise was successful the common stock would be made good; if not, even the bonds and preferred stock might become speculative.

#### WAS RESULT OF CONDITIONS THAT EXISTED

As stated, it seems to the writer that such a financial structure was a perfectly logical outcome of the highly competitive conditions under which those early traction utilities were built and the promoters were well entitled to any profits they could make in gathering so much money into the development of the new and still speculative

### COMING MEETINGS OF *Electric Railway and Allied Associations*

*Feb. 18*—New York Railroad Club, meeting, Engineering Societies Building, New York City, 8 p.m.

*Feb. 18-19*—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

*March 4*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

*April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.

*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.

utility field. Within a period of fifteen years poor guesses as to choice of territory in some cases and the development of the automobile in all cases changed what was a perfectly legitimate business enterprise into a task of intelligent salvaging.

The Fort Wayne & Northern Indiana securities structure was the result of such financing, and it is perfectly obvious that a utility property bonded up to 85 to 90 per cent of its construction cost must earn a good return from the start else the sheriff will not be far in the offing. This property, like others of a like character, would no doubt have come through well if it had not been for the miraculous development of the private automobile. A safe margin for bond interest could not be earned, and yet new money was needed for city lines, light and power and even for interurban improvements and extensions. Depreciation, a rather unwelcome and reasonably unknown visitor, also came in and demanded food from the operating revenues. The solution was comparatively simple; i.e., save what could be salvaged of the original cash investment and let the stockholder go by the board.

It was such a condition that confronted the Fort Wayne & Northern Indiana properties at the beginning of 1917, just ten years ago. On legal equities the bondholders would, of course, come first. It was indeed fortunate that the stocks and bonds had been sold in joint blocks, because if the bondholder could be saved it meant that the stockholder might lose nothing much except what had been his anticipated profits. This, of course, was not literally true in all cases, because some of the securities had changed hands. It was true in the main, however.

The most urgent need was money for rehabilitation so that better service and then possibly increased revenues might result. It was at this point that the only real unusual feature of the reorganization occurred. A default was started in 1917 on \$11,500,000 of bonds, and interest was paid on only \$500,000

of real underlying bonds and, of course, principal and interest on car trust certificates. With some \$500,000 owing to supply dealers, it was explained to the bondholders that future necessary credit made it desirable that these merchandise creditors be paid. A receivership might start rather expensive litigation and would surely hamper the improvement of the property from earnings, as court orders for improvements would be difficult to obtain.

Because the operators were too innocent to know that you can not default for such a length of time without a receivership, it was tried, and for 2½ years such default was made until the company was ready for a short voluntary receivership and reorganization. During this time the merchandise creditors were paid off and almost a million dollars was expended in new cars and improved power facilities so that net earnings might be improved. This task was also made much easier because it occurred during the difficult war period when security holders and creditors were busy at many other tasks.

#### NEW FINANCIAL PLAN SAVED ORIGINAL INVESTMENT

The new financial plan was simple indeed, even though it did require much co-operative work among the several sets of bondholders. The first lien bonds were cut from \$9,000,000 to \$4,700,000. The only slip in the plan came in the issue of \$4,800,000 of income bonds as the next set of securities. While the interest on these bonds need not be paid unless earned and is not cumulative, for future financing it would have been better to have had a first preferred stock. An issue of \$2,159,000 of 7 per cent non-cumulative preferred and \$2,159,000 of common stock completed the new financial structure. This might appear to be a rather meager set of securities to exchange for first mortgage bonds and preferred stock, all of which had formerly meant real cash investment. The new securities, however, did equal in face value all of the cash which had been put into the property, including the forgone interests for the three years of default.

With the net earnings during the default period put into betterments and the generally improved business conditions after the war, the task was made easy. Some financing was done by first mortgage bonds, as that issue now represented only 35 to 40 per cent of the investment. The income bonds paid 3, 4, 5 and 6 per cent for the succeeding years after 1920 and have been on a sound basis ever since. Light and power and city lines earnings increased sufficiently to make possible dividends on the preferred and common stock. In other words, there were fair earnings available for return on all of the cash actually invested in the property. Before such dividends were actually paid on the common and preferred stock the properties were sold to our operating syndicate, where the preferred was converted into common stock to make possible the issuance of new preferred for improvements to be sold on a customer-ownership plan.

There is nothing at all remarkable



about the plan we have outlined except that the new securities did represent all the cash in the properties at face value and were so arranged that future financing would be accomplished, and if earnings would have been low the sheriff was not so near by.

The holders of the common and preferred stocks received an average above par for their holdings at the sale and the first mortgage 5 per cent bonds and the 6 per cent income bonds are now selling for around 95 in the open market.

## Congestion Relief with de Luxe Coaches\*

By T. W. NOONAN

General Manager Pittsburgh Motor Coach Company

**M**ILLIONS of dollars are being spent for policemen, signal systems, street alterations and what not to relieve traffic congestion. Yet every change toward expediting traffic is soon offset by the increase in the number of personal automobiles. We cannot sweep back the ocean of personal cars by condemning their wasteful use of street space, whether running or parked; nor by finding fault with their

put the matter in a nutshell: We have found that long-headway buses do not pay and that short-headway de luxe coaches do pay. In both cases, traffic drawn from the associated Pittsburgh Railways was a negligible factor because the coach fare is 25 cents while the street railway schedule is 10 cents cash, 8½ cents token and \$1.50 weekly pass within the same area.

Following the acquirement from an

the others. They are therefore much easier to negotiate in downtown streets. The over-all length is also only 24½ ft. against the 28½ ft. length of the older vehicle. The reduction of over-all width from 90 in. to 81½ in. has been found of substantial value in avoiding accidents and in getting by other vehicles.

Because of the better clearance conditions and smaller capacity, we were able to cut the running time from 38 minutes to 30 minutes. In addition to making this time saving for the patron, we save him a possible ten minutes in the rush hours by shortening the headways from twenty minutes to ten minutes, and a possible further saving of eight minutes in the non-rush hours by shortening the headway from twenty minutes to twelve minutes. Business increased so rapidly that the six coaches soon were unable to cope with it. So we now throw in two of the 29 seaters to help the morning peak and three 29 seaters between 4 p.m. and 6 p.m.

The total increase in vehicle-miles offered is about 50 per cent. The increase in revenue is about 58 per cent. This is in comparison with the November weeks immediately preceding, as this route was not in operation in December, 1925. Probably some of this increase was due to the more wintry weather and Christmas shopping stimulation, but it will be seen from results on the other routes that the new type of equipment and shorter headways were responsible for the greater part of the gain.

Under the first operation, November showed earnings of \$170 a day or 29 cents per mile, but costs were 32 cents per mile.

Under the new operation, December showed earnings of \$301 a day. Earnings were 32.3 cents per mile, but costs only 26 cents per mile.

The table on page 299 shows the details of earnings and services in two weeks preceding the change and the first four weeks thereof.

Naturally enough, there was no large increase in earnings per vehicle-mile in view of the increase in number of miles offered and the reduction of seats per vehicle. The important point is that a loss of 3 cents per bus-mile has been turned into a profit of 4 to 5 cents per coach-mile.

Not the least interesting feature of the new service is the effect it has had on night travel. Even the earnings per vehicle-mile have been increased by 50 per cent. We cannot help concluding that this large increase in night travel, when there are no parking restrictions to hamper personal driving, must be due to having a service attractive enough to make the theater-going autoist keep his machine in the garage.

On the Squirrel Hill route we merely changed our service standards beginning on Dec. 6, 1926. Operation for the present continues exclusively with 29-seat single-deck buses. However, the peak headways were shortened from twelve minutes to ten minutes. Off-peak headways remained at fifteen minutes. The terminal-to-terminal time is 30 minutes, which is equivalent to a schedule speed of 11.4 m.p.h. It should be explained here that our layovers on



The New Coaches Seat Nineteen Persons in Comfort. Because of Their Size They Are Easier to Handle in Traffic than the Large Buses Used Previously

owners because they choose to roll their own, regardless of expense. We have no right to call for the removal of the personal car unless we can offer something of equal or greater value in its place.

The personal car has developed a desire for faster and more luxurious transportation than can possibly be given by a low-fare electric railway service. That desire has become so set with many automobilists that they are willing to subject themselves to heavy expense and much annoyance rather than return to what they deem lower-grade transportation.

Buses with narrow seats, skimmed aisles, insufficient lighting, poor ventilation and poor springs are surely not the vehicles with which we can draw the autoists and so work toward the only practical solution of congestion, to wit, reduce the number of vehicles which make inefficient use of their highway space privileges. Such operation stands even less chance of doing good when an inferior type of mass transport vehicle is accompanied by headways longer and fares higher than prevalent electric railway standards.

In making the foregoing assertions, I am sticking to the experience of the Pittsburgh Motor Coach Company. To

independent operator of a line joining the business and amusement centers of Pittsburgh and East Liberty, on Aug. 14, 1925, we originated a 5.7-mile route from downtown Pittsburgh to Squirrel Hill, a high-class residence district lying just beyond Schenley Park. For this service we installed 29 and 25-seat buses. On May 24, 1926, we originated a 6.6-mile route to Point Breeze, another fine residence district. The vehicles put on were 29 seaters.

Both the Squirrel Hill and Point Breeze routes make use of 2 miles of boulevard emanating from downtown Pittsburgh. The Squirrel Hill route also makes use of Schenley Park and, in general, is not near trolley territory. The Point Breeze route, after leaving the boulevard, is on tracked streets for a good part of the way.

### INCREASE IN BUSINESS OF 20 TO 58 PER CENT

The Point Breeze route is of greatest interest because it covers results from changes in both equipment and service, whereas the other lines are still being operated with buses instead of de luxe coaches.

Beginning Dec. 6, 1926, we changed Point Breeze from 29-seat buses to 19-seat coaches. These coaches have a wheelbase of only 210 in. compared with the 255-in. wheelbase of some of

\*Abstract of a paper presented before the Central Electric Railway Association, Toledo, Ohio, Feb. 3, 1927.



RECORD OF EARNINGS FOR SIX WEEKS BEGINNING WITH NOV. 22

Week begun	Miles	Total Revenue	Revenue, Cents Per Mile	
			All Day	7 P.M. to 11 30 P.M.
Nov. 22 .....	3,507	\$1,011	28.8	13.4
Nov. 29 .....	3,530	1,108	31.4	14.2
Dec. 6 .....	5,562	1,668	30.0	20.8
Dec. 13 .....	5,554	1,829	32.9	25.6
Dec. 20* .....	4,753	1,556	32.7	20.5
Dec. 27* .....	4,836	1,582	32.7	19.4

\*Five-day weeks.

all routes at the downtown end are no longer than necessary to interchange passengers, and they are never more than two minutes at the uptown end. The cost of operating these 29-seat buses is 34 cents per mile. They earned 46 cents per mile in December, 1926, an increase of 20 per cent over December, 1925.

Counting from the beginning of independent operation in November, 1916, the East Liberty route had been in operation ten years, so it might have been assumed that the market for 25-cent riding was pretty well stabilized. Our experience, on the contrary, proves that we were far from saturation point, although we still have no de luxe coaches on this route.

The equipment change on this route was to eliminate the double-deck bus completely. It was not only unsuitable for the curves and hills of this line, but so unpopular as a carrier that it did not earn any more per mile than the 25 and 29-seat units. The theoretical seating capacity of these double-deckers was 52. Their actual capacity for the greater part of the year was 22—the number of seats on the lower deck. Unlike the operation on Fifth Avenue, New York, or the Lake Shore, Chicago, there is no large number of sightseeing objectives to draw passengers to the upper deck. A special check made in the still balmy weather of September, 1926, showed that the upper deck was little used even then.

The cost of running the double-deckers was 42 cents per mile. The cost of running the single-deckers over the same route is 32 cents per mile. We did not alter the headways from the six-minute peak and the eight-minute off-peak, except that on Saturdays from 12 o'clock noon headways are on a five-minute basis. Since the effective seating capacity of the double-deckers was only 22, we really increased the number of seats available by confining ourselves to the 25 and 29-seat single-deckers. The running time between terminals is 26 minutes, which corresponds to a schedule speed of 11½ m.p.h. Earnings in December, 1926, were 54 cents per mile, which was 20 per cent more than in December, 1925.

RAISING THE STANDARD IN OTHER WAYS

In our endeavor to give the autoist something good enough to tempt him from the use of personal cars during busy hours, we have made several changes in other directions. In body color, we are changing from a yellow to a rich and dignified combination of dark gray below and sapphire green above the belt line.

In seating, the scant dimensions and rather stiff upholstery of the buses have been succeeded by twin chairs on one side of a 16½-in. aisle and single instead of double seats on the other side,

all spaced on 30 in. centers for real knee-room. These chairs are upholstered in air-cushioned Spanish leather. The single chairs are 23 in. wide over the arm rests, the double chairs 35 in. A set of air-cushion seats extends across the back of the coach.

Appreciated features are the mirrors on the posts between the extra long windows and the eight 21-cp. dome lights, which eliminate former complaints about light too dim for reading. The better riding quality of the



Panel Attached to Lamp Standard Shows Where Coaches Stop in the Business District

coaches also makes it easier to "read as you ride, while we do the driving."

In fare collection, we have tried to avoid the eyesoars and earsoars of register rods, cords and bells. The passenger simply drops his fare into a locked box finished to correspond to the interior trim of the coach. There are no cords or rods to irk the eye. Only an inconspicuous cord for signaling the operator is carried along the side of the coach within convenient reach of the rider. We display no printed matter whatsoever.

The bonus and free uniform features given originally in addition to a wage scale of 50 to 55 cents an hour were eliminated in favor of a wage scale corresponding to that of the Pittsburgh Railways.

We duplicated the 1½-cent increase of the railway, made on Jan. 1, so that the present scale is 61½ cents for the first three months; 66½ cents the next nine months and 68½ cents after the first twelve months. The first result has been a complete absence of turn-overs since Nov. 1. A second result has been a decrease of 35 per cent in accidents per vehicle-mile.

Our first publicity for the improved Point Breeze service was to run the first two coaches in with the others, but the chauffeurs gave each patron a card stating that a full service with coaches of the same design would be inaugurated on Dec. 6; also that the

new schedule would be handed out with them. On Dec. 2 we mailed a letter to 3,200 householders in the Point Breeze area, the names being selected from the customer list of the associated Duquesne Light Company.

It is hardly necessary to add that news of the de luxe coaches on the Point Breeze route spread quickly to the customers on the Squirrel Hill and East Liberty routes. We have been asked by them when will they be favored likewise.

Our present plans contemplate the purchase of ten more coaches, making a total of sixteen. Two of the new ones would be added to the Point Breeze route to permit 100 per cent operation of such coaches on a 7½-minute headway instead of the present ten-minute off-peak headway. The remaining eight will be put on Squirrel Hill in preference to East Liberty, because of the more industrial character of East

Liberty riding, but eventually this type of coach will be our standard except for the possible use of the larger buses during peaks.

Create the Demand for Modern Street Cars\*

BY M. B. LAMBERT  
Transportation Sales Manager Westinghouse Electric & Manufacturing Company

THE American electric railway industry has a more intimate responsibility to the public than any other industry. The nature of its service brings it into more intimate contact with a larger part of the public than do the steam railroads or any other public utility. Hence the electric railway executive has a far greater responsibility to his community than any other citizen in that community. The industrial and social progress of every community depends to some degree upon the vision and enterprise of its electric railway executive. The character of the support and co-operation that he enjoys from the public he serves also depends very largely upon the spirit and enterprise that he imparts to his entire organization and the character of service rendered to the public.

The exhibition of modern street cars

\*Address presented before Central Electric Railway Association, Toledo, Ohio, Feb. 3, 1927.



and other developments in the art of transportation at our annual conventions brings before every electric railway executive once each year all of the advances the manufacturers and operating engineers have evolved for the betterment of community transportation. Every electric railway company that has developed improvements in car design owes it to itself and the industry as a whole to exhibit these at the annual convention. It is largely through such co-operation and exchange of ideas that the industry advances. The progressive executives must of necessity carry the burden of encouraging and exciting interest and enthusiasm in the others, because if they do not their own efforts and that of the industry, as a whole, are materially hampered.

#### THE CO-OPERATION OF THE MANUFACTURERS

The manufacturers serving the electric railway industry are enjoying a very extraordinary co-operative set-up, fostered by the American Electric Railway Association and the technical press. In spite of this there is a feeling in some quarters that the manufacturers are not doing all they might do to promote the welfare of the industry to the degree that it justifies.

What are the extraordinary things the association and the technical press are doing to encourage the manufacturer? The most outstanding are:

The American Electric Railway Association provides for membership of operating companies and manufacturer companies on an equal basis. Buyer and seller are brought together in a common co-operative plane.

The association has established the manufacturers' co-operative committee, the chairman of which reports at all its executive committee meetings and has the privilege of the floor at annual conventions to submit a complete report of progress.

The association president and the managing director have for several years past devoted considerable time and effort in calling together numerous manufacturing representatives, urging them toward greater co-operative effort in promoting the adoption of modern equipment by the industry; in fact, helping the manufacturers to increase their sales.

The association set up an engineering committee to study and promote modern standard city and interurban cars, and, with association funds, published in book form the report of this committee.

The ELECTRIC RAILWAY JOURNAL staff, co-operating with the association executives, have called conferences of manufacturers at recent conventions and displayed charts and data showing the opportunities for replacement of the old with the new, modern equipment. In addition they have had these studies printed in attractive pamphlet form and distributed throughout the country—*Electric Traction* and *Forbes* offer prizes annually for special operating accomplishments.

In general, the situation is unique in that the progressive electric railway executives and their national association executives for the past several

years have been the "loud speakers" in urging the adoption of modern cars and equipment in a much more pronounced way than the manufacturers themselves have been. This year the association has broadened the scope of the manufacturers' co-operative committee, perhaps with the idea that this may arouse greater interest among all manufacturers to assume to a greater degree their own part in adequately promoting the development and sale of cars that will attract greater riding and reduce operating costs.

#### FACING A NEW SITUATION

The electric railway industry is no longer a monopoly in the sense that it is without competition. The private automobile is a formidable competitor, and in another sense the auto bus is a competitor to many electric railway manufacturers, while it at the same time opens up new markets to the larger electric railway manufacturers. Every electric railway manufacturer could consistently take his hat off in deference to the commercial progressiveness of the automotive manufacturing group. They have displayed in good measure the enthusiasm, courage and salesmanship that a youthful industry in this era may consistently possess. The electric railway manufacturers may with profit imbibe much of this enthusiasm and courage. As Admiral Schley said, "there is glory enough for all." The auto bus is here to stay, and so is the electric railway. Each has a service to perform distinctly its own, and the demand for transportation service in our progressive American communities is going to command right along the best engineering and sales talent that both forms of transport have to offer.

The chairman of the manufacturers' co-operative committee of the American Electric Railway Association has laid down a program for this year's activity, in addition to its publicity functions. The plan is to drive home in the minds of every manufacturer that it is to his interest to excite interest in and promote the sale of modern cars. The demand for all devices and appliances sold to the electric railway industry is increased with the adoption of modern cars. Every salesman serving the electric railway should keep that fact constantly before him. The more new cars that are sold and the better the service that is offered the public the greater will be the demand for both new cars and new buses. Let the slogan among the manufacturers in selling transportation be: "One for all and all for one." Sell modern street cars.

#### Kentucky Association of Public Utilities Meets February 18-19

"CITY and Interurban Transportation" will be discussed by W. H. Sawyer, guest of honor at the tenth annual meeting of the Kentucky Association of Public Utilities, held at the Brown Hotel, Louisville, Ky., on Feb. 18 and 19. Other subjects of interest on the program are: "Twenty Years of Utility Growth in Kentucky," by Harry Reid, president National Electric Power Company, New York City; "Hu-

manitarian Aspects of Safety," by Neil W. Funk, director of safety, Louisville Railway, Louisville, Ky., and "The Man May Pay, but Remember, It's the Woman Who Buys," by Helen E. Steiner, divisional chairman women's committee East Central Division, National Electric Light Association, Cleveland, Ohio.

## Increasing Speed and Comfort by Modernization of Equipment\*

BY E. A. PALMER

Westinghouse Electric & Manufacturing Company

OPERATING organizations of electric street railway companies and equipment manufacturing organizations are devoting particular attention to those items which contribute to fast, comfortable service and thereby attract more patronage to the electric railway business.

High schedule speeds on city surface lines are a function of the rate of acceleration, free running speed and rate of braking of the rolling equipment. Quadruple equipments of high-speed motors for double-truck cars during the past four or five years have comprised about 80 per cent of the installations, being preferred to double motor equipments because of the more rapid acceleration possible. Theoretically the energy consumption is lower for two motors than for four, because larger, more efficient units are involved and the weight efficiency is higher. Maintenance of the motors should be less because only half the number are involved and a part of the maintenance expense is nearly independent of the size of the motor. However, the majority of experienced operators feel that these theoretical advantages of the two-motor equipment are overcome by the waste of energy and excess stresses caused by wheel slippage and by the superior acceleration of the four-motor car.

The low floor car has been adopted by the industry almost universally. Since the innovation of this idea in 1912 a complete line of motors up to 60 hp. has been developed for use on wheels up to 28 in. diameter. During the last three years 85 per cent of all cars for which the Westinghouse company furnished the electrical equipment had wheels of this size or smaller.

One-man operation of street cars is now an established practice. The use of one-man cars has extended steadily during the last ten years. Frequently two-man cars can be so arranged that they may be operated by one man if the occasion arises. Whether cars should be single or double end depends on whether wyes and loops are available for turning. Approximately 80 per cent of all equipment furnished over a number of years has been double end.

Considerable study is being given at the present time in some large cities to multiple-unit two-car train operation.

\*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.



The permanently coupled articulated train has been very successful on some properties.

New cars must be adequately ventilated during the winter season. The majority of the men in the industry are quite satisfied with the arch roof and ventilation construction at present standard with all car builders. A heating system that will maintain a comfortable temperature is necessary. Electric heat seems to be specified on most new city cars where the winters are moderate.

A good proportion of cross seats properly spaced insures comfort. Practically all the plans of new cars specify all the cross seats possible. Safety devices interlocking the controller, line switch, doors and steps, and brakes are being used on practically all cars for one-man operation and most cars for two-man operation. Cars should be efficiently illuminated so that passengers may read without eyestrain even on rush-hour voltage. There is opportunity for the use of beautiful yet useful fixtures. The ceiling finish should reflect rather than absorb light.

New light-weight, one-man, two-man low-floor cars generally weigh less per seat than the cars replaced. The energy saving is generally in direct ratio to the reduction in weight. This is considerable where maximum demand energy contracts prevail.

Maintenance of equipment per car-mile should be less the first few years even though the new cars be kept in almost continuous service in the non-rush period of the day. The platform time savings will be very substantial if a change is made from two-man to one-man operation with the introduction of the new cars.

The Brooklyn City Railroad showed 28 per cent increase in traffic on one line with new cars and Thomas Fitzgerald, vice-president Pittsburgh Railways, advises that during recent years every time new cars replace old cars on a line the receipts increase substantially.

Without cheap and reliable electric railway transportation it would be impossible for the large business organizations in the congested sections of our cities to exist. Let us therefore all boost for the modernization of our rolling equipment.

### Birney Club Discusses de Luxe Cars

LIVELY discussion of car modernization and the present-day tendency toward the inclusion of more luxurious seats and accommodations for the comfort of passengers took place at the regular monthly meeting of the Birney Club of St. Louis held on Feb. 7 at the Missouri Athletic Club. There was general agreement of the need and importance of modernizing car equipment to meet the level of present-day transportation demand. Differences of opinion were expressed as to just what steps in car design and construction are needed to fulfill this demand and to increase the popularity of street car riding.

L. F. Stoll, assistant vice-president McGraw-Hill Publishing Company, Inc.,

and Charles Gordon, editor ELECTRIC RAILWAY JOURNAL, were called on for short talks by President Richards. Mr. Stoll discussed the significance of the fundamental changes taking place in the transportation industry and indicated that these changes are perhaps taking place faster than the industry itself realizes. Mr. Gordon spoke on the electric railway equipment situation and pointed out that the present widespread tendency to repaint and rebuild existing equipment is an index of the general interest being taken in car improvement. He held that this activity offers the equipment manufacturers an opportunity so to improve the performance and the ride merchandising appeal of their product as to demonstrate conclusively the desirability of replacing old equipment with new cars instead of rebuilding.

### Bus Drives Compared

RELATIVE advantages of mechanical and electrical drive for buses were discussed at considerable length at the February meeting of the New England Street Railway Club held at the Copley Plaza Hotel, Boston, Feb. 3. This topic aroused much interest on the part of the members and evoked many questions. Charles Froesch, engineer Mack Trucks, Inc., reviewed the technical features embodied in the gas-electric drive and showed by means of lantern slides the latest practice in adapting this drive to the new buses now in process of development. R. E. Fielder, sales engineer Yellow Truck & Coach Manufacturing Company, spoke briefly from his experience, running back over a period of twenty years of bus operation, and said that the future is promising for electric control. He stressed, in particular, the economics of operation, based on experience with crowded thoroughfare operation of buses in places where electric drive has proved both economical and desirable. Where the traffic averages four passengers or more per bus-mile, he said that electric control has an undoubted advantage. On the other hand, both speakers were of the opinion that on long suburban runs, where few speed changes are necessary, mechanical drive is superior in certain respects.

J. C. Thirlwall, engineer General Electric Company, added to the opinions of the previous speakers by citing the experience of the Philadelphia Rapid Transit Company. Greater ease in riding, less annoyance from speed changes, more comfort in every respect are features of electric drive that attract passengers. The speaker concluded that large operating companies are inclined to turn toward electric drive almost without exception. The Roston & Maine and the New England Transportation Company were cited as local companies favoring this method of drive.

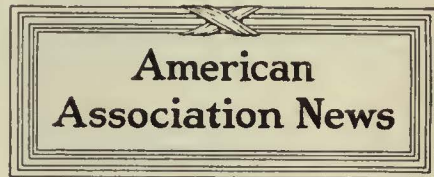
In the discussion that followed the remarks of the speakers it was brought out that the recent acceptance of \$2,000,000 of equipment bonds issued for electric drive buses to be purchased on a ten-year life period is perhaps the most marked acknowledgment of

the dependability and practicability of the electric drive.

Speaking at the close of the dinner, Ralph S. Bauer, Mayor of Lynn, Mass., advocated closer co-operation and stronger partnership on the part of public service companies in the solution of many problems confronting municipalities today.

### New York Railroad Club February Meeting

"TRAINING Understudies for Official Positions in Railroad Service," will be the subject of discussion at the meeting of the Railroad Club on Feb. 18, to be held at the Engineering Societies Building, at 8 p.m. Prof. William J. Cunningham, who is the James J. Hill professor of transportation at Harvard University Graduate School of Business Administration, will be the principal speaker. He advocates the creation of a corps of cadets, graduates of universities and technical schools, and those without college training who have shown exceptional promise in their work. Men who graduate from the course with high standing, according to Professor Cunningham, should form the group from which one-half or more of the minor officials for the various departments should be selected.



### American Executive Committee

STANDING and special committee reports occupied the attention of the executive committee of the American Electric Railway Association at a regular meeting held in Toledo, Ohio, on Feb. 4, 1927. Members in attendance were President W. H. Sawyer, Managing Director Lucius S. Storrs, Executive Secretary J. W. Welsh, R. P. Stevens, J. H. Hanna, F. R. Coates, L. E. Lippitt, C. B. Proctor, Daniel Durie, J. V. Sullivan, E. P. Waller, B. A. Hegeman, Jr., G. A. Richardson, S. J. Cotsworth, C. R. Ellicott, H. L. Brown, E. B. Meissner, C. L. Henry and K. A. Simmon representing M. B. Lambert. Representatives of state and sectional associations present by invitation included E. T. Chapman, president of the Connecticut Company section; G. K. Jeffries, president of the Central Electric Railway Association; C. R. Phenice, for the Wisconsin Utilities Association; A. E. Reynolds, president Midwest Electric Railway Association; C. F. Handshy, president Illinois Electric Railway Association; J. J. Coleman, for the Pennsylvania Street Railway Association; W. V. Griffin, president Chicago Rapid Transit Company section.

In addition to routine business, Thomas Fitzgerald, chairman of the committee on the Anthony N. Brady award, outlined the conditions which have been fixed this year for judging



accomplishment in the interest of safety. It was recommended that a gold medal be given to that property which had made the most outstanding accomplishment in the class operating 5,000,000 or more vehicle-miles per year. A silver medal will be given to the winning company operating between 1,000,000 and 5,000,000 vehicle-miles, and a bronze medal to the property having made the greatest contribution to safety in the class operating less than 1,000,000 miles per year. In the classification of properties for the award bus mileage is to be included with car mileage.

F. R. Coates, reporting for the committee on co-operation with state and sectional associations, recommended that the presidents of all sectional and state railway associations be made members of the American Association Executive Committee, without voting power. In the case of a combined utility association, this privilege would be extended to the chairman of the railway division or to the railway member designated by the sectional association. There was some discussion regarding the matter of membership in the American Association on the part of such sectional associations, and an alternative suggestion made that the presidents of these associations be invited to attend executive committee meetings. The matter was referred to the committee on revision of constitution and by-laws for further consideration.

H. L. Brown, chairman of the subjects and meetings committee, reported the result of a preliminary survey of the industry for opinion regarding the most valuable form of meeting and the character of subjects considered of most interest for an annual convention. Replies received indicate a preponderance of opinion in favor of comparatively short sessions with a few prominent speakers supplemented by group conferences on current operating subjects.

A preliminary report of the committee on revision of the constitution and by-laws was read by Charles Gordon, representing James H. McGraw, chairman of the sub-committee on association dues.

Since the action of this committee is contingent on the work of the policy, finance and other committees the report was principally in the nature of reporting progress and of informing the executive committee regarding the work which had been undertaken. A schedule of proposed dues was submitted for the purpose of establishing the basis on which the association's expense would be divided between companies of various sizes and classifications, the final schedule to be determined after various studies of association activity are completed.

Resolutions regarding the holding of demonstrations outside of regular exhibits, the setting aside of a day for inspection of exhibits and inspection of manufacturing plants during the annual convention, were passed. These were similar to resolutions on these matters adopted in previous years.

#### REPORT OF POLICY COMMITTEE

The report of the policy committee, read by Chairman R. P. Stevens, was as follows:

"Questions which have been referred to this committee for study and recommendation as to policy include the association's publishing plan, its statistical service and its Washington office.

"A recommendation was made by the publications committee that rates for advertising in *Aera* be increased. In bringing this specific question before the policy committee the president asked that a review be made of all phases of the association publishing plan with particular reference to possible co-ordination of this effort with the similar work of the business publications serving the industry.

"There was no thought that *Aera* should be done away with but that this committee should consider whether some change in its general character might better serve the interests of the association, avoid duplication and effect economy. There was also no thought that this review should in any way reflect unfavorably on the work of those who have been responsible for producing the magazine *Aera*. They have done a commendable job of carrying out the present publishing policy. The question is whether this policy should now be somewhat revised.

"After some investigation by the finance committee, the policy committee was asked to consider whether the services of the bureau of information and service might to advantage be expanded, or whether these might be somewhat curtailed in the interest of economy without serious detriment; also, whether co-ordination between the association's statistical work and that of the business press might be effected with economy and with strengthening of the facilities for securing and presenting these data. Again, this committee understands that there is no idea of doing away with the association's statistical service. The question did not arise through suggestion of dissatisfaction with the work of those in the headquarters staff assigned to this task, but only because the president has felt it wise that from time to time we should have a review of all major phases of the association work. It is only in this light that this committee understands its study is to be made.

"The finance committee has also questioned the necessity of the association continuing to retain an exclusive Washington office, as has been desirable heretofore. It was started as a war-time necessity. The policy committee was directed to give consideration to all phases of this question.

"On none of these three matters has this committee carried its study far enough to be able to make any recommendation at this time. It is desired only to report progress."

The report was signed by G. A. Richardson, C. R. Ellicott, H. L. Brown, J. P. Barnes and R. P. Stevens, chairman.

Presidents of the affiliated associations reported on the progress of their work, and visiting presidents of sectional associations expressed their desire to co-operate with the American Association.

The next meeting of the executive committee was fixed for Friday, April 1, at association headquarters in New York.

#### Co-operation with State and Sectional Associations

PLANS for getting better accord between the various associations occupied the members of the committee of the A.E.R.A. on co-operation with state and sectional associations held at Toledo, Ohio, on Feb. 4. Members present were F. R. Coates, chairman; R. F. Carbutt representing T. R. Langan, A. E. Reynolds, W. A. Alexander, W. V. Griffin, E. T. Chapman, C. R. Phenice representing J. P. Pulliam, R. McGregor, C. F. Handshy, J. J. Coleman, W. W. Holden, W. R. Robertson and Charles Gordon.

Mr. Coates called on representatives of the various associations, who spoke regarding the development of some means of keeping each local association as well as the national association informed of what the others are doing.

#### New Association Members

FOUR operating electric railways, two manufacturers and ten individuals were elected to membership in the American Electric Railway Association at the executive committee meeting held at Toledo on Feb. 4. Following is a list of companies elected:

Alton Railway, Alton, Ill.  
Illinois Power & Light Corporation, Chicago, Ill.  
Jamestown Street Railway, Jamestown, N. Y.  
Youngstown Municipal Railway, Youngstown, Ohio.  
H. K. Ferguson Company, Cleveland.  
J. D. Wallace & Company, Chicago, Ill.

#### Getting On with the Public

UNDER the general subject of "The Transportation Man and His Job" a meeting of the Metropolitan Section of the American Electric Railway Association, held on Feb. 4 at the Engineering Societies Building, New York City, resolved itself into a discussion of how to get on with the public. G. T. Geer, secretary Third Avenue Railway, emphasized the importance of courtesy and co-operation. He said that these come naturally to some men, but not to others. The latter, however, can at least adopt the outward form and in due time this will beget the proper spirit, he said.

Isabell Davie, secretary women's committee, Public Relations Section, National Electric Light Association, spoke about "The Woman in the Utility Field." She told how women can make themselves useful, particularly in the electric light industry.

"What the Public Thinks of the Transportation Man" was the subject of a talk by Major J. S. S. Richardson, director Public Service Information Committee of Pennsylvania. He pointed out that it does not always matter whether or not a thing is true; if the public believes it, it might as well be true so far as public relations are concerned.

The meeting was conducted under the sponsorship of a committee consisting of H. F. Merker, Brooklyn City Railroad; W. S. Keller, Third Avenue Railway; K. S. Lewis, Interborough Rapid Transit Company, and H. R. Sisson, Sisson Supply Company.



# The News of the Industry

## Eight Cents in St. Louis—Fares Fight Likely

Acting under a temporary restraining order issued by United States District Judge Reeves at Kansas City, Mo., forbidding the Missouri Public Service Commission or any state officer from interfering, the United Railways St. Louis, Mo., on Feb. 7 put into effect a new schedule of fares. Under the new rates adults must pay 8 cents for a single cash fare but may buy two tokens for 15 cents. The railway is giving each patron a receipt for 1 cent for each cash fare or every two tokens purchased. These receipts will be redeemed if the increase is held later to have been unjustified. Children's fare remains at 3 cents. The order issued by Judge Reeves is returnable within ten days. At that time it is probable arguments on the merits of the company's demand for the higher fare will be heard by two federal district judges and one circuit judge. Provision for this is made in the order of Judge Reeves, and this board would decide whether the higher fares should be made permanent.

In its appeal to the federal court the United Railways claimed that the valuation of its properties is \$75,000,000 instead of approximately \$58,000,000, allowing for additions made since 1919. In 1923 the Public Service Commission fixed the valuation of the property at \$52,000,000 as of 1919. The company says that the 8-cent cash fare for adults with two tokens for 15 cents will yield it only 5.8 per cent upon the valuation of \$75,000,000.

The action of the railway in applying to the federal courts for relief has been anticipated for some time. The action by the commission that forced Receiver Wells to go into the federal courts came on Feb. 4 when the commission suspended until June 7 the new schedule of fares the company had filed with the commission to take effect on Feb. 7. That forced a continuation of the 7-cent fare, under which it was claimed the railway was losing \$160,000 a month.

Prior to taking its case to the federal courts the company exhausted other methods of obtaining aid from the state commission. On June 3 last, Receiver Wells, with the permission of the United States District Court in St. Louis, applied for an increase in fares, but did not state the exact amount desired. Upon the request of the city the state commission then ordered an audit of the company's books to determine whether an increase was needed. The commission then delayed until September before attempting to start the audit. In October Receiver Wells again requested the commission to grant a temporary increased fare pending the final audit. Hearings were held and again the commission took the

matter under advisement. On Jan. 7 the receiver made the final move possible under the state laws, the filing of a new schedule of fares to take effect on Feb. 7 unless suspended by the state commission. The commission then suspended the new rates, contending that

the company having first followed the method of applying for an increase should have awaited a decision on that application. The commission admits that its audit of the earnings of the railway will not be completed before March 1.

## Ten Cents Cash in Syracuse

Review of Facts Which Led Commission to Advance Fares in Salt City—Company Earning Less than 4 Per Cent—New Rate Not Likely to Return 8 Per Cent

THE Public Service Commission on Feb. 4 authorized the New York State Railways, effective on Feb. 10, to establish new fare rates on its Syracuse Lines, ten tickets for 75 cents; single cash fare, 10 cents, the new rates to continue in effect until the commission shall otherwise order. The present cash fare is 7 cents.

While no valuation was fixed by the commission the rates were determined upon a tentative rate base of \$9,426,739 as of Sept. 30, 1925. Based upon revenue passengers carried for the year ended Sept. 30, 1925, and under the new fare rates authorized, estimating a 2 per cent decrease in travel, 70 per cent of riders using tickets and 30 per cent paying cash fares, the increased revenue, based on the tentative valuation of \$9,426,739, will give an estimated return of 7.58 per cent upon such value of the property used in giving service on the Syracuse Lines.

The tentative rate base established was based on a valuation by the commission in its decision on April 19, 1921, of \$8,554,240 plus additions to property since that date and allowances for materials and supplies and working capital.

The order was based upon a memorandum by Chairman Prendergast, who said:

Even on such a tentative rate base, the rate of return enjoyed by the Syracuse Lines of the petitioner during the year ended Sept. 30, 1925, was less than 4 per cent. Further, that the increased rates prayed for will likely provide a rate of return of considerably less than 8 per cent.

Petitioner has failed for many years to pay dividends and has certainly exhausted every reasonable expedient in endeavoring to effect economies so as to continue operations at the rates fixed by this commission in 1921. The financial results have been at least as disappointing as those set forth in a table covering 1925 revenues and expenses.

Therefore, upon this record and without a formal fixation of valuation, it is determined that the rates prayed for by petitioner will in no event be unreasonable and they should be permitted to file, to be effective as of Feb. 10, 1927, and continue thereafter until the commission shall otherwise order or direct.

Evidence showed that the actual passenger revenue for the year ended Sept. 30, 1925, was \$2,254,085 and the estimated increased revenue, due to the increased fare rates, will be \$346,023. This estimate took into consideration

a 2 per cent decrease in the number of car riders due to increased fare.

Five valuation estimates were submitted on the hearing, as follows:

Commission's valuation, estimated present-day costs, less observed depreciation and not including organization expense and working capital, \$8,485,168.

New York State Railways, estimated reproduction cost, new, no depreciation, \$15,658,081, and valuation used by Public Service Commission as of Dec. 31, 1921, with net additions to Oct. 1, 1925, \$9,601,534.

City of Syracuse, estimated original cost, less accrued depreciation, \$5,105,316, and as reported to State Tax Commission, reproduction cost, new, \$9,395,447, and present value, \$6,337,895.

Chairman Prendergast, in discussing the valuation figures presented, said:

Here, as is usual in rate proceedings, there was considerable dispute and variance of opinion as to the value of the petitioner's property, the existing depreciation and the rate of return to which the petitioner may be legally entitled. In view, however, of the conclusions reached in this memorandum, it will be unnecessary, as hereinafter shown, to enter into an extended discussion of any of these questions except that of valuation.

Petitioner presented a reproduction cost new valuation of its property as of Sept. 30, 1925, and also another valuation arrived at by taking the amount determined by the commission in the last rate case and bringing it down to date by including additions to property since Dec. 31, 1921.

The city of Syracuse offered exhibits showing values based on estimated cost, less depreciation, and also on reports made by petitioner to the New York State Tax Commission for 1925, to which certain amendatory and adjusting figures were applied.

In addition, engineers of the commission prepared and submitted a statement of values based on present-day costs less depreciation.

The city's cost less depreciation figures have certain inherent disabilities, which in our opinion, render them useless as an aid in the fixation of values. Their apparent source was Exhibit "E" in Case No. 7938, April 19, 1921. Referring to the opinion of Commissioner Kellogg in that proceeding, it appears that Exhibit "E" was in part at least based on reports made to state officials by some of the predecessor companies prior to the establishment of the Public Service Commission.

We have already referred to the complex and involved corporate consolidations culminating in the establishment of petitioner. The network of relationship, together with the methods of bookkeeping pursued, and the absence of many basic records, all tend to render it well-nigh impossible to find the original costs of much of the property acquired in the earlier days of street railway operation in Syracuse. In Case No. 7938 Commissioner Kellogg found:

"That it is not possible . . . to make an accurate statement of the actual original costs of all the property" and



"For these reasons, the estimate of the city of the actual cost to the company cannot be taken . . . because there are no complete data from which such cost can be entirely computed."

The precise situation still exists as to original cost estimates. Prior to Dec. 31, 1908, there were no regulations governing the keeping of uniform accounts by electric railways and neither books nor records can now be found (nor could they be found at the time of the investigation in Case No. 7923) to show complete cost figures of the properties of the Syracuse & East Side Railway, which succeeded to the property and rights of the Syracuse, Eastwood Heights & Dewitt Railroad and in Exhibit "E" \$53,000 was set forth as being its original cost. But the company had 7½ miles of track, eleven cars and a power house. Obviously its value was and is much more than the amount stated. Further, certain amounts, concededly upon the company's books and aggregating nearly \$1,000,000, had to be omitted because there was no means by which they could be checked. The data with respect to other constituent electric railways was also shown to be based on incomplete records and statements of account.

In such a situation and upon such a record, it is apparent that these estimates of original cost cannot be safely made the basis of any finding of value.

Neither can city exhibit valuation—\$9,395,447 or the \$6,337,895—be used. It is based in part upon reports made to the State Tax Commission as of Dec. 31, 1925, with amendments and changes. Different bases of valuation for tax purposes and rate-making purposes have been uniformly recognized.

Reproduction cost, new, figures submitted by the New York State Railways as of Sept. 30, 1925, were prepared by Henry G. Throop, an appraisal engineer. He based his inventory and appraisal upon one made by McClellan & Campion and used in a former proceeding. Values were attempted to be brought down to date by the application of Oct. 1, 1925, prices and also by the use of index number percentages. After adjustments of account for retirements and additions, a total of \$15,658,081 was reached. The commission said further:

The valuation made and submitted by engineers of the commission was based on estimated present-day costs, less observed depreciation. The figure stated, \$8,485,168, contained no allowance for organization, for cash working capital or for going value. If allowances be included for these items, such valuation would be upward of \$9,425,000.

There was also received in evidence the rate base fixed in the opinion of the commission of Sept. 21, 1922, \$9,038,050. If to such base be added net additions to fixed capital, Jan. 1, 1922, to Sept. 30, 1925, of \$540,565, as shown by the company's exhibit, or of \$406,724 in the commission's exhibit, the rate base of Sept. 30, 1925, would be either \$9,578,615 or \$9,444,774.

These valuations, with the exception of the commission's \$8,485,168 and the company's \$9,601,534, and the one referred to above, \$9,578,615 or \$9,444,774, are unsatisfactory and certain *indicia* of disability, which render them impossible and improper of use.

In any view of the matter, if a valuation were required to be found in this proceeding, it would necessarily be in excess of \$9,425,000.

Relative to the question of jurisdiction of the commission to fix fares, Chairman Prendergast says:

The city of Syracuse argues that the commission is without authority to increase fares because of limitations affecting fares contained in franchises granted to the petitioner and its predecessors. This question was passed upon in the opinion of Commissioner Van Voorhis on Sept. 21, 1922, wherein it was stated, referring to opinion of the Public Service Commission, 2nd District, April 19, 1921:

"There were no franchises granted between Jan. 1, 1875, and July 1, 1907, which limited the jurisdiction of the former Public Service Commission, Second District. (Matter of the United Traction Company vs. P. S. C. et al. App. Div. 3rd Dept., January term, 1927; and People ex rel. Garrison vs. Nixon, 229 N. Y. 575, as well

as matter of Evans vs. P. S. C. 214, App. Div. 122, seem authoritative, and it must be held that the commission has jurisdiction over the rates of fare in this proceeding)."

The fare was 5 cents prior to Nov. 26, 1918. It was then increased by the Public Service Commission, Second District, to 6 cents and in 1921 the Public Service Commission, Second District, authorized an 8-cent fare, four tickets for 29 cents, and a children's fare of 4 cents.

The city on Dec. 15, 1921, asked a reduction and on Oct. 1, 1922, the Public Service Commission directed a 7-cent fare.

Chairman Prendergast reviews the history of the New York State Railways, stating that that part of the system known as the Syracuse Lines involves a track mileage of about 98, of which about 74 miles is in paved streets. In 1912 the New York State Railways purchased the Syracuse Rapid Transit Railway. The latter leased and owned the East Side Traction Company and had succeeded under mortgage foreclosure to the properties and franchises of the Syracuse Street Railway and the Syracuse Consolidated Street Railway. The East Side Traction Company was the successor of the Syracuse & East Side Railway, which in turn had succeeded the Syracuse & Eastwood Heights & Dewitt Railroad. The Syracuse Street Railway was the successor of the Peoples Railroad, which had acquired all the assets of the Central City Railroad and the Syracuse & Onondaga Railway. The Syracuse Consolidated Street Railway was formed by the merger of nine street surface railroads operating horse car systems at the time of acquisition. The memorandum of the commission says that this series of mergers, consolidations and purchases becomes more than historically important because of the effect upon the original cost estimates of the petitioner's properties.

### Final Arguments on "L" Lease

The Public Service Commission of Pennsylvania on Feb. 7 took under final consideration the application of the Philadelphia Rapid Transit Company and the city of Philadelphia for approval of the 30-year Frankford elevated and Bustleton surface line lease. While the city and the company made almost identical requests for approval of the lease, opponents contended the lease would work a hardship upon the city, the taxpayers and the car riders.

City Solicitor Gaffney said the lease as it is drawn is only an amendment of one approved in 1922 by the commission. Instead of the graduated plan of paying an annual percentage up to 5 until 1957, the company under the new lease will pay the fixed charges, including sinking fund, interest and state tax and an amount equal to that contemplated by the 1922 lease.

C. Oscar Beasley, appearing for the United Business Men's Association, said the car rider and taxpayer would pay for the "L" and continue to pay. Harold Evans, representing J. Henry Scattergood, a former Public Service Commissioner, who has always been an enemy to the lease, also argued against the "L" lease approval.

### Decries City Attitude in Buffalo

A growing understanding among thinking people of the basic facts of the transportation situation in Buffalo, N. Y., was recently urged by Elliott C. McDougal, chairman of the Marine Trust Company, in an address decrying the attitude of the city toward the International Railway and the downtown station plan of the New York Central. It was his belief that the best results were obtainable only by co-operation and by bargains mutually beneficial. On this point he says:

Every business man knows this by experience. He cannot quarrel with his customers; both buyer and seller must be pleased. Should the present battle continue, the city as a corporation would lose because its share of the company's receipts cannot increase those receipts increase. The company would lose even after curtailing its service to the utmost possible limit. The car riders would lose because of the curtailed service on the old lines and because of the stoppage of the opening of new lines. With present conditions all three lose; with co-operation and fair dealing all three would win.

With reference particularly to the transportation problem in the city, he said that the city was in need of good electric railway and bus service and that it was better to be served by a company financially strong than one financially weak. Continuing, he said:

We appear to be doing everything that we can to weaken the present company and to compel it to spend, in defending itself against unwise legislation, money that would much better be spent on track, pavements and service.

### Another Subway Plan Suggested for Providence

Expenditure of the sum of \$17,000,000 would furnish Providence, R. I., with a system of equipped subways which would eliminate all surface cars from the business section of Providence and provide a safer, speedier and more comfortable means of travel at an increase of 1 cent in the present fare rates. This was the opinion expressed by William M. Lewis, assistant engineer in the Boston Transit Department, at a meeting of the Providence Engineering Society recently.

Mr. Lewis was associated with the building of the Tremont Street subway at Boston in 1894. He is the second speaker to discuss traffic problems of Providence at the Engineering Society during the last two months, the previous authority being Robert H. Whitten, city planning consultant. Mr. Lewis stated, however, that his subway proposition was not suggested to displace the Whitten plan, but was to be used in conjunction with it.

The plan as outlined by Mr. Lewis would provide for two subways, each running through Exchange Place, where a transfer station would be built. They would be laid with double tracks, would accommodate all traffic brought into the downtown district by electric cars, with two exceptions. In commenting on the change that would be wrought in traffic conditions by the removal of surface cars in the business section of Providence, Mr. Lewis held up Exchange Place as an example. By nature, he said, Exchange Place was a beautiful square, but now it was little more than a railroad yard most of the time.



**Paving Relief Measure Introduced in New Jersey**

In a modified form there has been introduced in the Legislature of New Jersey by Senator Abell of Morris County the bill to relieve the electric railways of the obligation to pave between tracks. Last year's bill failed to pass over Governor Moore's veto. It provided that the company be relieved of the entire cost of this paving. Senator Abell has explained his bill as follows:

The purpose of this bill is not to relieve railways of all paving obligations but rather to readjust those obligations so as to bring them into harmony with modern economic conditions and make them uniform throughout the state. Under this bill such companies at their own expense will have to restore all pavements they may disturb in connection with trackwork and in addition will be obligated to repair at their own expense damage heretofore or hereafter done to streets.

**Fort Wayne Company at Home to Public**

Proud of the completion of its construction program for the year, the Indiana Service Corporation, Fort Wayne, Ind., decided recently that it would be a good plan to exhibit the whole plant to the public. This it did on Nov. 21 between the hours of 2 and 5 p.m. The response on the part of the public was most gratifying. To the end that the tour might be conducted to its own best advantage and the best advantage of the public, the company had about fifteen platform men in uniform

**Chicago Street Traffic Article Reprinted**

SEVERAL requests have been received for additional copies of the article entitled "Street Traffic Analyzed in Chicago," appearing in the ELECTRIC RAILWAY JOURNAL for Jan. 8, 1926. The JOURNAL has therefore had a limited number of reprints made and these are available in lots of 50 or more at 10 cents a copy.

importance. These cards are changed weekly. One of them, in which the text and the illustration have been placed side by side merely for convenience of reproduction, is shown in the accompanying illustration. In addition to this, the company issued a pamphlet to every one who visited the plant. This was a 24-page publication, 5 x 8 in., on tinted paper describing the activities of the company. In addition to this each visitor to the plant was presented with a small souvenir in the form of a holder in which to carry the weekly pass.

As to the work which was done during the year, the company moved into its new shops, which have been described previously in the ELECTRIC RAILWAY JOURNAL, and did a very large amount of remodeling of small buildings to take care of bus repairs. Added to all this the company built a cyclone fence around the whole Spy Run yard

expire, the Governor said he expected to do so.

The Governor's proposal to the legislative reorganization commission was in effect to separate the transit commission of New York and the up-state commission, which were consolidated by the reorganization laws, and not appoint a successor to Mr. Van Voorhees, so that there would be three members on each commission.

**Wheeling Weekly Passes Made More Popular**

As of Jan. 10 the Wheeling Traction Company, Wheeling, W. Va., made an immediate and large increase in sales of its weekly passes through certain consolidations and reductions. From a total of nineteen varieties, eighteen of which were in use since May 3, 1926, there are now eleven, although only three were eliminated.

In the new line-up, the \$1 Wheeling and \$1.25 Greater Wheeling passes have been merged into a single \$1 Greater Wheeling pass. The \$1 Brookside and \$1.25 Martin's Ferry passes were merged into a \$1 pass. The \$1.50 McMechen and \$1.75 Ohio passes were merged to a \$1.50 pass called McBell, as it includes both McMechen and Bellaire. The \$3 Moundsville and \$3 Ohio Terminals passes were merged into a \$3 pass. The \$2 Linwood pass was cut to \$1.75. The \$2.50 Wellsburg, \$2 Brilliant and \$1 Mingo passes were eliminated.

The McBell and Moundsville-Ohio Terminals consolidations greatly stimulate riding between the West Virginia and Ohio portions of the property, while the new Greater Wheeling pass makes one pass good for Wheeling and its immediate suburbs.

**Attack on Indiana Commission**

A new attack on the Indiana Public Service Commission is probable in the state House of Representatives. Two representatives have prepared a measure identical to the Cann Senate bill to abolish the commission and restore utility regulation to the agencies that existed before the law was enacted.

In all, five bills dealing with the commission are pending in the Indiana Senate. Their provisions range from complete abolition of the body to removal of municipally owned utilities from commission control.

**Rules Off Obtrusive Fenders in St. Louis**

Projecting fenders of the cars of the United Railways, St. Louis, Mo., must be discarded within 60 days, the Missouri Public Service Commission ruled on Feb. 1. The ruling follows a complaint filed by the St. Louis Safety Council that the projecting fender is a menace. Company officials also favored the substitution of safety devices of the type now in use in many other cities, but a city ordinance requires the use of the overhanging type of fender and a ruling from the state commission for their removal was necessary. Evidence showed that this type of fender had been abandoned in many other cities.

**OPEN HOUSE**  
AT OUR  
**Spy Run Plant**  
**SUNDAY**  
**NOVEMBER 21**  
**2 to 5 p. m.**  
**EVERYBODY WELCOME**



Car Card Used by the Indiana Service Corporation to Invite the Public to Visit Its Plant

act as directors of traffic or guides. In addition other men were in attendance from different departments to answer questions and to direct the public once they were inside the building. As an extra precaution the company strung ropes around certain places, notably in the power houses and to some extent around the car pits in the shop, so as to minimize the element of danger that adheres in all such plants.

In anticipation of the event, the company advertised its invitation to the public to inspect the property, in the newspapers and with car cards. It is, of course, the regular practice of the company to display car cards in all its city cars to advertise its own business and to call attention to civic events of

and improved the appearance of the surroundings by sodding the grounds close to the buildings and otherwise improving the landscape. In addition a building was put up for storage in connection with the power house. This is called the pipe storage building.

**Reorganization of New York Commissions Unlikely**

Governor Smith of New York has practically abandoned his plan for reorganization of the Public Service Commission and the Transit Commission. When he was asked if he intended to appoint a successor to Commissioner Van Voorhees, whose term is about to



## Fare Increase Sought in Utah

The Bamberger Electric Railroad has applied to the Utah Public Utilities Commission for a 10 per cent increase in rates of its first class one-way and round-trip fares between Ogden and Salt Lake City and intermediate points. The application declares that the one-way fare now charged between the points named is based on a charge of approximately 2 3/4 cents per mile, with a minimum fare of 15 cents, and that the round-trip fares are based on a charge of 180 per cent of the one-way fare, with a minimum of 25 cents. It is pointed out that the Denver & Rio Grande Western Railroad first class one-way and round-trip fares between Salt Lake City and Ogden and intermediate points are based on a charge of approximately 3.6 cents per mile. For more than six years past the revenue from passenger travel on the Bamberger has shown a yearly decrease of \$35,000, or a total of \$214,039, and that in order to enable the petitioner to continue to give the public adequate and efficient service additional revenue must be obtained.

The application also states that in the event the request is granted for increased fares the road will resume operation of bus service between Salt Lake City and Ogden and intermediate points in co-ordination with the other service. It also states that, providing the increase is allowed, the fares will be applicable to bus lines also. Under the proposed increase, the first class one-way fares will be based on a charge of 3 cents per mile, with a minimum fare of 20 cents, and the first class round-trip fares will be based on a charge of 180 per cent of the proposed first class one-way fares, with a minimum fare of 30 cents.

## Pittsburgh Railways Officials Entertain Former Employees

There gathered in Pittsburgh, Pa., on Feb. 2 a group of men, all former Pittsburgh Railways employees, who are eminently successful in electric railway affairs. These guests of the railway included J. H. Alexander, B. J. Yungbluth, G. C. Hecker and J. W.

Welsh. The *Sun* thus summarized their careers:

Mr. Alexander started work for the Pittsburgh Railways in 1910 at \$85 a month. He was a colonel in the United States army for two years during the war and now is president of the Cleveland Railway.

Mr. Yungbluth commenced his railway experience as a \$15-a-month oil room employee of a Mexican railroad and shortly afterward came to the Pittsburgh Railways, where he remained ten years. Today he is president of the International Railway, Buffalo.

Mr. Hecker worked nights for the Pittsburgh Railways in 1910 in the load dispatcher's office and attended classes at Carnegie Tech. From 1912 to 1917 he was chief electrician for the company at Pittsburgh, later becoming electrical engineer. Now he is special engineer for the American Electric Railway Association at New York.

Mr. Welsh worked in 1906 as car tester at the Homewood carhouse. In 1918 he was electrical engineer and traffic manager for the Pittsburgh company. He came back today for a visit as executive secretary of the American Electric Railway Association at New York.

A. W. Robertson, president of the Pittsburgh Railways, entertained the group.

## Schenectady Railway Seeks Rehearing

The Schenectady Railway, Schenectady, N. Y., filed a petition on Feb. 1 with the Public Service Commission for a rehearing of the proceedings before the commission on the application of Bohl Brothers and John Coons for the transfer of certificate for the operation of a bus line between Schenectady and the hamlet of Guilderland. At the first hearing in this proceeding, the railway advised the commission it had no objection to the transfer. Subsequently Bohl Brothers operated the line as a through route from Schenectady to Albany, they already having acquired the right of D. C. Main to operate between Albany and Guilderland. To this method of operation, the Schenectady Railway objected.

The appeal for rehearing refers to the order of the commission denying a certificate to David W. Jeram and David W. Jeram, Jr., for operation of a through bus line between Albany and Schenectady on the ground that the Schenectady Railway and the New York Central Railroad were rendering adequate service.

## Concern in San Francisco

A steadily growing deficit in the San Francisco Municipal Railway, San Francisco, Cal., due to falling receipts and increased expenses has greatly alarmed city officials, who recently voted the platform men a raise in pay. Practically all the officials are in favor of the men getting a \$6 a day wage, but many of them are wondering where the money is coming from if the 5-cent fare is to be maintained and the tax rate not raised.

It has been estimated that receipts have fallen off approximately \$100,000 and that operating expenses have been increased \$182,000, due chiefly to increases in pay granted the men since last May.

According to the books of John Hannan, accountant for the Board of Public Works, the actual deficit of the operation of the lines from May 1 to Nov. 30 was \$38,000. But added expenses went into effect the first of the year and now officials are unable to predict just what the deficit will be by June 30.

Many causes are cited for the falling off in revenue—automobile competition, the fact that some lines operate in undeveloped territory which has not been fully settled and from which no great increase in revenue can be expected, and several others.

A 40-cent raise in daily pay was granted the men last May, when city officials fixed \$3,500,000 as about the amount of revenue that would be taken in by Dec. 1. The actual receipts, however, proved to be only \$3,101,346. It is not believed that the December receipts were more than \$300,000, which leaves a discrepancy of about \$100,000.

Late in December a second raise of 20 cents a day was voted for platform men.

Accountant Hannan declares that either an increase in fares or a resort to the tax rate for funds is the only way out of the dilemma.

Edward Van Deleur, president of the carmen's union, said:

If the supervisors will give the railway system credit for what it earns, I believe it will take care of most of the increases in pay.

By this I mean the interest on the daily balances of Municipal Railway funds should be credited to the railway account. The money now goes into the general fund and is used like other funds.

There is \$80,000 still due the municipal funds from money borrowed to pay the shortage in the cost of the Twin Peaks and Stockton Street tunnels.

There is \$125,000 in an old compensation insurance fund that we believe should be made available for the payment of our increases.

Then there is the \$200,000 of the earnings of the road that go each year to the retirement of bonds. No other road is ever expected to pay off the original investment. If these items are placed to the credit of funds necessary to meet the increases granted us there will never be any need to raise the fares.

T. A. Reardon, president of the Board of Works, in justifying the second raise granted the carmen said:

The street car men all started off on a \$3 a day basis. During the war the car repairers and others got increases which were refused the platform men owing to their numbers. We have been trying to equalize them. Mayor Rolph is insistent that the platform men have the greatest amount of responsibility and should receive as much as the others. When the supervisors raised the car repairers and provided \$50,000 we also raised the platform men.



Reunion at Pittsburgh Brings Former Employees Together



## Franchise Negotiations in Canton

Canton, Ohio, is now in the throes of a transportation problem. The Northern Ohio Power & Light Company, the local operator of railway service, will not consider continued operation unless the company is given the entire transportation privilege. A. C. Blinn, general manager of the company, has made it plain at all times to the City Council committee that the company was willing to quit if the Council could get some other responsible concern to take over the business and supply satisfactory service for less money. He said that whoever undertook the job should have all the business. There are thirteen independent, competing bus lines in the city.

The problem presented itself in Canton about a year ago when Mr. Blinn went there and in a conference with the Council suggested that it might be well to take up the question of the new franchise contract in view of the expiration of the old one in February, 1928. This conference led to the employment of the Beeler Organization by the city. Mr. Beeler and his assistants made a survey and filed a report suggesting a co-ordinated bus and rail system. The report provided for retaining the main car line arteries and for bus feeders.

Since the filing of the report, Mr. Blinn has had two or three conferences with the city relative to some plan for the continuation of service. The Chamber of Commerce and other organizations in the city do not want the car lines removed, but Mr. Blinn said that it was perfectly satisfactory to the company if the city could find some responsible concern to take over the city system. The city is not inclined to give the contract to any other company, but it has not indicated that it is willing to give the Northern Ohio exclusive operating rights.

The present fare is 6 cents with six tickets for 35 cents. There has been no discussion of future fares while negotiations are still in progress.

*Service News*, the official paper of the Northern Ohio Power & Light Company, compares the situation in Canton with that in Akron, solved a few years ago by the co-ordinated systems supplied by the Northern Ohio Power & Light Company.

## \$4,500,000 Railway Budget for New Jersey Company

Upward of \$57,000,000 is available this year for new construction, extensions and improvements by the Public Service Corporation of New Jersey in the territory which that company serves. Of this sum \$31,064,381 was authorized in the 1927 budget, the other \$26,000,000 having been authorized in previous budgets and covers work now in progress. The electric operating department's portion of this year's budget is \$25,461,578, of which sum about \$2,500,000 will be used for the installation of the fifth unit of boilers, consisting of three of 2,360 hp. each, for the Kearny generation station. There are twelve boilers at the station now and the extra three will provide for the maximum output planned for the first unit of the plant.

The railway and bus transportation companies will spend about \$4,500,000 for upkeep of properties, additions and alterations to plant and equipment. The largest item authorized is an appropriation for the purchase of about 200 new buses, contracts for which have not yet been awarded. The railway will spend approximately \$1,500,000 for track reconstruction in various parts of the state and 450 new electric fare boxes will be bought for the transportation company.

## Safety First in Booklet for Children

School boys and girls in Milwaukee, Wis., are being taught through a 32-page booklet that health, helpfulness and happiness are dependent, in a large measure, on safety first rules and their practice. The booklet, called "Safe at Play with Ned and May," has been prepared in the hope that it may show the children the way in which to avoid dangers of present-day traffic. While playing ball, the game of chase, coasting or roller skating, Ned and May and others learn how to play with safety. The booklet is replete with rhymes such as:

M is for Mindful  
Of danger around,  
So always be careful  
Wherever you're bound.

The booklet concludes with a safety song, the last verse of which says:

Now our song is ended,  
And if you are wise  
You'll make a pledge to safety  
And use your ears and eyes.



## News Notes

**Back to Five-Cent Fare.**—The Public Service Commission of Kansas recently approved the return by the Union Traction Company of the 5-cent fare at Coffeyville. Application for such permission was made by Receiver Layng. About a year ago the rate was boosted to 8 cents, but the revenues of the company did not increase with the increased fares.

**Twenty-five Cents in Conscience Fund.**—Following Mel Trotter's spiritual meetings in Grand Rapids, Mich., the so-called conscience fund of the Grand Rapids Railway was increased by 25 cents. This amount came from a woman who wrote that she had ridden at one time on the cars without paying. Her decision was to pay the amount with interest. L. J. DeLamar, vice-president and general manager of the railway, publicly acknowledged the amount with thanks.

**Through Service Contemplated.**—Negotiations are under way between the Milwaukee Electric Railway & Light Company and the City Council of West Allis, Wis., looking toward the establishment of a rapid transit line between West Allis and Milwaukee, together with the introduction of co-ordinated cross-town bus line service which would connect with the railway lines of the north and south sections of the city. The high-speed line project would give through transportation

service with no stops once the car left the Milwaukee or West Allis city limits. This change would cut the running time considerably between the two cities. Under cross-town bus line service, the present time-consuming circuitous route between downtown Milwaukee and West Allis would be eliminated.

**Engineer Opposes Shorter Headway.**—A public hearing was held before the New York Transit Commission on Feb. 8, 1927, on the petition of Jamaica Central Railways, Inc., to modify the commission's order requiring a ten-minute headway on the Jamaica-Far Rockaway route. Ira W. Fisk of Fisk & Roberts testified as the company's consulting engineer to the impossibility of operating the ten-minute headway with existing sidings and introduced traffic analyses showing that present service was more than ample. The commission reserved decision.

**West Penn Adds Another Weekly Pass.**—The West Penn Railways on Jan. 17, 1927, installed the weekly pass at Uniontown, Pa. The pass sells for \$1, against a cash fare of 8 cents and a ticket fare of 6½ cents. This makes the third installation of local city weekly passes along the West Penn system. The first was put on at Connellsville on June 1, 1925 and the second at Greensburg on March 1, 1926. Weekly and Sunday passes have also been used for several years at other points of the West Penn and subsidiary railways, including a zone-pass installation between Kittanning and Ford City since Sept. 20, 1925.

**New Rates in Fort Worth.**—The City Council of Fort Worth, Tex., recently authorized the Northern Texas Traction Company to put into effect a new schedule of fare rates. This includes a 10-cent adult cash fare, three tokens for 25 cents and a weekly ticket for 40 cents plus 5 cents for each ride. Children, entitled to half fare, will ride for 5 cents and school children may purchase six tokens for 25 cents. The old cash fare in Fort Worth was 7 cents for adult cash passengers. In its application for a revision of its rates, the company explained that it was earning a net return on its investment of less than 2 per cent and that new money could not be secured with that meager showing of earnings.

**New Contract Between Two Boston Companies.**—An operating agreement has been entered into between the Eastern Massachusetts Street Railway and the Boston Elevated Railway, Boston, Mass., governing the use of the lines between Maverick Square in East Boston and Revere Beach. It provides for the operation of Eastern Massachusetts cars over the Boston Elevated rails into Maverick Square and by Eastern Massachusetts crews. The fare is to be 15 cents between that terminal and Revere Beach, and of this amount the Elevated is to have 10 cents and the Eastern Massachusetts 5 cents, but this fare carries with it a free transfer privilege to all the other sections of the Boston Elevated. So that these cars shall not take any of the exclusively Elevated company business, they are to operate without stops between Gladstone Street and Maverick Square.



## Recent Bus Developments

### Status of Purple Swan to Be Determined

Whether the United States District Court for the Eastern District of Missouri or the St. Louis Circuit Court shall determine the question of appointment of a receiver for the Purple Swan Safety Coach Lines will be determined by the federal court after a transcript of the record of the Circuit Court in the litigation involving the company's finances is filed. The transcript is now being prepared for the federal court. In the meantime the temporary receivership, which resulted from a suit filed against the company by the Seiberling Rubber Company of Akron, Ohio, has been lifted and the lines have continued operation under their own management.

The question of whether a permanent receiver for the company should be appointed was set for hearing on Jan. 6, but prior to that date the bus company filed a motion for removal of the case to the federal court. As a result the hearing of Jan. 6 was continued indefinitely. Recently Circuit Judge Hartman ruled against the petition for removal for transfer to the federal court. Following his ruling on this point the bus company ordered a transcript of the record in the proceedings so that the federal court can pass on the same question.

Officials of the bus company have denied that there is any occasion for the appointment of a permanent receiver for the company, saying that the lines have been successfully managed and are in good shape financially. They want the question passed on by the federal court because of the diversity of citizenship involved.

Some of the Purple Swan lines were operated in competition with the Blue Goose line, run by the East St. Louis & Suburban Railway.

### Buses in Hudson

The Public Service Commission on Feb. 3 granted the petition of the Eastern New York Utilities Corporation (formerly the Albany Southern Railroad) and the Eastern New York Transportation Corporation for the abandonment of its railway lines in the city of Hudson and substitution of bus service thereon. A certificate was also granted for the operation of bus lines in Hudson and the town of Greenport and authorization was given for the issuance of \$25,000 capital stock for the transportation company and its acquisition by the utilities company. Commissioner Lunn's memorandum accompanying the order said that the substitution of buses appeared to be a solution of an unfortunate situation and would enable the railway to discontinue a portion of its system that has for a number of years failed to meet operating expenses and at the same time furnish a service acceptable to the people of Hudson. At the hear-

ing an exhibit was introduced showing that the local lines in the city of Hudson during 1926 earned \$20,500 gross with total expenses of \$28,693.

### Washington-Annapolis Service Planned

The Washington, Baltimore & Annapolis Electric Railroad, with headquarters in Baltimore, Md., plans to start a bus service between Washington and Annapolis within the next few weeks. The service will be in addition to the rail service now in operation. Permission to establish the bus line has been granted by the Public Utilities Commission of the District of Columbia and the Maryland Public Service Commission. Three buses will be ordered, all of them of the latest de luxe type. At first it is planned to make three round trips daily from both cities, but officials of the company said that if necessary the number of trips will be increased. The service will be over the new National Defense Highway, which is nearing completion, and will provide bus transportation between all points along the thoroughfare.

### Would Run Buses in Scarsdale

The Westchester Street Transportation Company, Inc., subsidiary of the Third Avenue Railway, New York, N. Y., on Feb. 3 petitioned the Public Service Commission for permission to operate buses on a portion of its route in the village of Scarsdale, Westchester County. This company operates the railway lines in White Plains and Scarsdale. On Oct. 18, 1926, White Plains consented to the substitution of bus service for street cars in that city for a period of five years and on Dec. 9, 1926, the commission granted an order approving the substitution. On Dec. 28, 1926, Scarsdale also granted similar consent, which the company now submits to the commission for approval.

The petition says that the proposed bus route and bus route of the Eastchester Transportation Company, another subsidiary, connect with each other at the dividing line of Scarsdale and the town of Eastchester. An arrangement has been made for through operation from White Plains and Scarsdale through the town of Eastchester, Tuckahoe and Winter Hill to Yonkers Avenue between Main Street and Bronx River. A public hearing will be held on the application.

### Bill to Permit New York City to Fix Bus Fares

Under the provisions of a bill introduced in the Assembly on Feb. 2 by Emory F. Dyckman, Republican, of Brooklyn, a new section 68 is added to the transportation corporations law, providing when New York City consents to operation of bus lines for not

exceeding ten years, including all renewals or extensions, such local authorities and person or corporation receiving such consent may, by agreement, fix rates of fare to be charged. The object of this measure is believed to be to overcome the provisions of a gratuitous opinion recently written by former Justice Hughes that even if a city entered into a contract with a transportation company on the matter of the fare to be charged the carrier could later appeal to the utility commissions for relief if it found the original fare condition to be onerous.

### Detroit Mayor After Competing Buses

In an attack on buses which compete with the municipal service of Detroit, Mich., made by Mayor John W. Smith while speaking before city officials and members of the Grand River-Redford federation, the Mayor invited the City Council to oust the Detroit Motorbus Company from Detroit streets by abrogation of the day-to-day agreement under which it operates.

In reply to statements made by one of the Councilmen to the effect that the Department of Street Railways should use buses only as feeders for its street cars, and that paralleling of street cars and city bus service was unwise, the Mayor cited that the Detroit Motorbus Company was operating on a day-to-day agreement, which was entered into with the Common Council and stated that he would like to see "some big red-blooded friend of the people in the Council move to have that agreement abrogated." The Mayor further pointed out that privately owned buses and jitneys were running beside the city street cars, and furthermore, they were allowed to charge a 10-cent fare. Referring to the Street Railway Department, the Mayor pointed out that the department was giving fine service, that it paid its employees the highest wages in the country, and that for 7 cents a passenger might ride 37 miles. The Detroit Municipal Railway was meeting its financial obligations, including payments on the purchase contract for the system.

Accepting the Mayor's challenge to abrogate the agreement with the Detroit Motorbus Company, the City Council unanimously adopted a resolution asking the Mayor and the Street Railway Commission for information as to the negotiations being carried on between the city and the bus company. In introducing the resolution, one of the Councilmen expressed the opinion that it was for the Mayor and his Street Railway Commission to decide and inform the Council whether the day-to-day agreement with the Detroit Motorbus Company should be discontinued.

A later announcement attributed to Mayor Smith was to the effect that he was not advocating at this time the removal of the buses operated by the private bus company. Also, that the Councilmen were just as much a part of the city administration as was the Mayor's office, and had as much to do with the operation of buses of the private company on the streets as had the executive end of the government.



**Would Run Two Lines.**—The County Transportation Company, Inc., Port Chester, N. Y., filed a petition on Jan. 31 with the Public Service Commission for a certificate for the operation of two bus lines in Mamaroneck, N. Y. The petition alleges that the New York & Stamford Railway intends to acquire all of the capital stock of the company and that the New York, Westchester & Boston Railway is committed to the financing of requirements of the County Transportation Company, Inc.

**Reports on Bus Situation.**—E. R. Baker, accountant in the public utilities department of St. Paul, Minn., has presented a report of 150 pages on the bus and taxicab situation in the city to the bus committee of the City Council. Data are to be employed as a basis for recommendations for the Council on bus and taxicab routes and fares. The report includes data on the history of the newest subsidiary of the Twin City Rapid Transit Company, Minneapolis, Minn., as affecting St. Paul, a corporation which has taken over most of the taxicabs in the two cities, in Duluth and in Rochester, Minn.

**Bill Would Increase Gasoline Tax.**—On the ground that it now costs the state of Wisconsin about \$550,000 to collect \$9,000,000 in license fees, whereas it costs only about \$10,000 to collect the \$5,000,000 obtained in gasoline taxes, a bill is being prepared for presentation to the Legislature providing for an increase in gasoline tax from 2 to 5 cents. With the 5-cent tax a law, the registration fee would be reduced to \$1 and the personal property tax abolished. Electric railway and independent bus operators are now paying the 2-cent tax.

**New Bus Schedule in Effect.**—The Illinois Traction System on Jan. 16 put into service a new schedule on its bus line between Edwardsville, Ill., and St. Louis, Mo. Several buses have been eliminated. The new schedule is as follows: Edwardsville to St. Louis, 8 a.m., 10:50 a.m., 4:50 p.m., 7:30 p.m. and 10:50 p.m. St. Louis to Edwardsville, 6:45 a.m., 12:15 p.m., 3:30 p.m., 6:05 p.m. and 9:30 p.m.

**Transfers on "Beauty Specials."**—To allow students of the Girls' High School at Atlanta who live in the territory served by the Morningside and Virginia-Highland coach routes of the Georgia Railway & Power Company to use the "Beauty Special" coaches, as the special coaches to and from the Girls' High School are called, transfers are being issued on all of the regular coaches which are accepted on the "Beauty Specials." Transfers are also being issued from the specials to the regular coaches. The plan was started with the recent reopening of school for the spring term. Already it has proved very popular with the students. The "Beauty Specials," which were started when the Girls' High School opened for the current year, have proved a good supplement to the regular railway service. The schedules are arranged so that the buses arrive at the high school just before opening time and leave shortly after closing. The coaches have proved a great convenience to students.

## Financial and Corporate

### Net Income of Texas Electric Decreases

The gross earnings from operation on the Texas Electric Railway, Dallas, Tex., for the year ended Dec. 31, 1926, were \$2,036,859, compared with \$2,362,114 for 1925. The gross earnings were made up from the following principal items:

Passenger transportation.....	\$1,692,142
Mail.....	26,827
Express.....	258,279
Rents of tracks and terminals.....	32,005
Rents of buildings and other property.....	14,395
Miscellaneous.....	13,209

Operating expenses and taxes for the year totaled \$1,360,118, compared with \$1,524,615 for 1925. Included in this decrease is an allowance of \$15,000 made to the company by the Texas Power & Light Company upon power bills for the last half of the year. The item of taxes included in the above figures was \$99,725 for the year, compared with \$122,123 for the preceding year. The net income for the year was \$250,769, compared with \$411,763 for the year of 1925. These facts are contained in the annual report to the stockholders for the year ended Dec. 31, 1926.

#### INCOME ACCOUNT OF THE TEXAS ELECTRIC RAILWAY FOR YEAR ENDED DEC. 31, 1926, AND SUMMARY OF SURPLUS ACCOUNT

INCOME ACCOUNT	
Gross earnings from operations.....	\$2,036,859
Operating expenses and taxes.....	1,360,118
Net earnings from operations.....	\$676,740
Add—Interest on bank balances.....	1,853
Total net earnings before depreciation..	\$678,594
Interest deductions.....	427,825
Surplus net income before depreciation....	\$250,769
SUMMARY OF SURPLUS ACCOUNT	
Balance Jan. 1, 1926, per previous report..	\$1,354,614
Add: Surplus net income before depreciation for the year ended Dec. 31, 1926, as above	250,769
Less—Provision for depreciation (retirements).....	100,000
	\$150,769
Sundry direct items—	
Discount on Texas Traction Company bonds purchased due sinking fund.....	\$13,688
Less—accrued rent for express terminal charged off.....	4,875
	\$8,813
Dividends declared on first preferred stock.....	29,957
Surplus balance, Dec. 31, 1926, per balance sheet.....	\$1,484,240

Despite declining receipts and the necessity for the most rigid economy, the physical condition of the property was well maintained during the year. Under its mortgage the company is required to spend annually 15 per cent of its gross revenue for the maintenance of roadway and equipment. During the year expenses for these purposes were \$351,950, or \$46,421 in excess of the mortgage requirement. The company spent for additions, renewals

and improvements to its property the sum of \$95,477, including construction work and renewals of poles and cars. There was taken out of property value the price of \$1,000 for certain lots sold and the sum of \$1,368, representing certain railway construction abandoned in the city of Sherman.

Changes have occurred in the securities of the company during the year as follows: The outstanding underlying Texas Traction Company 5 per cent sinking fund bonds were reduced by the amount of \$93,000 by the purchase of that amount through sinking fund accumulations; the company has now outstanding 6 per cent gold debentures to the amount of \$1,348,000, a reduction of \$2,000, representing an exchange during the year of debentures for first preferred stock; this exchange increased the amount of outstanding first preferred stock to \$1,712,000; Texas Traction Company bonds in the amount of \$4,000, par, held by the trustee of Texas Electric Railway mortgage and pledged under that mortgage were sold to the sinking fund of the Texas Traction Company; second preferred stock of the company in the par amount of \$47,000, heretofore sold by the company to employees, has been repurchased by the company.

During 1926, the company discontinued railway service at McKinney and upon Mulberry Street in Sherman because the receipts therefrom were insufficient to provide for the service given.

Bus competition continued throughout the year upon substantially the same basis as it was at the close of the preceding year. The company experiencing its lines between Dallas and McKinney, a distance of 32 miles, and between Waco and Hillsboro, a distance of 33 miles. The fare charged by bus service between Waco and Hillsboro is the same as the fare by interurban. Between Dallas and McKinney the bus fare during the year was advanced from 50 cents to 75 cents, while the interurban fare between these two points has been maintained at \$1.

The address to the stockholders by Jack Beall, president, made a plea for legislation exempting interurban and street railways from a tax upon their gross receipts, legislation, calling for regulation of truck and bus operation and legislation requiring automobiles to stop before going over the railway crossings.

The report also estimated cash requirements for 1927, which, without considering the floating indebtedness of approximately \$164,000, totals \$1,871,718. This includes operating expenses, of \$1,230,000; taxes, \$100,000; interest, \$409,855; sinking fund requirements, \$81,550; payment of Denison & Sherman Railway bonds due July 1, \$50,313. In addition it includes approximately \$100,000, required during the year to take care of renewals and replacements



and for new construction. In other words, there will be required during the year to pay operating and other necessary expenses and charges, including renewals and replacements and improvements, approximately \$1,971,718. For the company to meet these charges and to enter 1928 free of floating indebtedness about \$2,135,718 will be required, whereas the gross receipts for the year were \$2,036,859.

### California Railways Hit by Tax Ruling

Unless a tax decision rendered in Sacramento, Cal., on Jan. 27 by Superior Judge Peter J. Shields is upset by appeal, many electric railways in California may be seriously embarrassed. Judge Shields held that the separate class taxation is unconstitutional and ruled that all steam and electric lines should pay the 7 per cent rate. The decision was the result of a suit brought by the Southern Pacific on behalf of some of its electric lines to reduce the state tax rate for those lines. Under the King bill, which has been a law since 1921, electric lines have been assessed at the rate of 5½ per cent, while steam lines and former steam lines have been assessed 7 per cent. The Southern Pacific in its suit sought to put its electric lines, which were formerly steam lines, under the lower tax rate.

The back taxes due the state under this decision amount to more than \$2,500,000. A meeting of electric railroad men from all parts of California was held in San Francisco on Jan. 31 and a committee was appointed to study the situation and report at a future date.

### Valuation of Capital Traction Cut

The valuation of the Capital Traction Company, Washington, D. C., for rate purposes was fixed at \$25,756,880 by a decision of the District Court of Appeals rendered on Feb. 7. The appellate tribunal, through Chief Justice Martin, modified the decision of Justice Hoehling of the District Supreme Court by disallowing a claim of the company for \$5,150,000, for the purchase price of the franchises and good will of the old Washington & Georgetown Railroad by the Rock Creek Railway, from which merger the Capital Traction Company was created in 1895. Justice Hoehling had sustained the claim of the company and had fixed a total valuation of \$30,906,880.

The Public Utilities Commission had ncted an appeal from the decision of Justice Hoehling and contested the allowance of the \$5,150,000, which the commission had refused to consider when, in September, 1919, the commission reported its finding fixing the company's valuation as of June 30, 1919, at \$14,270,495. This valuation was based on the normal prices as of July 1, 1914.

In disallowing this amount Chief Justice Martin declared it was a speculative price paid for the stocks and bonds of the company and should not have been paid for the franchise and good will of that corporation any more than should payment have been made to the holders of the securities of the

Rock Creek Railway for its good will and franchises. The court declared it made no charge of bad faith respecting the merger, but pointed out that \$8,000,000 was paid for the outstanding bonds of an issue of \$4,000,000, three-fourths of which were redeemable within four years and one-half of the remainder in less than eight years thereafter.

Taking up the claim of the commission that Justice Hoehling had not provided any deduction for depreciation, which the experts for the commission had estimated at \$2,000,000, the appellate tribunal adopted the decision of Justice Hoehling that no depreciation figures be set. The court ordered the commission and its successors in office to modify forthwith its former valuation and order in accordance with the decision of the appellate tribunal.

George E. Hamilton and G. Thomas Dunlap, counsel for the Capital Traction Company, announced they would take an appeal to the Supreme Court of the United States.

### Receiver Appointed for Cincinnati-Portsmouth Road

The Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, was placed in the hands of L. E. Woster as receiver when Judge Struble acted upon a suit brought by the Union Trust Company, holder of the trust indenture and first mortgage given by the company when it issued \$1,000,000 in 5 per cent bonds. Mr. Woster is superintendent of transportation of the company.

J. P. Longon, attorney for the Union Trust Company, alleged in the suit that the railroad had failed to meet installments of interest, aggregating a large sum, due on its million-dollar bonded indebtedness. The petition said:

For more than a year past the earnings of the company from all sources, in excess of the cost of operation, maintenance and other necessary expenses, have been far less than the amount required to enable it to pay the interest upon the bonds and other obligations.

Because of the alleged insolvency of the railroad there was danger of disruption of the system, the trust company asserted in its suit. In this connection it explained that:

It is of vital importance not only to the holders of the bonds and of the other obligations of the railroad, but also to the public that the operation of the system should not be interrupted or disorganized until the rights of the various bondholders and creditors can be ascertained and an opportunity given for some reorganization or re-adjustment of the properties.

### Increase in Revenue Passengers in Syracuse

The Syracuse lines of the New York State Railways carried a total of 33,458,417 passengers during 1926, an increase of 250,000 revenue passengers over the preceding year, according to a report issued by Benjamin E. Tilton, vice-president and manager. The report covered both the electric railway and bus systems. While the annual financial report is not completed, Mr. Tilton said the gross passenger revenue for electric cars would reach \$2,222,000 and for buses the figure was set at \$132,770, a total of \$2,354,770.

Street cars carried 31,604,430 and buses 1,853,987. The street cars traveled more than 5,000,000 miles and the buses 525,000 miles. Total number of transfers issued was about 6,000,000.

Mr. Tilton announced that the chartered bus business instituted by the Syracuse lines during the year had proved profitable. Buses were chartered on 72 occasions, or about twice a week since the system was installed. Parties were taken to Binghamton, Buffalo, State College, Pa., northern New York and many other points.

### Sale of Indiana Road Approved

The Indiana Public Service Commission has approved the purchase of the property and franchises of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind., by the Fort Wayne-Lima Railroad. The road was bought recently at receiver's sale by Edward Hopkinson, Jr. The commission authorized an issue of \$100,000, par value, of 6 per cent fifteen-year first mortgage bonds; \$441,000, par value, of general mortgage bonds, and 10,290 shares of no par common stock.

In this connection it is interesting to note that in a recent opinion to John W. McCardle, chairman of the Indiana commission, Arthur L. Gilliom, Attorney-General, held that state laws provide sufficient authority for one utility to take over the property and franchises of another public utility operating in Indiana and an adjoining State, and that the only authority necessary from the commission in such a case is approval of any bond issue asked by the purchasing utility.

Mr. McCardle based his question on a petition by the Fort Wayne-Lima Railroad to purchase the Fort Wayne, Van Wert & Lima Traction Company and to issue \$641,290 in securities. Mr. Gilliom pointed out that since the railway was recently sold at a judicial sale and that since the law requires the purchaser at a judicial sale, if not a corporation, to organize one, the law gives the new corporation authority and the matter does not rest with the commission.

### Hydro May Take Windsor, Essex & Lake Shore

Announcement that the Windsor, Essex & Lake Shore Electric Railway, Windsor, Ont., plans to shut down within 60 days has provoked much comment in the border cities. Following a recent meeting at Kingville attended by civic leaders it was decided that a complete survey of the situation be made with a view toward its possible purchase by the Ontario Hydro-Electric Commission for operation as a part of the Hydro radial services. A tentative price was not mentioned. W. R. Robertson, superintendent of the Hydro lines, reviewing the situation and contrasting bus operation with radial service, believed the Hydro department could operate the Lake Shore road at an estimated annual saving of \$100,000. He cited the reduced cost of power as an important consideration. He set the costs of bus operation at 40 per cent higher than radial overhead.



### Chicago "L" Issue Going Well

The sale of the new issue of \$1,500,000 of prior preferred stock of the Chicago Rapid Transit Company, operating the elevated lines, is now in progress through the Utility Securities Company, Chicago. The new stock, which pays a rate of return of 7.2 per cent, or 60 cents a share a month, is proving a popular investment with middle class investors. It is being sold on the monthly payment plan, as was the former issue, 7 per cent interest being allowed on partial payments. The monthly payment is \$10 a share and the stock is being sold at \$100 a share. The previous issue of prior preferred is now quoted on the Stock Exchange at several points above par.

### Power Equipment of Detroit United Sold

One of the largest sales of its kind in recent years has been announced in Detroit by the receivers for the Detroit United Railway, who have disposed of idle equipment, including four power houses and twelve substations, to the Woodmere Scrap Iron & Metal Company, Detroit, for \$800,000. An order in federal court disposing of the equipment was signed by Judge Charles C. Simons.

The steam and electrical power equipment included in the deal was valued at several million dollars when installed many years ago. The main power plants have been idle for the past two years. They are located at Monroe, Rochester, Farmington and New Baltimore. The substations are at Oxford, Conger, South Rockwood, Erie, Earthville, Roseville and two at Atlas.

### New Incorporation at Rockford

The Rockford & Belvidere Railway has been incorporated with \$300,000 capital. The stock includes 3,000 shares of common at \$50 a share and 1,500 shares of preferred at \$100. T. M. Ellis is president, William D. Bangs vice-president, Paul V. Harper secretary and John P. Brown treasurer. Offices of the company are at 128 Kishwaukee Street, Rockford, Ill. The corporation is operating the former Rockford-Belvidere branch of the Rockford & Interurban Railway, which, with the Rockford City Traction Company, went into bankruptcy a year ago. Both units were taken over by the Ellis interests.

**Net Profit \$5,271 in 1926.**—The net profit of the Worcester Consolidated Street Railway, Worcester, Mass., dropped from \$349,735 in 1925 to \$5,271 in 1926, principally because of decline of patronage of its lines and increased operating expenses, according to a report filed with the Massachusetts Department of Public Utilities. In 1925 the railway carried 36,781,407 revenue passengers, while in 1926 the total was only 33,870,220. The railway shows that its operating revenue for the year 1926 amounted to \$3,338,544, compared with \$3,595,403 in 1925. Although operating revenues declined, operating expenses increased nearly \$160,000, being \$2,903,725 in 1926 compared with

\$2,745,002 in 1925. All items of expense except conducting of transportation, which includes wages, increased in 1926 over 1925. As a result of the diminution of profits the railway paid no dividends in 1926, while \$348,750 was distributed in dividends in 1925.

### The Situation in Chicago Traction Negotiations

Failure of the Chicago Railways to pay off the principal of \$55,655,000 of its first mortgage gold bonds on Feb. 1, the date its 20-year franchise with the city of Chicago expired, resulted in the initiation of proceedings the following day in the Federal District Court for the foreclosure of the mortgage by the Harris Trust & Savings Bank, acting as trustee for approximately 50 per cent of the bondholders. There was no contest against the contentions of the bill and the foreclosure was immediately ordered by Judge James H. Wilkerson. The petition asked the court to declare the first mortgage claim a valid first lien and sell the property as an entirety to satisfy it. In the meantime, the court was also asked to have the receivers hold all profits for the trustee and to restrain the company agents and receivers from transferring the property.

In granting the application, Judge Wilkerson also ordered consolidation of the proceedings with the receivership suit of the Westinghouse Electric & Manufacturing Company, which on Dec. 15 appealed for appointment of the present receivers on account of failure to pay a bill of \$67,000. The same receivers—John J. Mitchell, Frederick A. Rawson and Henry A. Blair—were reappointed.

Although the court took no legal action on the application for sale of the properties, the natural sequence of this petition is that the company will be given 20 days to make answer. During that time, a formal hearing will be held on the merits of the appeal. With no funds in the treasury to meet the principal of the bonds now due, the property will be ordered sold at the expiration of this period.

Reorganization of the system contemplated by the controlling bondholders, however, will have to wait until the city either passes a new ordinance or the state Legislature passes the necessary legislation, it is believed. If the city grants a new franchise, of either terminable or fixed duration, the main problem is one of refunding. Under existing laws the city may only grant a twenty-year franchise. The companies contend it is impossible to fund present indebtedness under a limited grant. If the city is willing to coincide with that view, then it is predicted both parties will join in a plea of the state Legislature for the necessary enabling laws to permit the granting of an indeterminate permit.

Holder of some \$40,000,000 par value of junior bonds of the Chicago Railways and of \$39,455,000 first mortgage bonds of the Chicago City Railway and Calumet & South Chicago Railway, which also fell due on Feb. 1, as yet have made no formal demands for payment of their investments.

The aggregate funded debt of the

Chicago Railways Company, as shown in its latest published report, is as follows:

First mortgage .....	\$62,785,000
Consolidated mortgage Series A..	16,703,800
Consolidated mortgage Series B..	17,164,475
Purchase money mortgage.....	4,073,000
Adjustment income mortgage....	2,500,000
Underlying securities .....	1,980
Total .....	\$103,228,255

Of this amount, approximately \$8,594,000 of bonds are unsold and still remain in the company's treasury, leaving a total of \$94,634,185 in the hands of the public.

Because the bondholders will be interested in protecting their property, the local transportation committee of the City Council recognized their right to be represented at future hearings on all traction ordinances by postponing further sessions until after the bondholders come into control of the property. That numerous aldermen are now in the midst of heated campaigns for re-election on Feb. 22 is also given as another reason for the recess.

**Petition Dismissed.**—The California Railroad Commission has dismissed the application of the Union Traction Company for authority to abandon its stage lines operated between Santa Cruz and Capitola and intermediate points and between Santa Cruz and Twin Lakes and intermediate points.

**Deficit on Lake Shore.**—The gross earnings of the Lake Shore Electric Railway, Cleveland, Ohio, for the period from Jan. 1 to Nov. 30, 1926, was \$2,947,274, against \$2,924,613 for a similar period the year previous. Operating expenses and taxes increased from \$2,416,604 to \$2,554,098. After the consideration of interest the company concluded the eleven months period with a deficit of \$14,197, against a surplus the year previous of \$113,496. The Lake Shore Electric Railway has asked permission of the Ohio Public Utilities Commission to discontinue railway service on its line from Sandusky to Norwalk, Ohio.

**Net Income Lower.**—The operating revenues of the Eastern Massachusetts Street Railway, Boston, Mass., for December, 1926, were \$927,815, compared with \$850,448 for December, 1925. The net income for December after taxes, charges and depreciation was \$102,548, against \$112,711 in December, 1925.

**New Preferred Stock Issue.**—The directors of the Midland Utilities Company, Chicago, Ill., on Jan. 17 authorized the issuance and sale of \$1,000,000 of its 7 per cent cumulative class A preferred stock. Public offering of this stock will be made at once by the Utility Securities Company, Chicago. The Midland company owns or controls companies serving 201 communities in northern Indiana and western Ohio with an estimated population of 850,000. The total investment of the subsidiary companies in properties is \$94,318,673. The chief transportation subsidiaries of the Midland Utilities Company are the Chicago, South Shore & South Bend Railroad, Gary Railways, Shore Line Motor Coach Company, Indiana Service Corporation and the Marion & Bluffton Traction Company.



## Book Reviews

### Accounting Procedures for Public Utilities

By Warren G. Bailey, M.A., and D. E. Knowles, C.P.A. Chicago and New York: A. W. Shaw Company. 459 pages. Price, \$7.50.

This is a massive volume. It runs to the extent of 459 pages. This is not said as a deterrent, but is intended merely to convey an idea of the extent to which the authors have gone in covering their subject. To do the contents of the book full justice in a review of this kind would be impossible. Limitations of space make a critical summary of the volume out of the question. It seems better unequivocally to indorse the work as a whole and then to attempt to summarize the purpose of the authors and to convey an idea of the contents of the volume.

The present volume is the first of the series of so-called Public Utility Text to be published under the auspices of the Institute of Research in Land Economics and Public Utilities with Richard T. Ely, editor-in-chief, and Herbert B. Dorau, managing editor. This series is intended to cover the entire field of public service company operation and management. One finds himself heartily in agreement with the editors that as a study in a special aspect of public service company business administration "Accounting Procedures for Public Utilities" represents a real and valuable contribution to the literature on utilities.

As for the authors, who dedicate the volume to the public utility accountant, whose importance in the industry has been underestimated and whose work is essential to the proper management of utility companies, they have sensed the need for a reference book that would in a satisfactory manner review briefly the accounting practices in utility companies. As they point out, the compilation of accounting and financial data is logically the function of the accountant. To assemble these data accurately, the forms, methods and procedures he uses must be appropriate and complete. To this end the authors have attempted to describe the accounting records that have been found necessary, to explain briefly the manner in which the records are kept and to indicate the purposes for which the accounting information is used. In most instances the procedures presented are a composite of those used in various companies. In a few instances only are more or less specific practices discussed. It has been felt by the authors that procedures discussed or presented in a general way would be of greater assistance to executives and students of accounting than would procedures of particular companies. The authors warn the reader, however, that few records and practices used effectively in any one company can be used successfully *in toto* in another company.

There is, of course, a certain futility about giving a list of chapter headings.

Yet in a review, fixed as to space limitations, there is, perhaps, no better way to convey an idea of the contents of a volume of this kind, particularly a business book. So the headings of the chapters are appended:

(1) Introduction; (2) Place of Accounting in Public Utilities; (3) Uniform Accounting for Utility Companies; (4) General Accounting Books; (5) Expense Accounting; (6) Timekeeping and Pay-Roll Methods; (7) Distribution of Labor Charges; (8) Departmental Responsibilities in Accounting for Materials; (9) Accounting for Materials and Supplies; (10) Plant Accounting; (11) Current Liabilities; (12) Revenues from Utility Services; (13) Revenue Accounting for Electric, Gas and Water Services; (14) Accounting for Merchandising Sales; (15) Accounting for Revenue of Electric Railways; (16, 17, 18 and 19) Customers' Accounting; (20) Accounting for Customers' Payments and Petty Cash; (21) Accounting for Refunds and Adjustments with Customers; (22) Auditing Procedure; (23) Budget Procedure; (24) Interpretation of Financial and Operating Statements; (25) Public Utility Construction and Extensions; (26) Accounting for Capital Stock and Dividends; (27) Accounting for Capital Stock Sales.

As a piece of bookmaking the volume is in consonance with the text. All in all, the book reflects great credit on the authors, the editors and the publisher.

### Notes on the Collection of Transfers

By Frank Folupa. Philadelphia, Pa.: Dorrance & Company. 306 pages. Price \$2.

Are you a peridromophile? You need not consult the psychoanalysts or the behaviorists for an answer to this question, for its field is new even to them. Only you yourself can settle the mooted point. Did you ever impulsively or with studied malice pay an extra fare on the street cars rather than relinquish the orange-colored, mysteriously marked and deliberately punched transfer? If so, you are a believer in the science of "peridromophily," the name assigned by Frank Folupa in his "Notes on the Collection of Transfers" to the habit of collecting transfers.

Few people in this workaday world see anything of beauty in a street car transfer, evidenced by the various drastic changes the forms undergo before being deposited in the hands of the waiting conductors or receptacles. Not so do these specially colored slips, with their listings and punches, affect the transfer collector. This particular one has more than an academic interest in the origin of transfers. He is especially intrigued with their destiny—namely, personal collection—and this hobby he constantly reminds his readers is not for fraudulent purposes but rather as an honest avocation. Why, he wonders, should not the collecting of transfer forms be just as interesting as collecting coins and stamps. Besides, transfer collecting has this advantage—it can never be commercialized, "since trading in transfers is illegal. . . . Therefore, collectors must always be amateurs collecting for the intrinsic interest in it."

And if the avocation of the collector is honest, it is delightful, too, he finds. On transfer forms one can be

transported into the unbounded realms of history and knowledge, although these same slips appeared at first commonplace and stodgy. On this point he says: "A trolley ride along the traditional route or close to it, with a souvenir in some such form as a transfer used in Lexington, can add some interest to the history of Paul Revere's ride. A collection of Washington transfers seems to make news from the capital seem a bit more realistic, especially such forms as mention well-known places like the Capitol, the Treasury, Pennsylvania Avenue."

To one concerned in transportation questions or to one who has already acquired an interest in collecting transfer forms, this book should be of inestimable value. It is a carefully prepared, technical treatise on transfer privileges and classifications. Fare limits, overlaps, reversibility, direction punches, square box type, Ham type, Pope type and other equally perplexing terms to the layman are treated at considerable length. Supplementing the text are appendices dividing the United States into geographical divisions and subdivisions as a sample of a code notation of transfer systems.

But granting the reader has never found inspiration in transfers and will likely never indulge in the transfer-collecting hobby, the book contains entertaining and instructive matter. Even a cursory glance may be productive of reminiscent moods in which transfers played some part, though that part was negligible. Some such nostalgia affected one reader of a review published in a New York daily. Through the reviewer he subsequently offered to the author of "Notes on the Collection of Transfers" his own collection dated 26 years ago. Just a mention of this hobby was enough to carry him back to the days of his boyhood, when he and other kids in the neighborhood awaited the return of their traveling salesman fathers, who in a big-hearted way dumped out of their pockets transfers from San Francisco, Louisville, Boston, St. Louis and several other cities. If the wandering transfers could have told their tales, . . . when will we have the autobiography of a transfer?

### The Rapid Transit Situation in Greater New York

Many persons other than New Yorkers will be interested in this booklet of 70 pages, which contains the open letters of G. M. Dahl, chairman of the board of the Brooklyn-Manhattan Transit Corporation, on the Greater New York transit situation written during December, 1926, and January, 1927, to the Transit Commission of the State of New York and the Board of Estimate & Apportionment of the city of New York.

Mr. Dahl explains that the letters were written with the sole purpose of creating constructive discussion of local transit matters, and to aid in bringing about a co-operative effort on the part of existing transit companies and city and state officials for a solution of the transit problem, equitable alike to all interests—the public, the city and the companies.



## Personal Items

### Luke C. Bradley Heads New Providence Company

Luke C. Bradley, Richmond, Va., has accepted the invitation of the board of directors to become president of the Rhode Island Public Service Company, Providence, R. I. He will succeed Louis C. Gerry, and will assume his new duties about Feb. 20.

Mr. Bradley has resigned as president of the Virginia Electric & Power Company to accept this position. As head of the Service Company he will supervise the operations of the Narragansett Electric Light Company and the United Electric Railways, which have been merged under the Service Company.

Mr. Bradley has been associated with Stone & Webster, Inc., for the past 22 years in executive capacities. As president of the Virginia Electric & Power Company he had direct oversight of the electric light and power properties, electric railway lines, bus systems and gas properties in Richmond, Norfolk, Portsmouth, Peterburg, Fredericksburg and other cities in Virginia and extending into northeastern North Carolina.

The Virginia Electric & Power Company is controlled by the Engineers Public Service Company, and is under the executive management of Stone & Webster, Inc. Stone & Webster are also interested in the New England Power Association, which controls the Rhode Island Public Service Company. Mr. Bradley will be elected a director of the New England Power Association. He has been executive vice-president and division manager of the utilities properties under the management of Stone & Webster in Louisiana, Texas, New Mexico, Wisconsin, Nebraska, Wyoming and Colorado, serving about 100 cities and towns in these states. He is severing his connection with Stone & Webster in becoming connected with the Rhode Island Public Service Company.

### Fred Hamilton President in Omaha—Other Changes

At the annual meeting of the Omaha & Council Bluffs Street Railway, Omaha, Neb., held on Jan. 10, a change in officers was effected as follows:

Fred Hamilton was elected president, succeeding W. A. Smith.

R. A. Leussler, formerly a vice-president and the general manager, will continue as general manager and assume the first vice-presidency.

J. A. Munroe, formerly vice-president, is now designated as second vice-president.

The new president, Fred Hamilton, has been a member of the board of directors of the company for the past seven years, and during 1926 was first vice-president. He is well known in banking circles, being president of the Merchants National Bank until the consolidation of that bank with the

Omaha National Bank last April. He is at present vice-president of the Omaha National Bank.

### M. Ackerman Heads C.E.R.A.

Martin Ackerman, general manager of the Lake Shore Electric-Railway since Feb. 1, 1926, was elected president of the Central Electric Railway Association at its meeting in Toledo, Ohio, on Feb. 3-4, 1927. Mr. Ackerman is well known in the Central West, particularly for his affiliations with the Cincinnati & Dayton Traction Company and the Lake Shore Electric Railway.

In accepting the general management of the Cleveland interurban a year ago he returned to the property on which he obtained his early electric



Martin Ackerman

railway experiences. Here he started at the bottom, receiving in the course of time many advancements. Early in his career he was identified with the Youngstown & Ohio River Railway, and later with the Springfield & Xenia Railway and the Interurban & Terminal Company at Cincinnati. As a result of his efficient handling of the latter property Mr. Ackerman was made general manager of the Cincinnati & Dayton Traction Company in July, 1918. He encountered many difficulties, but his efforts at restoration did bear much fruit. He remained with this railway until Feb. 1, 1926, when he went to Sandusky as head of Lake Shore. At that time his career was reviewed in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 6, page 268.

### Changes in Personnel of American Light & Traction Company

Alanson P. Lathrop, president of the American Light & Traction Company, New York, since 1909, has been elected chairman of the board of directors. R. B. Brown, who had been vice-president and general manager of the Milwaukee Gas Light Company several years, has been made president to succeed Mr. Lathrop.

### W. E. Wood Made President at Richmond

William E. Wood, who has served as vice-president and general manager of the Virginia Electric & Power Company, Richmond, Va., since operation and control of the properties were taken over by Stone & Webster, Inc., Boston and New York, in 1925, will become president of the company, succeeding Luke C. Bradley. J. Frank McLaughlin, in charge of the company's Norfolk division, will succeed Mr. Wood as first vice-president, retaining his headquarters in Norfolk.

Mr. Wood joined the Stone & Webster organization immediately on graduation from the Georgia Institute of Technology. After a few months in the company's Boston offices he was sent to Jacksonville, Fla., where he eventually became superintendent of transportation. His promotion was rapid. Both Mr. Wood and Mr. Bradley came to Richmond in June, 1925, from highly successful management of the Stone & Webster properties in Texas, and they are now completing a \$20,000,000 program of improvements and extensions for the Virginia Electric & Power Company in Tidewater Virginia and northeastern North Carolina.

### Changes in Personnel of the Capital Traction Company

Edwin P. Goucher, formerly assistant engineer, has been appointed engineer of way and structures, and Joseph H. Dierken, formerly head of the electrical department, has been made electrical engineer of the Capital Traction Company, Washington, D. C.

Mr. Goucher has had charge of track construction for the Capital Traction Company for several years and has started some very valuable methods of construction which have materially reduced costs. His application of labor-saving tools in this work has shown remarkable results. He is a graduate of public schools and technical high school of Washington, D. C. For six years he served as assistant engineer in the surveyor's office in the District of Columbia. In 1917 he worked as assistant engineer at the United States Naval Academy, Annapolis, Md., on construction work and joined the engineering force of the United States Navy in 1918 as inspector of construction, Philadelphia Navy Yard. A year later Mr. Goucher was appointed assistant engineer in the way department of the Capital Traction Company.

Mr. Dierken entered the service of the Capital Traction Company in 1909 in the electrical department. He was appointed chief electrician in 1917. During the past five years he has had entire charge of the electrical department. Mr. Dierken is a graduate of Georgetown University Preparatory School, St. John's College, and Bliss Electrical School of Washington, D. C. In 1906 he served with the J. G. White Company and in 1907 and 1908 with the Westinghouse Electric & Manufacturing Company's construction department.



### E. J. Anderson Advanced at Davenport

E. J. Anderson, formerly general superintendent of the Tri-City Railway, Davenport, Iowa, has been made general superintendent of both the Tri-City Railway of Illinois and the Tri-City Railway of Iowa, with offices in Rock Island.

Arthur Grunwald, formerly assistant superintendent in Davenport, is made division superintendent of the Iowa lines under Mr. Anderson.

John Arnell continues as division superintendent of the Illinois lines.

Frank V. Skelley, for several years an assistant under T. C. Roderick former general manager of the Illinois lines but now at Ottumwa, is made transportation engineer for the entire Tri-City Railway lines.

### H. W. Blake Goes Abroad

Henry W. Blake, senior editor of the *ELECTRIC RAILWAY JOURNAL*, sailed for Europe on Feb. 10 on the *Conte Biancomano* on a business and pleasure trip that will extend over a period of several months. He expects to arrive in Naples on Feb. 22 and will proceed thence to Rome, Florence, Milan, Nice, Paris, Brussels, Berlin, Hamburg and London. Mr. Blake will travel leisurely, as bespeaks the scholar that he is, studying and drawing upon the background of previous trips and the inherent culture that is his. He will contribute to the *JOURNAL* some of his observations on public utility practices, particularly in the field of city railway operation and heavy electric railroading.

### D. A. Powell at Muskegon

D. A. Powell was recently elected vice-president and general manager of the Muskegon Traction & Lighting Company, Muskegon, Mich. From November, 1925, until his recent appointment Mr. Powell was employed by the American Light & Traction Company, as traveling engineer. He is a graduate of the University of Wisconsin, 1907, with a degree of bachelor of science, school of electrical engineering. Upon graduation, he entered the employ of the Madison Gas & Electric Company as chemist, cadet engineer, and engaged in construction work and plant appraisal for rate-making purposes. In 1910 he was transferred to the Milwaukee Gas Light Company and was employed by this company until 1925. During that time he acted in the capacity of construction engineer and later he served as engineer of distribution.

R. R. Cheever, associated for many years with the Pacific Electric Railway, Los Angeles, Cal., was recently appointed to the position of the assistant chief clerk in President William Sproule's office. For the past six years he had been secretary to Mr. Sproule. He entered the service of the Pacific Electric Railway in Pasadena in 1903 as stenographer in the superintendent's office and was advanced to similar positions in the general manager's office

and later in the office of the vice-president. Subsequently he was secretary to Paul Shoup, at that time vice-president of the Pacific Electric. Following this assignment he became chief clerk in that office. Before going to San Francisco, in 1920, Mr. Cheever was secretary to H. B. Titcomb, who was then vice-president of the Pacific Electric Railway.

Lewis E. Gettle, chairman of the Wisconsin Railroad Commission since 1922, at which time he succeeded Carl D. Jackson, resigned, has been reappointed by Governor-elect Zimmerman. His new term will expire in 1933.

Ray A. Poteracke, head bookkeeper of the Grand Rapids Railway, Grand Rapids, Mich., has been promoted by Vice-President and General Manager DeLamar to chief clerk in charge of accounting. Mr. Poteracke entered the service of the company ten years ago as a storeroom clerk.

T. F. Gnevo, former general agent of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has assumed the duties of assistant general passenger agent of the North Shore Line with offices at Milwaukee, Wis., to which position he was recently appointed. Mr. Gnevo succeeds R. S. Amis, who has been promoted to general passenger agent. The new assistant general passenger agent has served as passenger traffic representative on various steam and electric railways for the past eighteen years.

Hazen J. Payette has resigned as secretary to Mayor John W. Smith of Detroit, Mich., to become chief trial attorney for the Detroit Department of Street Railways. Following the close of the World War, Mr. Payette joined the claims department of the Detroit United Railway and when the Detroit United lines were taken over by the city of Detroit he entered the employ of the city, serving the Department of Street Railways in a legal capacity. He remained with the department until nine months ago, when he became secretary to the Mayor. He is 28 years old. He was graduated from the University of Detroit law school.

R. E. Jamieson, for the past year district passenger agent for the Chicago, South Shore & South Bend Railroad, South Bend, Ind., was recently appointed district passenger agent with offices in Chicago. Mr. Jamieson's experience in railroading began in 1911 with the Grand Trunk System at London, Ont. Since that time he has been engaged in various capacities in passenger solicitation work. He was connected with the Canadian Pacific Railroad in Chicago prior to his service with the South Shore Line. He was elected president of the Chicago Passenger Club, an organization of electric and steam railroad and steamship passenger agents, at its annual meeting in December, 1926.

James H. Powell, formerly assistant superintendent of transportation of the Scranton Railway, Scranton, Pa., has been appointed superintendent of transportation. He succeeds in that capacity George C. Towle, recently resigned. Mr. Powell has risen from the ranks.

A. I. Hunter has replaced L. Stinson as vice-president of the Grand Forks Street Railway, Grand Forks, N. D. He was formerly treasurer.

Joseph M. Nolan has succeeded James H. Powell as assistant superintendent of transportation of the Scranton Railway, Scranton, Pa. Mr. Nolan has been an employee of the company for more than twenty years.

A. J. Goedjen, manager of the Menominee & Marinette Light & Traction Company in Menominee, Mich., and Marinette, Wis., has been named manager of the northern division of the Wisconsin Public Service Corporation under a rearrangement of divisions. Mr. Goedjen's supervision over the operation of the corporation's properties will be widened to include twelve more communities.

## Obituary

William L. Schulz, formerly claim agent for the Washington, Baltimore & Annapolis Electric Railroad, with headquarters in Baltimore, Md., died on Jan. 10 at his home in West Annapolis. Mr. Schulz went with the company in 1908 and remained there until his health forced him to retire.

Alfred J. Becht, active in civic affairs of Cincinnati, Ohio, and identified with traction interests, died recently. On Nov. 14, 1910, Mr. Becht became secretary of the Cincinnati Street Railway, succeeding James A. Collins. He served in this capacity until Jan. 1, 1926, when he resigned to devote his time to his various personal interests. Prior to the sale about four months ago of the Toledo, Bowling Green & Southern Railroad Mr. Becht was its secretary. He also served the Cincinnati-Hamilton Traction Company in a similar capacity until it was taken over recently by the Cincinnati Street Railway.

W. C. White, superintendent of the western division of the Pacific Electric Railway, Los Angeles, Cal., for many years, died recently. He had been a resident of Los Angeles for more than 30 years.

William Wright, auditor for the Washington, Baltimore & Annapolis Electric Railway, with headquarters in Baltimore, Md., died suddenly on Jan. 5. He was found unconscious at the wheel of his automobile in his garage. His death was due to apoplexy. Mr. Wright was 65 years old.

William H. Hodgins, secretary of the Okonite Company, died recently at his home in Glen Ridge, N. J. Mr. Hodgins had been associated with the Okonite Company for more than 40 years and served for many years as a director in addition to his office as secretary. During his long connection with the Okonite Company he had seen the wire and cable industry develop from its earliest application to its present tremendous proportions.

George William Norwood, 83 years old, Kokomo, Ind., one of the promoters and builders of the interurban line of the Marion & Bluffton Traction Company, Bluffton, Ind., died recently in Lebanon.



# 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

## \$5,000,000 for Steel Equipment

Long Island Railroad Outlay Includes 60 Motor and 30 Trail Cars for Electric Service

George Le Boutillier, vice-president of the Long Island Railroad, announced this week that by the end of 1927 every passenger-carrying car operated in both steam and electric train service on the Long Island Railroad system will be of steel construction. This means that the Long Island will be the first Class I railroad in the United States to retire all remaining wooden cars and place its passenger-carrying equipment on a 100 per cent steel basis.

Orders will be placed immediately for 127 new steel passenger cars. Of these 117 will be coaches and ten combination baggage and passenger cars. As wooden cars have not been operated in electric passenger train service for many years, the new steel cars to be ordered will be used on steam trains, although they are of such a type as may readily be converted into electric motor or trail cars. This new equipment represents an investment of \$2,114,188. In addition to the cars covered by the new authorization, the company will put in service this year 114 new steel passenger cars which are now under construction at a cost of \$2,902,286. The latter order includes 60 motor cars, 30 trail cars for electric service and 20 coaches and four combination cars for steam service. The outlay for new equipment to be placed in service during 1927 will therefore amount to more than \$5,000,000.

Upon delivery of the 127 cars just authorized and the 114 now being built the Long Island will have a total of 1,411 steel passenger-carrying cars and no wooden cars.

## Hyatt Names New Sales Manager and Chief Engineer

H. J. Forsythe, president of the Hyatt Roller Bearing Company, Newark, N. J., announces the appointments of H. O. K. Meister as general sales manager and A. W. Scarratt as chief engineer.

Mr. Meister joined the Hyatt forces more than fourteen years ago, locating first as an engineer at the home office in Newark. Later he was transferred to the Chicago office, where, after a few years, he took over the supervision of Hyatt sales work in the Western territory.

Eighteen months ago Mr. Meister was appointed assistant sales manager and remained in the headquarters at Newark, where he will continue to be located as general sales manager.

Mr. Scarratt is well qualified to take

over the duties of chief engineer on account of his past experience in the design and construction of automotive, tractor, railroad and industrial equipment. He joined the Hyatt engineering staff a few months ago as assistant chief engineer. Mr. Scarratt will remain at the headquarters in Newark.

Both Mr. Meister and Mr. Scarratt are members of the Society of Automotive Engineers and have held important offices in the sections where they were previously located.

## Supplementary Compensation for General Electric Employees

Supplementary compensation totaling \$1,358,669.89 was distributed in February to 30,518 factory and office employees who have been in the employ of the General Electric Company for five years or more. The distribution was based on 5 per cent of the employee's earnings for the six months from July 1 to Dec. 31, 1926. Payments were made in General Electric Employees' Securities Corporation bonds or in cash, as the employees desired. The largest amount was paid to Schenectady employees, who received \$452,489.

## Large Terminal for Watertown

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has two electric railway improvements under consideration for Watertown, Wis., provided authority to carry them out is received from the City Council. One plan calls for the removal of the company's tracks on Main Street to Western Avenue and Second Street and the other the building of a large terminal to which point all lines would run directly. These two proposals, which were circulated by the Council among business men of the city in the form of ballots on which to indicate their approval or disapproval, found 63 business men who favored removal of the tracks

## Metal, Coal and Material Prices

Metals—New York		Feb. 8, 1927
Copper, electrolytic, cents per lb.	.....	12 30
Copper wire, cents per lb.	.....	14 50
Lead, cents per lb.	.....	7.425
Zinc, cents per lb.	.....	6.90
Tin, Straits, cents per lb.	.....	69.50

Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.95
Somerset mine run, Boston, net tons	2.30
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.425
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
Lined oil (5-bbl. lots), N. Y., cents per lb.	10.9
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	\$0.78

and 27 against it. To these ballots was attached another proposal, requesting that the company replace the railway service with buses.

## New Equipment for Cincinnati, Hamilton & Dayton

In line with its extensive rehabilitation program the Cincinnati, Hamilton & Dayton Railway has placed an order for ten all-steel high-speed interurban cars with the J. G. Brill Company. Each car will seat 50 passengers—sixteen in a smoking compartment and 34 in the main section. Delivery is expected about May 1, at which time the present interurban equipment will be retired.

With a lower center of gravity, the car floor 1 ft. nearer the ground, and three easy steps in place of the four steep risers on the present interurban equipment, the new cars will provide every comfort from the passengers' standpoint.

Specifications call for an extensive finish in Duco, the color scheme a brilliant Tuscan red with black and gold lettering and striping to conform with company's standards for maximum visibility and elegance. The interior finish will be in rich mahogany, set off by rubber tile flooring and Pullman type dome lights. All cars are to have Hale & Kilburn deep cushion, double spring, curved back, leather seats, and will be equipped with water flush toilets and wash basins, and sanitary water coolers of the indirect icing type, all of the very latest models.

In order to minimize the possibility of accidents while operating in the city, a concealed group of lights over the front dash of the cars has been specified. The front end of each car will be lighted in this manner when the headlight is dimmed while running through city streets. In addition to a red tail light there will be a stop light which is to function when the brakes are set, thus giving motorists a caution signal that a stop is about to be made.

To insure the maximum comfort for trainmen, permanent sun visors over the motorman's window, automatic window cleaners, comfortable leather chairs, and special electric heaters have been specified.

Of the ten cars, seven will carry baggage compartments, the other three being designed for double-end operation. An automatic coupling device provides for connecting the air line and for making all necessary electrical contacts for motor control. Each car will be equipped with four 60-hp. Westinghouse ventilated motors.

## Spanish Northern to Extend Electrification

The Spanish Northern Railway is about to electrify its lines, starting from Barcelona, through all of the section Barcelona-Manresa and the line Lerida-Varagoza, as well as the section running toward San Juan de las Abadesas in the Pyrenees. On all these lines direct current of 1,500-volt tension will be used.



### Rolling Stock

Mississippi Valley Public Service Company has added two new one-man safety cars to its equipment. These cars embody the latest developments in street car design and have been placed in service in La Crosse, Wis.

Fageol Company, Kent, Ohio, reports delivery of two buses to the Scranton Railways and fifteen buses to the city of Detroit, Department of Street Railways, during the period from Dec. 15 to 31, inclusive.

United Railways of St. Louis, Mo., is equipping all of its 1,800 cars with automatic window wipers as a safety measure. The wipers will assure the motorman a clear vision in all kinds of weather. They work on the same principle as the more familiar automobile windshield wiper, but cover a much larger area of the glass. Fifty cars on the Park Avenue division and several on the various suburban lines have already been equipped with the cleaners.

### Track and Line

Cincinnati, Hamilton & Dayton Railway, Dayton, Ohio, has commenced the reconstruction of its line between Dayton, and Cincinnati, it was announced this week by J. H. McClure, vice-president and general manager. The work will cost approximately \$200,000.

Athol & Orange Transportation Area, Orange, Mass., shows much activity in the way of improvement in the past year. The tracks and bridge between Athol and Brookside Park, about half way to Orange, have been reconstructed; 1,000 ft. of 60-ft. rail has been laid in South Main Street, Athol, and 4,000 new ties have been placed. In addition more than 2,000 ft. of overhead was installed with new span wires and poles. The largest expenditure was for power, which cost \$12,908.

### Trade Notes

Raymond H. Liefeld, formerly a salesman for the Packard Motor Car Company, has joined the forces of the Bridgeport Brass Company of Bridgeport, Conn.

Mather Garland has been appointed acting general manager of the Hegeman-Castle Corporation of Chicago, replacing W. E. Kelly, resigned. The Hegeman-Castle Corporation is owned and controlled by the National Railway Appliance Company of New York.

American Brown Boveri Electric Corporation, Camden, N. J., announces that Harold D. Gregory has just joined the patent department. Mr. Gregory is a graduate of the George Washington University law school and also a Stevens Institute graduate in engineering. For several years he was patent examiner of the Eastern Railroad Association at Washington, D. C., and for the past few years has been with Bottom, Hudnall, Lecher & McNamara of Milwaukee, Wis. With the former, he

conducted infringement and validity investigations for the railroads, as assistant to General Counsel Robert J. Fischer. With the latter company Mr. Gregory was solicitor of patents in the patent department.

Edwin Besuden has joined the sales organization of the National Railway Appliance Company in the capacity of special representative, with headquarters at the main office of the company, 452 Lexington Avenue, New York City. Mr. Besuden was for many years sales manager of the Jewett Car Company, and later served as manager of the railway department Chicago Var-nish Company in the Eastern district. Due to a typographical error in the JOURNAL of Jan. 29, Mr. Besuden's name was printed "Desuden."

Manganese Steel Forge Company, Philadelphia, Pa., has appointed Harry Howe engineer of railway equipment in connection with the development of the use of Rol-Man Steel in steam and electric railway passenger and freight equipment. Mr. Howe has resigned as special engineer for the Pressed Steel Car Company, after 21 years service with that concern. He is entirely familiar with all types of steam, electric and freight car details of equipment and design.

Rome Wire Company, Rome, N. Y., has opened a new warehouse for the purpose of serving its Detroit territory. The warehouse is located at 199 Minnie Street, Detroit. It is under Herman C. Joos, the district manager of the company at Detroit, who has always been in charge of this territory.

International Steel Tie Company announces the appointment of Frederic A. Tayler, Richmond, Va., as its southeastern representative, to handle all business in Virginia, North and South Carolina, Georgia, Florida and a part of Tennessee and Alabama. Mr. Tayler was born in Philadelphia on April 7, 1898. He was educated in the public schools there, but removed to Spokane, Wash., in 1912. There he continued his education, entering the Lewis and Clark High School. He left this school in 1915, his senior year, to accept a special apprenticeship with the Baldwin Locomotive Works at the Philadelphia plant. When he had completed this course Mr. Tayler was transferred to the Eddystone plant as track foreman of engines. Later he was promoted to assistant advertising manager in Philadelphia. On Sept. 12, 1921, he was transferred to the domestic sales department, going to the Richmond, Va., office as sales representative. He filled this position until Jan. 1, 1927, when he engaged in the railway supply business.

Ames Shovel & Tool Company, Boston, Mass., announces the appointment of N. E. Brooks as representative in the railway sales division of the Oliver Ames & Sons Corporation. Mr. Brooks is a graduate engineer of Massachusetts Institute of Technology, and comes to the Ames Shovel & Tool Company with fifteen years' experience in railway sales work. His headquarters will be at 41 Park Row, New York City.

### New Advertising Literature

Ohmer Fare Register Company, Dayton, Ohio, has just issued a new circular describing its ticket printing register, type 79. The machine is designed for use on buses as well as street cars.

W. S. Godwin Company, Inc., Baltimore, Md., is distributing a new booklet describing steel paving guards. "Booklet 27" contains comprehensive photographs and cross sections showing the application of this product to road edging, street railway paving platforms and steps, sewer inlets and columns.

American Brown Boveri Electric Corporation, Camden, N. J., is mailing out a handsome booklet dealing with the merits of its steam turbo-generators. Splendid illustrations, charts and diagrams are features of the new mailing piece.

Hyatt Roller Bearing Company, Newark, N. J., has announced that the recently named headquarters for the central sales division are now located at 806 Fulton Building, that city. They were formerly at 1352 Union Trust Building. The new location provides amply for the increased sales and engineering forces of the central division, functioning under the direction of B. H. Lytle. H. R. London, a new member of the Pittsburgh force, is now operating in the industrial field of W. L. Iliff.

General Electric Company, Schenectady, N. Y., has just issued a new loose-leaf circular describing arc-welding, equipment. In the main, the circular details recent developments in helmets for operators of arc-welding apparatus.

Dunn Painting Machine Company, San Francisco, Cal., has issued a pamphlet describing the Dunn patent painting machine and the Dunn patent cleaning process. The Dunn equipment and process feature the complete breaking up and atomization of the paint in the machine itself and not at the nozzle. The paint is carried in suspension in the atomized form through a single line of hose for any reasonable distance. The Dunn company believes that this insures a more uniform application of paint than when the atomization is accomplished at the nozzle.

Ohio Brass Company, Mansfield, Ohio, is distributing a descriptive mailing piece which presents new O-B bonds, designated as Hebi-bede Titon and AW-12. The first bond is especially designed for use on heavily beaded and Weber type joints where it is impracticable to install the ordinary type of rail bond. It embodies all the features of the Titon bond, including steel terminals and copper sleeves. The AW-12 bond can be wedged firmly to the rail base by the tap of a hammer before welding is started.

Kentucky Rock Asphalt Company, Louisville, Ky., has just issued "The Story of Kyrock," a booklet describing its natural asphaltic paving material which is mined in Edmonson County, Kentucky. Half-tone illustrations give a very clear idea of its application to paving projects of every description, including its use in connection with street railway construction.





*Lightness of Weight—*

*Flexibility of Operation and—*

**“Peacock” Staffless Brakes—**

*Reg. U. S. Pat. Off.*

*features of new Williamsport, Pa., cars!*



Emphasizing these vital elements of modern rolling stock five one-man, two-man cars were recently delivered to the Williamsport Passenger Railway of Williamsport, Pa., by the J. G. Brill Company.

The interior appearance of these cars is particularly pleasing, brown leather upholstery being standard equipment, while the motorman's operating equipment is enclosed by wood paneling.

Naturally, “Peacock” Staffless Brakes were specified in these cars on account of their light-weight, tremendous braking power, low installation and maintenance costs, simplicity of operation and their occupation of small platform space.

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When the wheels stop turning  
the bus stops earning.  
And when buses are piling  
up mileage month after month  
it pays real dividends to  
have a battery that stands  
the racket of rough roads  
and long-hour use.

*F.A. Willard*

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Baker-Raulang Model 10,  
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**A**SSIGN your toughest job to a DUFF Jack. Spot a DUFF under that heavy load—"It's Light on DUFF Jacks." In

every field—for every lifting requirement—there is a model that lives up to this slogan.

Sturdy, long-lived, easier to operate, scientifically designed and accurately manufactured, DUFF Jacks perform satisfactorily even under the most adverse conditions. Repairs are practically eliminated. You save in labor cost, in time and in trouble. It *pays* to standardize on DUFF Jacks.

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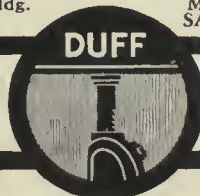
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are the product of one dominant idea—to give the coach route operator a quality vehicle at low cost. The idea is not uncommon but *the coach is*. It is built on a long, low, fast and sturdy chassis. It has attractive lines. Its inviting interior holds perfect comfort for 15 passengers in the Club Coach and for 17 in the Sedan-type Coach. The tremendous value at the outset is more and more apparent as the coach reaches big-figure mileage. Build patronage and profit with International Harvester 6-Cylinder Coaches.

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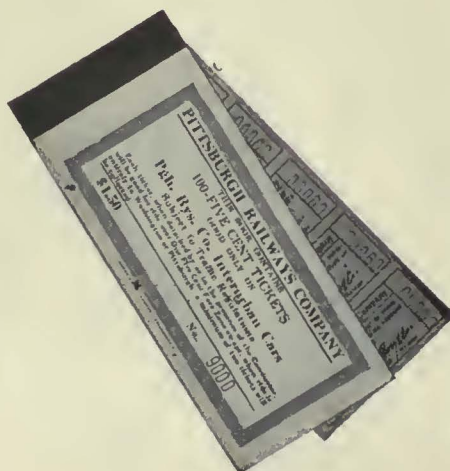
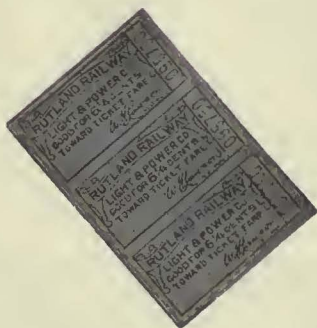
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Most railway men, when they think of Mohair Plush, think of red or green plush. Green is always an attractive serviceable color.

But there are many new and distinctively modern patterns and colorings now made as standard by Massachusetts Mohair Plush Co. They can be used most effectively in planning a passenger-attractive car interior. And they all have the well known Mohair Plush characteristics,—*easy to clean, always "new-looking," and usually good for the life of the car.*

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Makers of BAY STATE PLUSH

New York Agent:  
Sisson Supply Co.  
1845 Grand Central Terminal,  
New York City

Western Agent:  
Midgley & Borrowdale  
1822 McCormick Building,  
Chicago, Illinois.

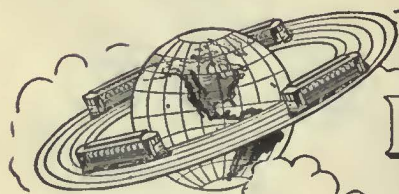
**MASSACHUSETTS MOHAIR PLUSH**

*The railroad standard for over 35 years*



An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.



**Barron G. Collier**

INCORPORATED  
CANDLER BLDG. NEW YORK



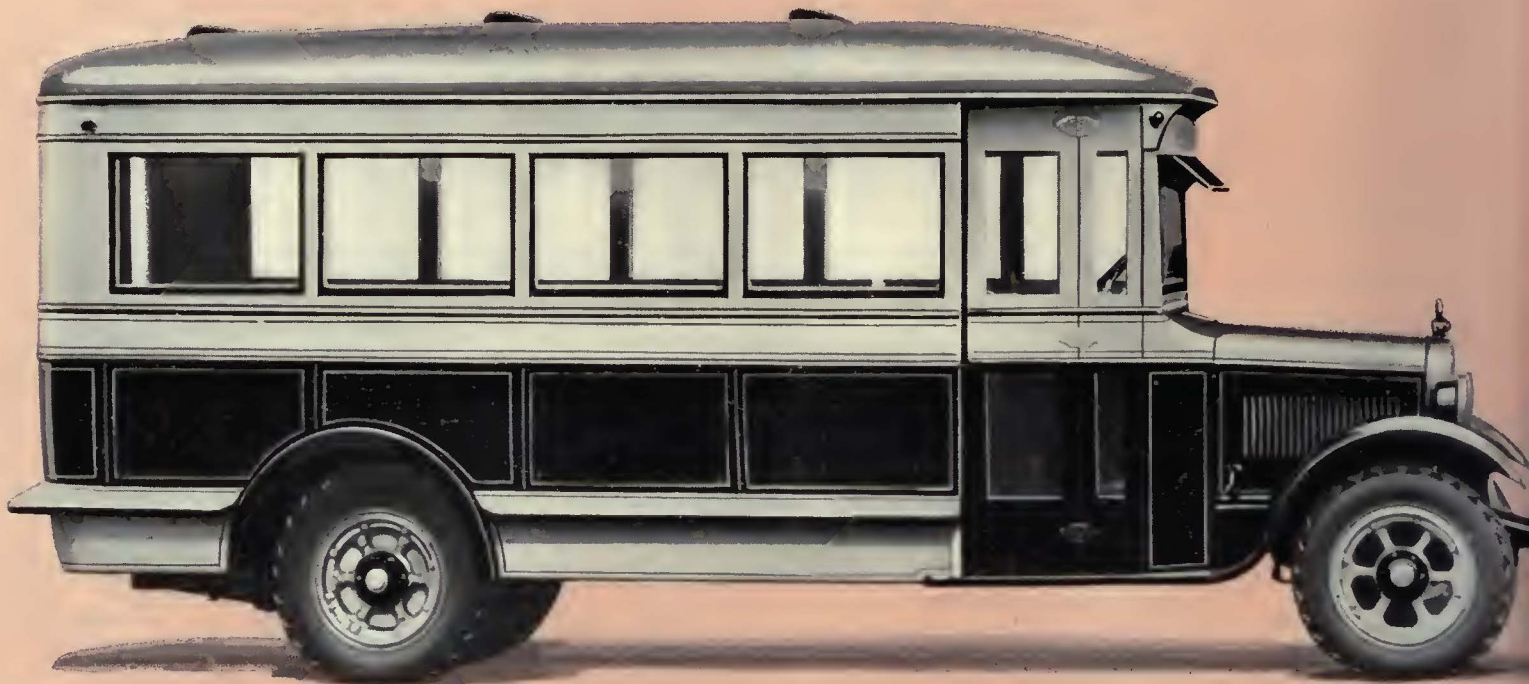


*They Ride* ~ ~  
and Ride again





# Ease and Comfort



*The 21-Passenger street car type coach illustrated above is being shown marked preference by operators. Its interior matches its exterior in trim, clean-cut appearance. The well-cushioned, well-spaced seats are exceptionally comfortable.*

**GRAHAM BROTHERS**  
**SOLD BY DODGE BROTHERS**



# Hold Patronage -

## *Pleasant Riding Qualities of Graham Brothers Motor Coaches Build Business—and 21-Passenger Capacity Makes Operation Profitable*

Graham Brothers Motor Coaches are so attractive in appearance they invite patronage—so comfortable and dependable they hold that patronage.

Daily operation is proving more conclusively that the coach of medium capacity best meets the demands of public and operators alike.

Graham Brothers 21-Passenger Street Car Type Motor Coaches assure the operators dependability, low cost, ease of handling and adaptability—and they stand up day after day in the gruelling service to which motor coaches are subjected. They appeal to passengers because of their fine appearance, frequent service, quiet, comfort and speed with safety.

For completeness and accessibility the service facilities for Graham Brothers Motor Coaches are not equalled by any other motor coach organization.

PRICES: 21-Passenger Street Car Type, Complete, \$3815;  
12-Passenger Parlor Coach, Complete, \$3750, f. o. b. Detroit.

# **MOTOR COACHES**

## **DEALERS EVERYWHERE**



# STABILITY

## your investment is safe

An operator's investment in Graham Brothers Motor Coaches is a sound investment.

It is secured by the recognized stability of Graham Brothers, a division of Dodge Brothers, Inc.

The employment of thousands of men and the earnings of millions of dollars are dependent upon the continued satisfactory performance of the products of this great organization.

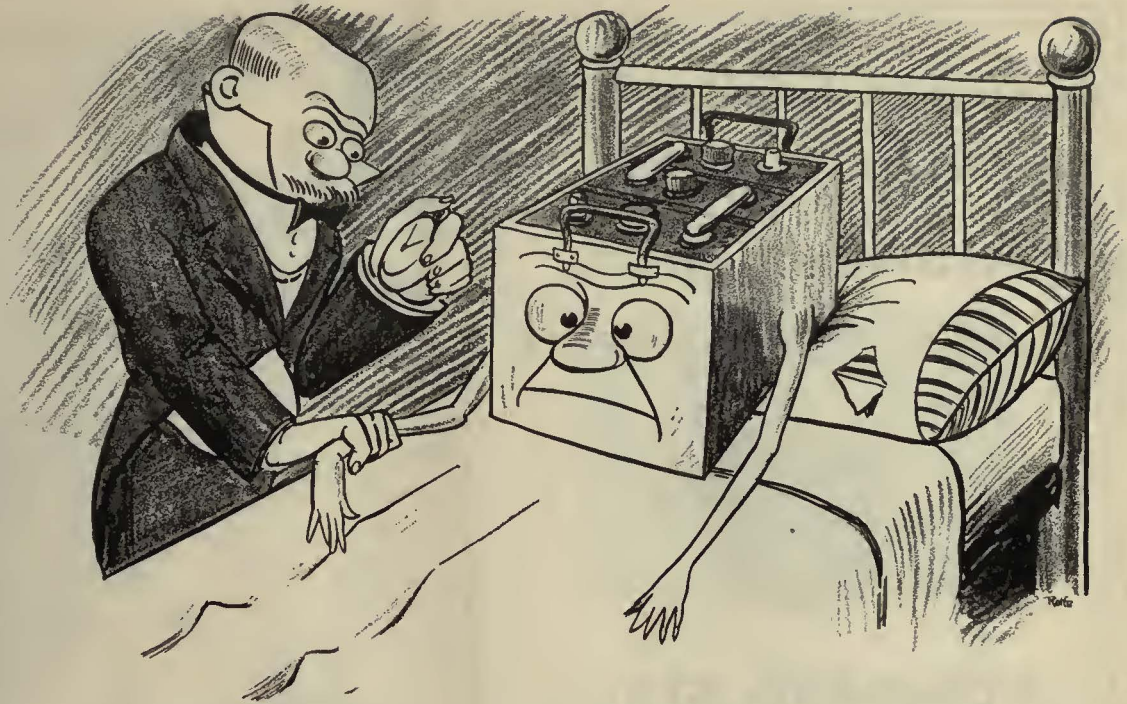
Dodge Brothers Dealers everywhere recognize their responsibility in safeguarding the Good Will of a Good Name. They are equipped to give immediate service. They carry a complete stock of repair parts. And the Dodge Brothers Dealer is right there where you bought your Motor Coach, this year, next year, whenever you need him.

**G R A H A M B R O T H E R S**

EVANSVILLE · DETROIT · STOCKTON

A DIVISION OF DODGE BROTHERS, INC.  
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO





## 'Hardening of the Arteries' from a fast life

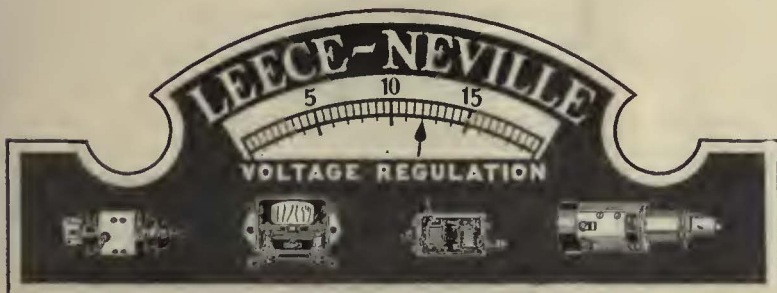
Every month that harsh verdict is pronounced over hundreds of batteries—young batteries that ought to be in the prime of life.

And then these batteries, that started out so full of promise, are ignominiously buried in the scrap heap—potter's field—and somebody's good money has to be spent to replace them.

The fast life they had to lead—constant overcharge or undercharge—killed them. No battery can last its full time if it leads such a life.

Leece-Neville Patented Voltage Regulation prevents the conditions which kill batteries. All over the country batteries thus protected are giving several times usual service life, because they don't have to lead so fast a life.

As a result, most bus makers either install Leece-Neville Patented Regulation, or provide for its optional installation—if you haven't got it let us tell you about it, and stop this flaming youth among your batteries.



# THE LEECE-NEVILLE CO.

5353 Hamilton Ave., Cleveland, Ohio



Steel Axles  
 Steel Springs  
 Armature Shafts  
 Rolled Steel Wheels



**STANDARD STEEL  
 WORKS COMPANY**

PHILADELPHIA, PA.

BRANCH OFFICES:

Chicago New York Portland San Francisco Pittsburgh  
 St. Louis Houston Richmond St. Paul Mexico City

WORKS: BURNHAM, PA.



**BUFFALO**  
*Hand-Holds—*

are a necessity! Without them great difficulty is experienced by passengers attempting to walk through cars. They create better public relations!

They will not stain the hands, and the riding public, which shuns anything soiled, is pleased with this feature. This also helps to improve good will!

And they are moderately priced. *Investigate.*

**CENTRAL EQUIPMENT COMPANY**  
 800 Englewood Ave., Buffalo, N. Y.

VIZABLED G  
 PATENTED  
**SAFKAR**  
 TRADE MARK REG  
**SAFSTEP**

Winter's icy storms bring no added hazard to the car equipped with "Safkar" Steps. Snow, ice or sleet will not make their surface slippery—snow will not build up in and on them. Not only are step accidents reduced, but traffic is speeded up because passengers feel the secure "Safkar" foot hold.

*Write for Bulletin D28.*

**IRVING IRON WORKS CO.**  
 LONG ISLAND CITY, N.Y. U.S.A.

Established in 1902

SALES OFFICES IN ALL PRINCIPAL CITIES  
 See Your Telephone Book for Local Address





## OONGLI

Watch a couple of Zulus and you'll find that their method of greeting is by shaking thumbs (oongli).

By this exercise of their daily duties they become quite deft with the thumb.

But in America the thumb has never shown up as much of a factor in the day's work.

Here and there you may see a carbon brush application made by rule of thumb, and it may get by, but as a whole, such applications show up awfully poor in comparison with a Morganite brush application made on engineering prescription.

In short, while the Zulu's thumbwork is deft—the American's is dumb.



Main Office and Factory

3302-3320 Anable Ave., Long Island City, N. Y.

### DISTRICT ENGINEERS AND AGENTS

- Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
- Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
- Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
- Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
- Revere, Mass., J. F. Drummey, 75 Pleasant Street.
- Los Angeles, Special Service Sales Co., 502 Delta Building.
- San Francisco, Special Service Sales Co., 222 Underwood Building, 545 Market Street.
- Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
- Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
- Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

## Do You Buy Repairs For Your Packard At the Five and Ten?



Trolley Pole Stock In Nuttall Store Room

Not on your life. You know that only Packard can turn out Packard cars and parts—you can't afford to take any chances.

But how about trolley parts and accessories? You should see some of the junk we see. Oh Man! soft, scrap brass trolley wheels, where the best of phosphor bronze is hardly good enough. Heavy, cast iron harps, where lightest malleable iron or forgings have their own troubles to stand the gaff.

Poles made of almost any kind of tubing, where heat treated steel, reinforced, carefully swedged and tapered is Nuttall Standard.

Springs!—well just springs, that's all. A spring is a spring, but the service requires the Nuttall Spring, designed to give the right tension, the right wheel contact pressure on the wire—oil tempered springs that *spring* and don't set.

Trolley parts—run of mines stuff—actually cost you more money than genuine, guaranteed Nuttall parts. No substitute is ever as good. Ask the man with a glass eye.

Send for a Nuttall Catalog and Price List



**R.D. NUTTALL COMPANY**  
**PITTSBURGH PENNSYLVANIA**

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



# Bankers and Engineers

**Ford, Bacon & Davis**  
 Incorporated  
**Engineers**  
 115 Broadway, New York  
 PHILADELPHIA CHICAGO SAN FRANCISCO

**The J. G. White**  
**Engineering Corporation**  
 Engineers—Constructors  
 Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.  
 43 Exchange Place New York

**STONE & WEBSTER**  
 Incorporated  
 EXAMINATIONS REPORTS APPRAISALS  
 ON  
 INDUSTRIAL AND PUBLIC SERVICE PROPERTIES  
 New York Boston Chicago

**THE BEELER ORGANIZATION**  
 ENGINEERS AND CONSULTANTS  
**Traction-Traffic-Equipment-Power Investigations**  
 TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS  
 COORDINATING SERVICE—FINANCIAL REPORTS  
 APPRAISALS—MANAGEMENT  
 52 Vanderbilt Ave. New York

**SANDERSON & PORTER**  
 ENGINEERS  
 PUBLIC UTILITIES & INDUSTRIALS  
 Design Examinations Construction Reports Management Valuations  
 CHICAGO NEW YORK SAN FRANCISCO

**ENGELHARDT W. HOLST**  
 Consulting Engineers  
 Appraisals Reports Rates Service Investigation  
 Studies on Financial and Physical Rehabilitation  
 Reorganization Operation Management  
 683 Atlantic Ave., BOSTON, MASS.

**ALBERT S. RICHEY**  
 ELECTRIC RAILWAY ENGINEER  
 WORCESTER, MASSACHUSETTS  
 REPORTS-APPRAISALS-RATES-OPERATION-SERVICE

**KELKER, DELEUW & CO.**  
 CONSULTING ENGINEERS  
 REPORTS ON  
 Operating Problems Valuations Traffic Surveys  
 111 W. Washington Street, Chicago, Ill.

C. B. BUCHANAN President W. H. PRICE, JR. Sec'y-Treas. JOHN F. LAYNO Vice-President  
**BUCHANAN & LAYNG CORPORATION**  
 Engineering and Management, Construction  
 Financial Reports, Traffic Surveys  
 and Equipment Maintenance  
 BALTIMORE 1904 Citizens National Bank Bldg. Phone: Hanover: 2142 NEW YORK 49 Wall Street

**DAY & ZIMMERMANN, Inc.**  
 ENGINEERS  
 DESIGN - CONSTRUCTION - REPORTS  
 VALUATIONS - MANAGEMENT  
 NEW YORK PHILADELPHIA CHICAGO

**HEMPHILL & WELLS**  
 CONSULTING ENGINEERS  
 Gardner F. Wells Albert W. Hemphill  
 APPRAISALS  
 INVESTIGATIONS COVERING  
 Reorganization Management Operation Construction  
 43 Cedar Street, New York City

**STEVENS & WOOD**  
 INCORPORATED  
**ENGINEERS AND CONSTRUCTORS**  
 120 BROADWAY, NEW YORK  
 ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

**WALTER JACKSON**  
 Consultant on Fares and Motor Buses  
 The Weekly and Sunday Pass—Differential Fares—Ride Selling  
 143 Crary Ave., Mt. Vernon, N. Y.

**McCLELLAN & JUNKERSFELD**  
 Incorporated  
**ENGINEERING AND CONSTRUCTION**  
 Examinations—Reports—Valuations  
 Transportation Problems—Power Developments  
 68 Trinity Place, New York  
 Chicago St. Louis

**KELLY, COOKE & COMPANY**  
 ENGINEERS  
 Operation and Management  
 Traffic and Transportation Surveys  
 PARKWAY at SIXTEENTH ST. PHILADELPHIA

**J. ROWLAND BIBBINS**  
 Engineer—2301 Connecticut Ave., N.W., Washington, D. C.  
**TRANSPORTATION SURVEYS**  
 Organized Traffic Relief and Transit Development  
 Co-ordinating Motor Transport, Railroad and City  
 Plans, Service, Routing, Valuation, Economic Studies  
 EXPERIENCE IN 20 CITIES



# THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of  
Water Tube Boilers  
of continuing reliability

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



WORKS  
Bayonne, N. J.  
Barberton, Ohio

**BRANCH OFFICES**

BOSTON, 49 Federal Street  
PHILADELPHIA, Packard Building  
PITTSBURGH, Farmers Deposit Bank Building  
CLEVELAND, Guardian Building  
CHICAGO, Marquette Building  
CINCINNATI, Traction Building  
ATLANTA, Candler Building  
PHOENIX, ARIZ., Heard Building  
DALLAS, TEX., 2001 Magnolia Building  
HONOLULU, H. T., Castle & Cooke Building  
PORTLAND, ORE., 805 Gasco Building

**BRANCH OFFICES**

DETROIT, Ford Building  
NEW ORLEANS, 344 Camp Street  
HOUSTON, TEXAS, 1011-13 Electric Building  
DENVER, 444 Seventeenth Street  
SALT LAKE CITY, 405-6 Kearns Building  
SAN FRANCISCO, Sheldon Building  
LOS ANGELES, 404-6 Central Building  
SEATTLE, L. C. Smith Building  
HAYANA, CUBA, Calle de Agular 104  
SAN JUAN, Porto Rico, Royal Bank Building



Type R-11  
Double Register

## International Registers

Made in single and double  
types to meet requirements  
of service. For hand or foot,  
mechanical or electric opera-  
tion. Counters, car fittings,  
conductors' punches.

The International Register Co.  
15 South Throop Street, Chicago, Illinois

## THE WORLD'S STANDARD

# "IRVINGTON"

Black and Yellow  
Varnished Silk, Varnished Cambric, Varnished Paper

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

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

Sales Representatives in the Principal Cities

## A. B. COLE

Commercial Consultant

Merchandising and Co-ordination  
of Transportation

500 Shelbourne Ave., Wilkesburgh, Pa. (Pittsburgh)

Our advertisement in the issue of February 5 showed how

## HASKELITE and PLYMETL

effect big savings in the weight of street cars. Haskelite has been  
specified on five new cars being built for Virginia Ry. & Power Co.

Another ad will appear next week.

HASKELITE MANUFACTURING CORPORATION  
133 W. Washington St., Chicago, Ill.

## THE P. EDWARD WISH SERVICE

50 Church St.  
NEW YORK

Street Railway Inspection  
DETECTIVES

131 State St.  
BOSTON

When writing the advertiser for information or  
prices, a mention of the Electric Railway  
Journal would be appreciated.



## CHILLINGWORTH

One-Piece Gear Cases

Seamless—Rivless—Light Weight  
Best for Service—Durability and  
Economy. Write Us.

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

## INDUSTRIAL GASES

OXYGEN  
ACETYLENE



HYDROGEN  
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches,  
regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.  
Branches: New York Pittsburgh Toledo

Transmission Line and Special Crossing  
Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

## ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.



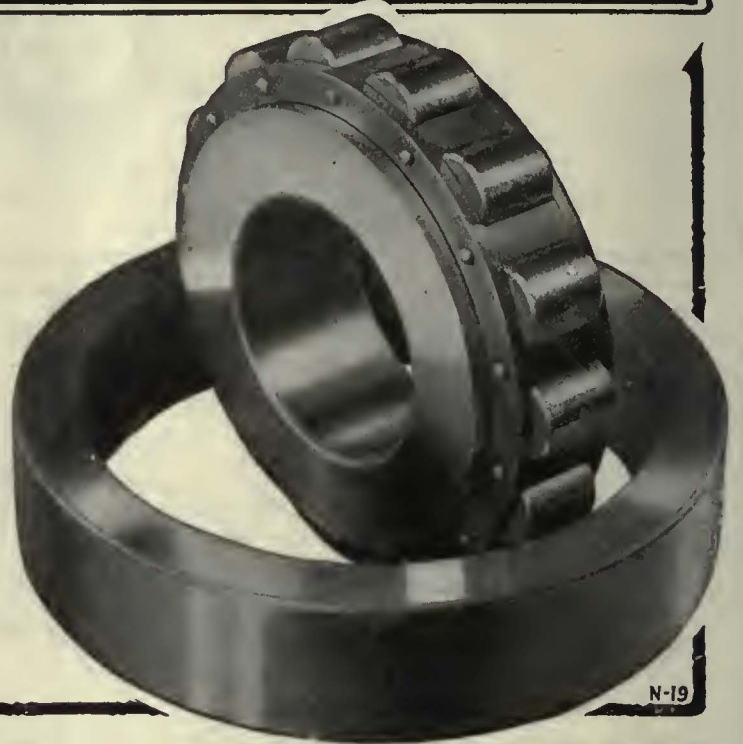
# "HOFFMANN"

"Hoffmann" Precision Roller Bearings combine the load-ability, the shock-ability, the speed-ability and the trouble-free simplicity which—in railway terms—mean maximum mileage with minimum maintenance. Your motors can be "Hoffmann" equipped—ask your motor builder, or our engineers.

**NORMA-HOFFMANN  
BEARINGS CORPORATION**

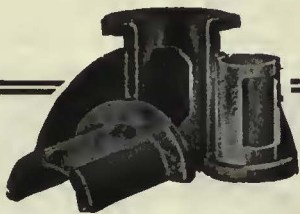
Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS



N-19

## Greater Service Per Dollar Invested



### "Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

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

## MORE-JONES QUALITY PRODUCTS

## Griffin Wheel Company

410 North Michigan Ave.  
Chicago, Ill.

## Griffin Wheels

with  
Chilled Rims  
and

## Chilled Back of Flanges For Street and Interurban Railways

FOUNDRIES:

Chicago  
Detroit  
Denver

Boston  
Kansas City  
Council Bluffs  
Salt Lake City

St. Paul  
Los Angeles  
Tacoma



# SEARCHLIGHT SECTION

## USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

**UNDISPLAYED—RATE PER WORD:**  
 Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.  
 Positions Vacant and all other classifications, 8 cents a word, minimum charge \$3.00.  
 Proposals, 40 cents a line an insertion.

**INFORMATION:**  
 Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.  
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

**DISPLAYED—RATE PER INCH:**  
 1 to 3 inches.....\$4.50 an inch  
 4 to 7 inches..... 4.30 an inch  
 8 to 14 inches..... 4.10 an inch  
 Rates for larger spaces, or yearly rates, on request.  
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

## SEARCHLIGHT SERVICE

Covers the advertising of

- Agencies Wanted
- Agents Wanted
- Auction Notices
- Bids Wanted
- Books and Periodicals
- Buildings for Sale
- Business Opportunities
- Civil Service Opportunities
- Contracts to Be Let
- Contracts Wanted
- Desk Room for Rent
- Desk Room Wanted
- Educational
- Employment Agencies
- Evening Work Wanted
- Foreign Business
- For Exchange
- For Rent
- Franchises
- Industrial Sites
- Labor Bureaus
- Machline Shops
- Machinery Wanted
- New Industries Wanted
- Partners Wanted
- Patent Attorneys
- Patents for Sale
- Plants for Sale
- Positions Vacant
- Positions Wanted
- Property for Sale
- Proposals
- Receivers' Sales
- Representatives Wanted
- Salesmen Want Connections
- Salesmen Wanted
- Second Hand Equipment
- For Sale For Rent
- Exchange Wanted
- Specialties
- Tutoring
- Vacation Work Wanted
- Water Front Property
- Work Wanted
- Miscellaneous for Sale
- for Rent or Want Ads.

Can we serve you?

0150

### POSITIONS VACANT

**EQUIPMENT** engineer and maintenance executive, six years' factory engineering experience and seven years' maintenance work with large railway company, desires change. College graduate with A-1 references. P-967, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

**TRACK** foreman, experienced in track and paving work. Energetic man wanted. Give references and experience in detail. P-968, Electric Railway Journal, Tenth Ave. at 36th St., New York.

### POSITIONS WANTED

**OPERATING** man; capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

**SUPERINTENDENT** of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

**TRACK** engineer with twenty years' electric railway experience desires change in location. Thoroughly understands modern track and special work design, practice and necessity for economy. PW-969, Electric Railway Journal, 1600 Arch St., Phila., Pa.

## TO HELP YOU

GET WHATEVER YOU WANT

"Searchlight" Advertising

G-8

### FOR SALE

## BIRNEY CARS

In First-Class Condition

WH-508 and GE-264 Equipment

Inspection Invited

Apply to

Eastern Mass. St. Ry. Co.

1 Beacon Street, Boston, Mass.

### SPECIAL BARGAIN

20—303 C. V. MOTORS, ventilated, split frame, complete less gears.

IRVING S. VAN LOAN CORPORATION  
 1750 Broadway, New York City  
 Specialists in street cars or any part of a street car.  
 Illustrated bulletin supplied on request.

### FOR SALE

## 15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors  
 Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

12 miles 70-lb. ASCE Relayers.  
 10 miles 60-lb. ASCE Relayers.  
 practically as good as new. Also 12 miles  
 4/0 figure 8 Copper Wire practically new.

M. K. FRANK

Park Row Bldg. Union Trust Bldg.  
 New York City Pittsburg, Penna.

"Opportunity" Advertising:

Think "Searchlight" First!



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

We solicit a test of TULC  
 on your equipment

**The Universal Lubricating Co.**

Cleveland, Ohio

Chicago Representatives: Jamson-Ross Company,  
 Straus Bldg



FARE

## BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.  
 4900 Lexington Ave., Cleveland, O.

Canadian Cleveland Fare Box Co., Ltd.  
 Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens





## Cold Dinners

for *your* passengers?

Not if you use

### AJAX

**BABBITT for ARMATURES**

*keeps the rolling stock rolling*



The Ajax Metal Company

Established 1880

**PHILADELPHIA**

NEW YORK    CHICAGO    BOSTON    CLEVELAND

# PANTASOTE

Trade Mark

Seat and Curtain Materials

*There is no substitute for Pantasote*

# AGASOTE

Trade Mark

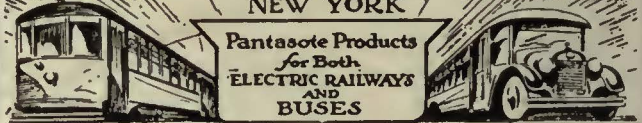
Roofing—Headlining—Wainscoting

*The only homogeneous panel board*

*standard  
for electric railway cars  
and motor buses*

The PANTASOTE COMPANY Inc.

At 46th Street 250 Park Avenue  
NEW YORK



People's Gas Bldg., Chicago, Ill.

*Where performance counts*

use

**Le Carbone Carbon Brushes**

*They talk for themselves*

## W. J. Jeandron

Factory Terminal Bldg.,

Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.  
Montreal and Toronto

## Kalamazoo Trolley Wheels

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



**THE STAR BRASS WORKS**

KALAMAZOO, MICH., U. S. A.

## The DIFFERENTIAL CAR



*Standard on  
60 Railways for*

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

*Use These Labor Savers*

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

**THE DIFFERENTIAL STEEL CAR CO., Findlay, O.**





The Sterling Mark on Bus Bodies

The Lang Body Company  
CLEVELAND, OHIO



# LANG BODIES



## *The Sterling Mark on Bus Bodies*

Sterling quality is always associated with Lang Bodies. It is inherent in the materials—the seasoned skeleton of the frame, the metal covering, the plate glass, the leather for the seats. It is built in the construction—the careful fitting of joints, the reinforcing, the manufacture and assembly of all parts. It is evident in the painting—the quality of the hardware, the study given to the perfection of every detail.

The Sterling Mark on bus bodies is found on Lang—put there by the work of long-experienced craftsmen in body building.

THE LANG BODY COMPANY, CLEVELAND, OHIO

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





# COLUMBIA

## Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings  
Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

*The*  
Columbia Machine Works  
*and M. I. Co.*  
265 Chestnut St., corner Atlantic Ave.,  
Brooklyn, N. Y.



Structural Shapes • Steel Sheet Piling  
Plates • Skelp  
Bars and Bar Mill Products  
Bands • Hoops  
Axles • Wrought Steel Wheels  
Rails • Rail Joints  
Steel Cross Ties

**CARNEGIE STEEL COMPANY**  
*General Offices • Carnegie Building • 434 Fifth Avenue*  
PITTSBURGH PENNSYLVANIA



1839

# Wharton Special Trackwork

Trackwork of superior quality,  
incorporating the famous  
Tisco Manganese Steel.

**WM. WHARTON JR. & CO., Inc.**  
EASTON, PA.

OFFICES:

Boston Chicago El Paso Montreal New York  
Philadelphia Pittsburgh San Francisco Scranton

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

## National Railway Appliance Co.

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

BRANCH OFFICES

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

### RAILWAY SUPPLIES

Tool Steel Gears and Pinions	Ft. Pitt Spring & Mfg. Co., Springs
Anglo-American Varnish Co., Varnishes, Enamels, etc.	Flaxilium Insulation
National Hand Holds	Anderson Slack Adjusters
Genesco Paint Oils	Economy Electric Devices Co., Power Saving and Inspection Meters
Dunham Hopper Door Device	"Topesald" Lamps
Garland Ventilators	Bus Lighting Equipment
Walter Tractor Snow Plows	Cowdrey Automotive Brake Testing Machine
Feasible Drop Brake Staffs	

# Lorain Special Trackwork Girder Rails

*Electrically Welded Joints*

**THE LORAIN STEEL COMPANY**

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York  
Philadelphia Pittsburgh Dallas

Pacific Coast Representatives:

United States Steel Products Company

Los Angeles Portland San Francisco Seattle

Export Representatives:

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



Special Track Work of every  
description

**THE BUDA COMPANY**  
Harvey (Suburb Chicago) Illinois



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car Collier, Inc., Barron G.

**Air Brakes**  
Westinghouse Air Brakes Co.  
Air Receivers & Aftercoolers Ingersoll-Rand Co.

**Anchors, Guy**  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

**Armature Shop Tools**  
Columbia Machine Works  
Elec. Service Supplies Co.

**Automatic Regulators, Voltage, Current & Synchronizing**  
American Brown Boveri Corp.

**Automatic Return Switch Stands**  
Ramapo Ajax Corp.

**Automatic Safety Switch Stands**  
Ramapo Ajax Corp.

**Axles**  
Bemis Car Truck Co.  
Bethlehem Steel Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Illinois Steel Co.  
National Ry. Appliance Co.  
Standard Steel Works  
Westinghouse E. & M. Co.

**Axles, Steel**  
Carnegie Steel Co.

**Babbitt Metal**  
Ajax Metal Co.  
More-Jones Brass & Metal Co.

**Babbitting Devices**  
Columbia Machine Works & M. I. Co.

**Badges and Buttons**  
Elec. Service Supplies Co.  
International Register Co.

**Batteries, Storage**  
Willard Storage Battery Co.

**Bearings, Ball**  
Norma-Hoffman Co.

**Bearings and Bearing Metals**  
Ajax Metal Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Columbia Machine Works & M. I. Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
Westinghouse E. & M. Co.

**Bearings, Center and Roller Sides**  
Cincinnati Car Co.  
Columbia Machine Works  
Stucki Co., A.

**Bearings, Roller**  
Norma-Hoffman Co.  
Timken Roller Bearing Co.

**Bells and Buzzers**  
Consolidated Car Heating Co.

**Bells and Gongs**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Columbia Machine Works & M. I. Co.  
Elec. Service Supplies Co.

**Benders, Rail**  
Railway Trackwork Co.

**Bodies, Bus**  
Baker-Raulang Co., The  
Brill Co., The J. G.  
Lang Body Co., The  
Bodles, Passenger Car  
Baker-Raulang Co., The  
Body Material, Haskelite and Plymet  
Haskelite Mfg. Corp.

**Bollers**  
Babcock & Wilcox Co.

**Bolts & Nuts, Track**  
Illinois Steel Co.

**Bond Testers**  
American Steel & Wire Co.  
Elec. Service Supplies Co.

**Bonding Apparatus**  
American Steel & Wire Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Railway Trackwork Co.  
Una Welding & Bonding Co.

**Bonds, Rail**  
American Steel & Wire Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Railway Trackwork Co.  
Una Welding & Bonding Co.  
Westinghouse E. & M. Co.

**Braces, Timber**  
Duff Mfg. Co.

**Braces, Trench**  
Duff Mfg. Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)**  
Columbia Machine Works  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
Hubbard & Co.  
Ohio Brass Co.

**Brake Adjusters**  
Brill Co., The J. G.

Cincinnati Car Co.  
National Ry. Appliance Co.  
Westinghouse Tr. Br. Co.

**Brake Shoes**  
American Brake Shoe & Foundry Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.

**Brakes, Brake Systems and Brake Parts**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Columbia Machine Works & M. I. Co.  
General Electric Co.  
National Brake Co.  
Safety Car Devices Co.  
Westinghouse Tr. Br. Co.

**Brakes, Magnetic Rail**  
Cincinnati Car Co.

**Brushes, Carbon**  
General Electric Co.  
Jeandron, W. J.  
LeCarbone Co.  
Morganite Brush Co.  
Westinghouse E. & M. Co.

**Brushes, Graphite**  
Morganite Brush Co.

**Brushes, Wire, Pneumatic**  
Ingersoll-Rand Co.

**Brushholders**  
Columbia Machine Works

**Bulkheads**  
Haskelite Mfg. Corp.

**Bus Wheels, Steel**  
Heywood-Wakefield Co.

**Buses**  
Brill Co., The J. G.  
Graham Bros.  
International Harvester Co.  
International Motor Co.  
Mack Truck Co., Inc.

**Bushings, Case Hardened and Manganese**  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Columbia Machine Works

**Cables (See Wires and Cables)**  
Cambrie Tapes, Yellow and Black Varnish  
Irvington Varnish & Ins. Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Lighting Fixtures**  
Elec. Service Supplies Co.

**Car Panel Safety Switches**  
Consolidated Car Heating Co.  
Westinghouse E. & M. Co.

**Car Steps, Safety**  
Cincinnati Car Co.  
Irving Iron Works Co.

**Car Wheels, Rolled Steel**  
Bethlehem Steel Co.

**Cars, Dump**  
Brill Co., The J. G.  
Differential Steel Car Co.

**Cars, Gas-Electric**  
Brill Co., The J. G.  
General Electric Co.  
Westinghouse E. & M. Co.

**Cars, Gas, Rail**  
Brill Co., The J. G.  
St. Louis Car Co.

**Cars, Passenger, Freight, Express, etc.**  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Kuhman Car Co., G. C.  
National Ry. Appliance Co.  
Wason Mfg. Co.

**Cars, Second Hand**  
Elec. Equipment Co.

**Cars, Self-Propelled**  
Brill Co., The J. G.  
General Electric Co.

**Castings, Brass Composition or Copper**  
Ajax Metal Co.  
A. & J. M. Anderson Mfg. Co.  
Cincinnati Car Co.  
Columbia Machine Works & M. I. Co.  
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**  
American Steel Foundries  
Bemis Car Truck Co.  
Columbia Machine Works & M. I. Co.  
Standard Steel Works

**Castings, Malleable & Brass**  
Bemis Car Truck Co.  
Columbia Machine Works & M. I. Co.

**Catchers and Retrievers, Trolley**  
Elec. Service Supplies Co.

Ohio Brass Co.  
Wood Co., Chas. N.

**Cenary Construction**  
Archbold-Brady Co.

**Ceiling Car**  
Haskelite Mfg. Corp.  
Pantaso Co., Inc.

**Ceilings, Plywood, Panels**  
Haskelite Mfg. Corp.

**Change Carriers**  
Cleveland Fare Box Co.  
Elec. Service Supplies Co.

**Change Trays**  
Cincinnati Car Co.

**Circuit-Breakers**  
A. & J. M. Anderson Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Circuit Breakers, Oil**  
American Brown Boveri Corp.

**Clamps and Connectors for Wires and Cables**  
Columbia Machine Works  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Westinghouse E. & M. Co.  
Ohio Brass Co.

**Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.

**Clusters and Sockets**  
General Electric Co.

**Coil Banding and Winding Machines**  
Columbia Machine Works & M. I. Co.  
Elec. Service Supplies Co.  
Westinghouse E. & M. Co.

**Colls, Armature and Field**  
Columbia Machine Works & M. I. Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Coils, Choke and Kieking**  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Coin Counting Machines**  
Cleveland Fare Box Co.  
International Register Co.

**Coin Sorting Machines**  
Cleveland Fare Box Co.

**Coin Wrappers**  
Cleveland Fare Box Co.

**Commutator Sletters**  
Columbia Machine Works  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.  
Wood Co., Chas. N.

**Commutator Truing Devices**  
General Electric Co.

**Commutators or Paris**  
Cameron Electrical Mfg. Co.  
Columbia Machine Works & M. I. Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Compressors, Air**  
General Electric Co.  
Ingersoll-Rand Co.  
Westinghouse Tr. Br. Co.

**Compressors, Air, Portable**  
Ingersoll-Rand Co.

**Condensers**  
General Electric Co.  
Ingersoll-Rand Co.  
Westinghouse E. & M. Co.

**Condensar Papers**  
Irvington Varnish & Ins. Co.

**Connectors, Solderless**  
Westinghouse E. & M. Co.

**Connectors, Trailer Car**  
Columbia Machine Works  
Consolidated Car Heating Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.

**Controllers or Paris**  
Columbia Machine Works & M. I. Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Controller Regulators**  
Elec. Service Supplies Co.

**Controlling Systems**  
General Electric Co.  
Westinghouse E. & M. Co.

**Converters, Rotary**  
General Electric Co.  
Westinghouse E. & M. Co.

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American Brass Co.  
American Steel & Wire Co.  
Anaconda Copper Mining Co.

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Anaconda Copper Mining Co.  
Cord, Bell, Trolley, Register  
American Steel & Wire Co.  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
International Register Co.  
Roebbling's Sons Co., John A.  
Samson Cordage Works  
Silver Lake Co.

**Cord Connectors and Couplers**  
Elec. Service Supplies Co.  
Samson Cordage Works  
Wood Co., Chas. N.

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American Steel Foundries  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
Westinghouse Traction Brake Co.

**Cranes, Electric, Industrial Truck, Mounted**  
Baker-Kaulang Co., The

**Cranes, Hoists & Lifts**  
Elec. Service Supplies Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**  
International Steel Tie Co.

**Crossings**  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

**Crossings, Frogs & Switches**  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

**Crossings, Manganese**  
Bethlehem Steel Co.  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

**Crossings, Track (See Track Special Work)**

**Crossings, Trolley**  
Ohio Brass Co.  
Westinghouse E. & M. Co.

**Curtains and Curtain Fixtures**  
Brill Co., The J. G.  
Pantaso Co., Inc.

**Dealer's Machinery & Second Hand Equipment**  
Elec. Equipment Co.  
Frank, M. K.  
Van Loan Corp., Irving S.

**Derailing Devices (See also Track Work)**  
Derailing Switches  
Ramapo Ajax Corp.

**Destination Signs**  
Columbia Machine Works & M. I. Co.  
Elec. Service Supplies Co.

**Detective Service**  
Wish-Service, P. Edward

**Door Operating Devices**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Consolidated Car Heating Co.  
National Pneumatic Co.  
Safety Car Devices Co.

**Doors & Door Fixtures**  
Brill Co., The J. G.  
Cincinnati Car Co.  
General Electric Co.  
Hale-Kilburn Co.

**Doors, Folding Vestibule**  
National Pneumatic Co.  
Safety Car Devices Co.

**Drills, Track**  
American Steel & Wire Co.  
Elec. Service Supplies Co.  
Ingersoll-Rand Co.  
Ohio Brass Co.

**Dryers, Sand**  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

**Ears**  
Columbia Machine Works  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

**Electric Grinders**  
Railway Trackwork Co.

**Electrical Wires and Cables**  
Amer. Electrical Works.  
American Steel & Wire Co.  
John A. Roebbling's Sons Co.  
Electrodes, Carbon  
Railway Trackwork Co.  
Una Welding & Bonding Co.  
Electrodes, Steel  
Railway Trackwork Co.  
Una Welding & Bonding Co.

**Engineers, Consulting, Contracting and Operating**  
Archbold-Brady Co.  
Beeler, John A.  
Bibbins, J. Rowland  
Buchanan & Layng Corp.  
Cole, A. B.  
Day & Zimmermann, Inc.  
Ford, Bacon & Davis

Hemphill & Wells  
Hoist, Engelhardt W.  
Jackson, Walter  
Kelker & DeLeuw  
Kelly-Cooke Co.  
McClellan & Junkersfeld  
Richey, Albert S.  
Sanderson & Porter  
Stevens & Wood  
Stone & Webster  
White Eng. Corp., The J. G.

**Engines, Gas, Oil or Steam**  
Ingersoll-Rand Co.  
Westinghouse E. & M. Co.

**Exterior Side Panels**  
Haskelite Mfg. Corp.

**Fare Boxes**  
Cleveland Fare Box Co.  
Nat'l Ry. Appliance Co.  
Perey Mfg. Co.

**Fare Registers**  
Elec. Service Supplies Co.  
Ohmer Fare Register Co.  
Fences, Woven Wire & Fence Posts  
American Steel & Wire Co.  
Fenders and Wheel Guards  
Brill Co., The J. G.  
Cincinnati Car Co.  
Consolidated Car Fender Co.  
Star Brass Works  
Wood Co., Chas. N.

**Fibre and Fibre Tubing**  
Westinghouse E. & M. Co.

**Field Coils (See Coils)**

**Flaxinum Insulators**  
National Railway Appliance Co.

**Floodlights**  
Elec. Service Supplies Co.

**Floor, Sub**  
Haskelite Mfg. Corp.

**Flooring, Fireproof**  
Irving Iron Works Co.

**Flooring, Non-Slipping**  
Irving Iron Works Co.

**Flooring, Steel Subway**  
Irving Iron Works Co.

**Flooring, Ventilating**  
Irving Iron Works Co.

**Floors**  
Haskelite Mfg. Corp.

**Forgings**  
Brill Co., The J. G.  
Cincinnati Car Co.  
Duff Mfg. Co.  
Standard Steel Works

**Frogs & Crossings, Tee Rail**  
Bethlehem Steel Co.  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

**Front Track (See Track Work)**

**Frogs, Trolley**  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

**Furnaces, Electric**  
American Brown Boveri Corp.

**Fuses and Fuse Boxes**  
Columbia Machine Works & M. I. Co.  
Consolidated Car Heating Co.  
General Electric Co.  
Westinghouse E. & M. Co.

**Fuses, Refillable**  
General Electric Co.

**Gaskets**  
Westinghouse Tr. Br. Co.

**Gas Producers**  
Westinghouse E. & M. Co.

**Gates, Car**  
Brill Co., The J. G.  
Cincinnati Car Co.

**Gauges, Oil and Water**  
Ohio Brass Co.

**Gear Blanks**  
Brill Co., The J. G.  
Standard Steel Works

**Gear Cases**  
Chillingworth Mfg. Co.  
Columbia Machine Works & M. I. Co.  
Elec. Service Supplies Co.  
Westinghouse E. & M. Co.

**Gears and Pinions**  
Bemis Car Truck Co.  
Columbia Machine Works & M. I. Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Nat'l Ry. Appliance Co.  
R. D. Nuttall Co.

**Generating Sets, Gas-Electric**  
General Electric Co.  
American Brown-Boveri Corp.  
General Electric Co.  
Leece Neville Co.  
Westinghouse E. & M. Co.

**Girder Rails**  
Bethlehem Steel Co.  
Lorain Steel Co.

**Gongs (See Bells and Gongs)**

**Grating, Steel, Subway**  
Irving Iron Works Co.

**Greases (See Lubricants)**

**Grinders and Grinding Supplies**  
Railway Trackwork Co.

(Continued on page 48)





4 Pneumatic Tie Tampers at Work on a Crossover

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A gang of four men employing Pneumatic Tie Tampers will accomplish as much per day as three times their number tamping by hand. With the untiring power of compressed air, a firm and solid bedding is secured which hand-tamping cannot equal.

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Consolidated Car Heating Co.  
Gold Car Heat. & Lig. Co.  
Nat'l Ry. Appliance Co.  
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Heaters, Car, Hot Air and  
Water  
Smith Heater Co., Peter  
Heaters, Car Stove  
Smith Heater Co., Peter  
Helmets, Welding  
Railway Trackwork Co.  
Uns Welding & Bonding Co.  
Holsta & Lifts  
Columbia Machine Works &  
M. I. Co.  
Holsta, Portable  
Ingersoll-Rand Co.  
Hose, Bridges  
Ohio Brass Co.  
Hose, Pneumatic  
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Testing and Recording  
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General Electric Co.  
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Tape  
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Co.  
Okonite Co.  
Okonite-Callender Cable Co.  
Westinghouse E. & M. Co.  
Insulating Silk  
Irvington Varnish & Ins.  
Co.  
Insulating Varnishes  
Irvington Varnish & Ins.  
Co.  
Insulation (See also Paints)  
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Elec. Service Supplies Co.  
General Electric Co.  
Irvington Varnish & Ins.  
Co.  
Okonite Co.  
Okonite-Callender Cable Co.  
Westinghouse E. & M. Co.  
Insulation Slats  
Irvington Varnish & Ins.  
Co.  
Insulator Pins  
Elec. Service Supplies Co.  
Hubbard & Co.  
Insulators (See also Line  
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Elec. Service Supplies Co.  
General Electric Co.  
Irvington Varnish & Ins.  
Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.  
Interior Slide Linings  
Haskelite Mfg. Corp.  
Interurban Cars (See Cars)  
Jacks (See also Cranes,  
Hoists and Lifts)  
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Columbia Machine Works &  
M. I. Co.  
Duff Mfg. Co.  
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National Ry. Appliance Co.  
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Duff Mfg. Co.  
Jacks, Ball Bearing, Screw  
Duff Mfg. Co.  
Jacks, Governor Controlled  
Duff Mfg. Co.  
Jacks, Horizontal  
Duff Mfg. Co.  
Jacks, Lifting  
Duff Mfg. Co.
- Jacks, Pipe Forcing  
Duff Mfg. Co.  
Jacks, Pole  
Duff Mfg. Co.  
Jacks, Push & Pull  
Duff Mfg. Co.  
Jacks, Special Purpose  
Duff Mfg. Co.  
Jacks, Track  
Duff Mfg. Co.  
Joints, Rail  
(See Rail Joints)
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Brill Co., The J. G.  
Cincinnati Car Co.  
Lamp Guards and Fixtures  
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General Electric Co.  
Westinghouse E. & M. Co.  
Lamps, Arc & Incandescent  
(See also Headlights)  
General Electric Co.  
Westinghouse E. & M. Co.  
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Ohio Brass Co.  
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Cincinnati Car Co.  
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Lighting Fixtures, Interior  
Electric Service Supplies  
Co.  
Lighting Systems  
Leece Neville Co.  
Lightning Protection  
Elec. Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.  
Line Material (See also  
Brackets, Insulators,  
Wires, etc.)  
Archbold-Brady Co.  
Electric Ry. Equipment Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
More-Jones Brass & Metal  
Corp.  
Westinghouse E. & M. Co.  
Locking Spring Boxes  
Wm. Wharton, Jr. & Co.  
Locomotives, Diesel, Electric  
American Brown Boveri  
Co.  
Locomotives, Electric  
American Brown Boveri  
Corp.  
Cincinnati Car Co.  
General Electric Co.  
Westinghouse E. & M. Co.  
Locomotives, Oil Engine,  
Electric Driven  
Ingersoll-Rand Co.  
Lubricating Engineers  
Universal Lubricating Co.  
Lubricants, Oil and Grease  
Universal Lubricating Co.  
Manganese Parts  
Bemis Car Truck Co.  
Manganese Steel Guard Rails  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.  
Manganese Steel, Special  
Track Work  
Bethlehem Steel Co.  
Wm. Wharton, Jr. & Co.  
Manganese Steel Switches,  
Frogs and Crossings  
Bethlehem Steel Co.  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.  
Meters (See Instruments)  
Mirrors, Inside & Outside  
Cincinnati Car Co.  
Motor and Generator Sets  
American Brown Boveri  
Corp.  
General Electric Co.  
Motor Buses (See Buses)  
Motors, Electric  
General Electric Co.  
Westinghouse E. & M. Co.  
Motorman's Seats  
Brill Co., The J. G.  
Cincinnati Car Co.  
Elec. Service Supplies Co.  
Wood Co., Chas. N.  
Nuts and Bolts  
Bemis Car Truck Co.  
Cincinnati Car Co.  
Hubbard & Co.  
Oils (See Lubricants)  
Omnibuses (See Buses)  
Oxygen  
International Oxygen Co.  
Packing  
Westinghouse Traction  
Brake Co.  
Paints and Varnishes  
(Insulating)  
Elec. Service Supplies Co.  
Irvington Varnish & Ins.  
Co.  
Paints and Varnishes for  
Woodwork  
National Ry. Appliance Co.  
Panels, Outside, Inside  
Haskelite Mfg. Corp.  
Pavement Breakers  
Ingersoll-Rand Co.  
Pickup, Trolley Wire  
Elec. Service Supplies Co.  
Ohio Brass Co.
- Pinion Pullers  
Duff Mfg. Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Wood Co., Chas. N.  
Pinions (See Gears)  
Pins, Case Hardened, Wood  
and Iron  
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Westinghouse Traction  
Brake Co.  
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Standard Steel Works  
Westinghouse Tr. Brake Co.  
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Ramapo Ajax Corp.  
Pliers, Rubber Insulated  
Elec. Service Supplies Co.  
Nat'l Ry. Appliance Co.  
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Floors, Interior Panels,  
Bulkheads, Truss Planks  
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Ingersoll-Rand Co.  
Pole Line Hardware  
Bethlehem Steel Co.  
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Poles, Metal Street  
Elec. Ry. Equipment Co.  
Hubbard & Co.  
Poles and Ties Treated  
Bell Lumber Co.  
International Creosoting &  
Construction Co.  
Poles, Ties, Posts, Piling &  
Lumber  
International Creosoting &  
Construction Co.  
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(Continued on page 51)





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## These handy test clamps save time

When you want to make quick, temporary connections, these clamps will save you time and trouble.

They are readily attached and removed by hand; the grip is secure and positive and will take a cable or flat bar up to 1 1/4 in. thick. Stock clamps are supplied with a 100-ampere lug and will take heavy overloads.

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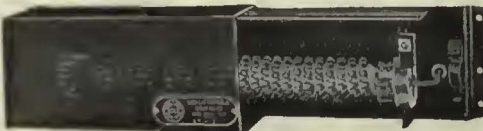
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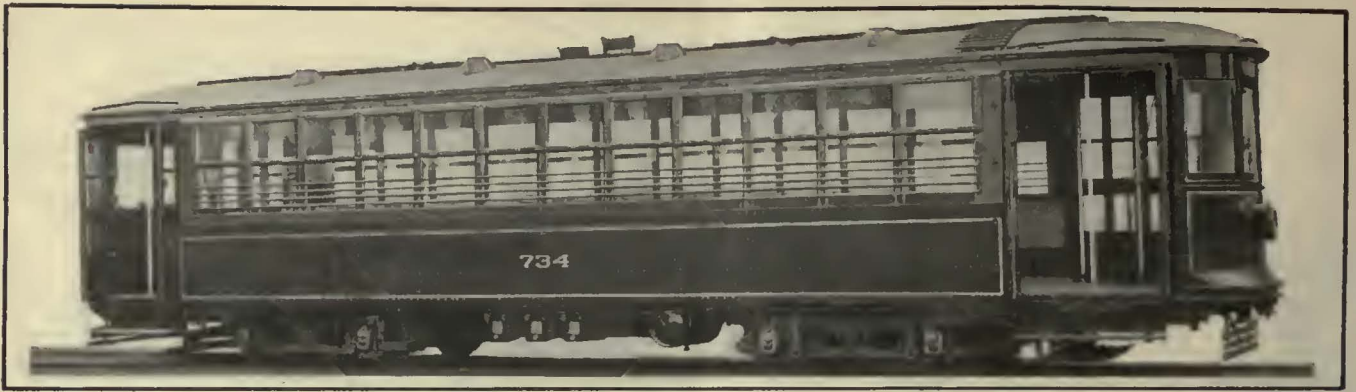
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## Modern—to the Nth Degree

*Wilkes Barre's new cars reflect industry's progressive tendencies*

During the year 1926 there was a marked increase in the number of revenue passengers carried by electric railways. This fact is particularly remarkable considering the greater number of private automobiles used.

That there is a trend toward electric railway transportation is undeniable. The present policy to place more attractive and more comfortable equipment in service is bound to win public patronage, and it is. New cars, modern to the Nth degree, such as the ten recently placed in service in Wilkes Barre, Pa., reflect the present tendencies of the electric railway industry.



*Accessibility is an important feature of vestibule equipment cabinet.*

*Rubber tile floor covering and center dome direct lighting system also used.*



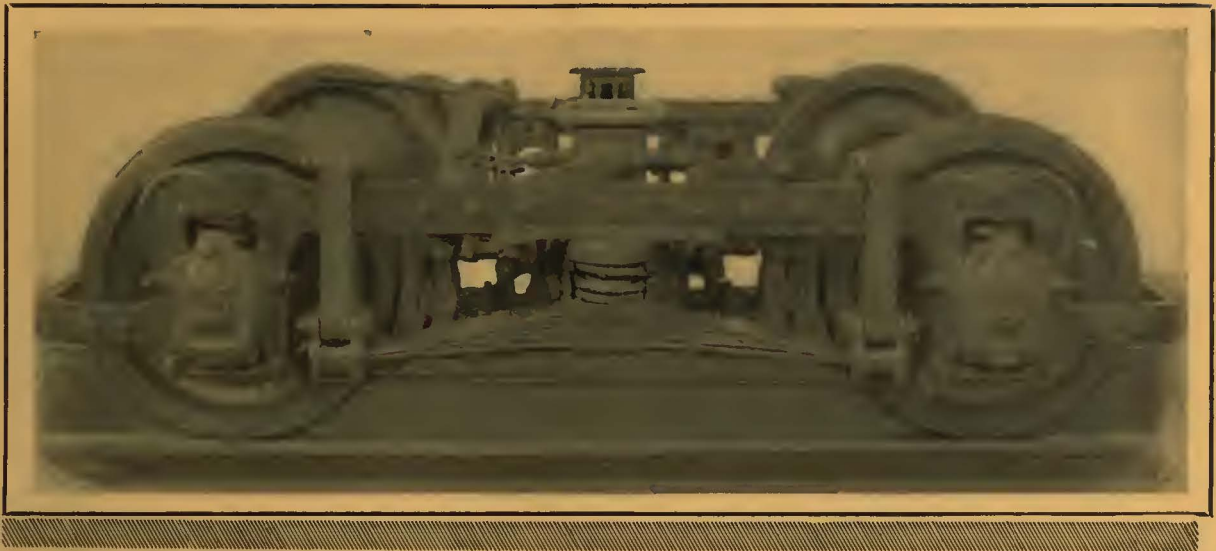
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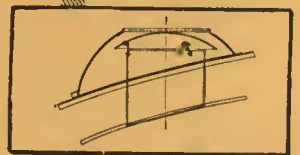
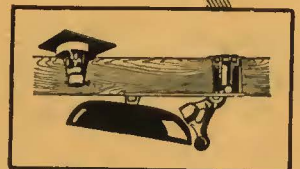
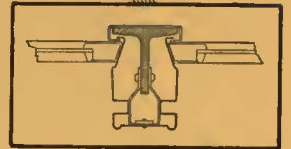


## Brill Specialties feature Wilkes Barre's New Cars

In equipping their ten new modern type cars recently placed in service the officials of the Wilkes Barre Railway Company were particular to see that they measured up in every respect to the highest standard. Consequently, Brill 177-E Trucks, equipped with Twin Links, and Brill No. 201-B deep-spring leather upholstered seats were selected to assure maximum riding comfort.

Brill "Renitent" spring brass post casings, Dedenda Alarm Gongs and Exhaust Ventilators were also specified to contribute their part to this truly modern type car.

Brill  
No. 177-E Trucks  
Renitent Posts  
Dedenda Gongs  
Exhaust Ventilators  
No. 201-B Seats



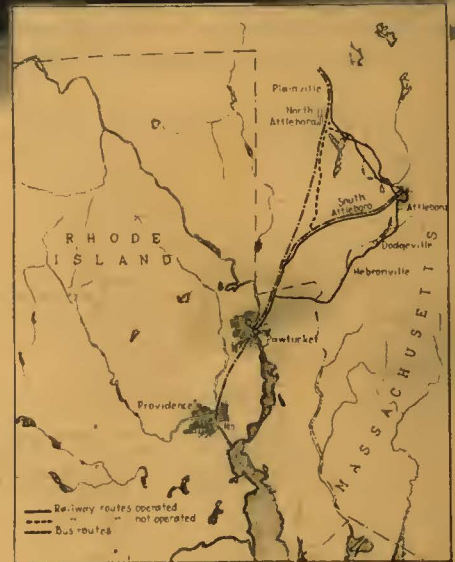
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The reduced expenses, and often increased revenue, mean such a large annual return on the investment that modern cars soon pay for themselves—and then they go on earning more than the obsolete cars they replaced.



## New light-weight cars help retain railway service for “the Attleboros”

The history of the Interstate Street Railway covering recent months is another story of the power of modernization to make railway operation pay.

This road operated at a loss, passed into receivership and was sold at auction. Then it purchased lighter, attractive cars, G-E equipped; began one-man operation; increased schedule speeds; reduced sub-station costs by the adoption of automatic control; and promoted public good will.

Savings made during three months' operation total more than \$13,000—an annual return of 65% on the new-car investment.



General Electric equipment has been chosen for many of the recent outstanding, forward-looking car developments. It has helped to make many of the operating records which have established so conclusively the value of the modern light-weight car.

	Operating costs per car-mile for 3-month period during 1925		Reductions in operating costs per car-mile for accounts affected by the new cars	
	Old Cars	New Cars	Cents	Per cent
Way & Structures	4.10¢	2.38¢	—	—
Equipment	8.11	3.14	4.97¢	61%
Power	8.80	5.43	3.37	38
Conduct. Trans.	13.06	9.02	4.04	31
General & Misc.	3.52	5.93	—	—
<b>Total</b>	<b>37.59¢</b>	<b>25.90¢</b>	<b>12.38¢</b>	<b>33%</b>

# GENERAL ELECTRIC