

ELECTRIC RAILWAY JOURNAL



In de luxe service

BETWEEN Steubenville, Ohio, and Beaver, Pa., runs the Ceramic Flyer, a car de luxe in upholstery, painting, and in the schedule it maintains. To protect the reliability of operation of this car, on which passengers have come to rely, National Pyramid Brushes, Grade 402, are used exclusively in driving motor and compressor motor.

In displaying such confidence in these brushes, the Steubenville, East Liverpool & Beaver

Valley Traction Co. pays a deserved tribute to quality and service. This company carries about twelve million passengers a year

National Pyramid Brushes

Manufactured and guaranteed by

NATIONAL CARBON CO., INC.

Carbon Sales Division

Cleveland, Ohio San Francisco, Cal.

Canadian National Carbon Co., Limited
Toronto, Ontario

Emergency Service Plants

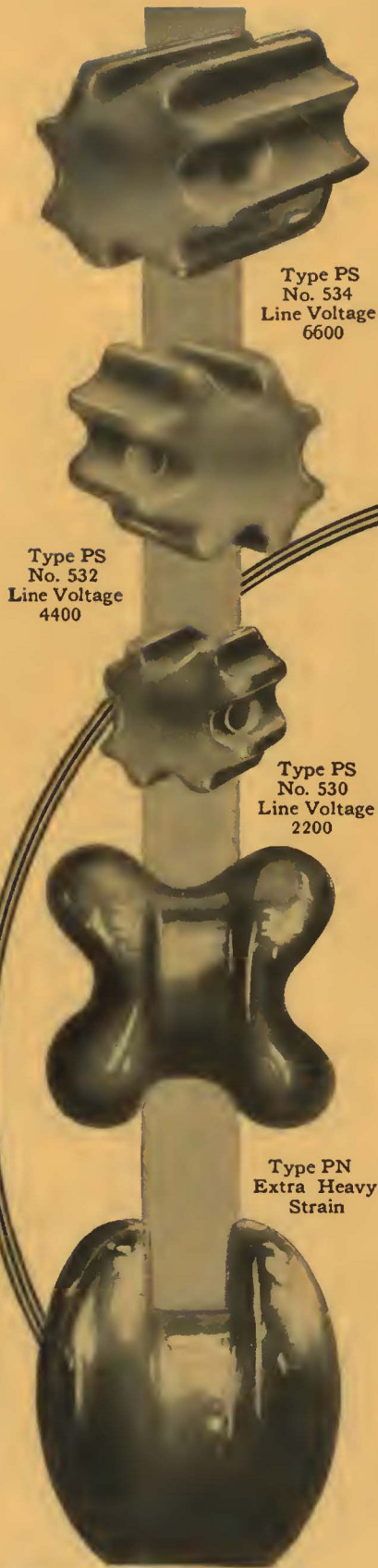
in city and interurban runs, and operates 56 cars. Its reliance on National Pyramid Brushes is of significance to traction companies large and small.

NCC grade 402 is one of the most popular of our brushes. We also make a number of other grades and types to suit special conditions. Our Sales Engineers will be glad to study these thoroughly before making brush recommendations that will give increased reliability of service.

Porcelain

You Can Install

—and Forget



Type PS
No. 534
Line Voltage
6600

Type PS
No. 532
Line Voltage
4400

Type PS
No. 530
Line Voltage
2200

Type PN
Extra Heavy
Strain

Strain Insulators

THESE strain insulators are good examples of how Westinghouse steps over the bounds of custom to improve its porcelain insulators.

The type PS design was made to eliminate all sharp corners that might chip off, to give a more natural position for the cable reducing internal strains in the porcelain, and to increase the leakage distance between the cables.

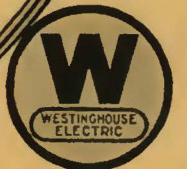
Type PN insulators were designed for extra-high mechanical strength. The largest of this type will test close to 100,000 pounds. The open-end feature is an advantage where it may be desirable to remove a broken insulator without unlashng the connecting cable.

The same high grade porcelain that insulates high tension transmission lines makes these strain insulators safe to forget.

Westinghouse Electric & Manufacturing Company
Westinghouse High-Voltage Insulator Works
Derry, Pa. Emeryville, Cal.
Sales Offices in All Principal Cities of the
United States and Foreign Countries



1926



Westinghouse

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No. 10

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From the Pacific

COMMENT from afar is often of more value than that of near-by critics. For instance, a recent visitor to the JOURNAL office, who comes from one of the British possessions in mid-Pacific, said that this paper is the most valuable periodical he receives.

"Through its aid," he continued, "I have been able to analyze the various situations as they have arisen in the United States and prepare in advance to meet them. It was that way with the jitney, with the one-man car and with the merchandising of transportation. I have been able to get such a clear picture of transportation in your cities that when I visited them this month there was little more I could learn. The information had reached me long before through the columns of the JOURNAL."

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SAVING THE RAIL SAVES THE RAILWAY

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You can speed your cars safely only on good track.

You can speed noiselessly only on good track.

You can speed comfortably only on good track.

You can speed economically only on good track.

Smooth, silent, speedy track is easy to own and cheapest to own.

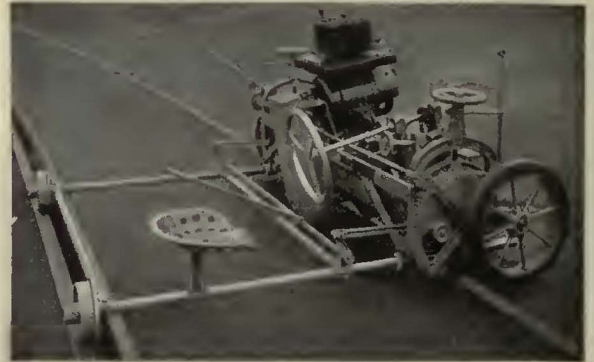
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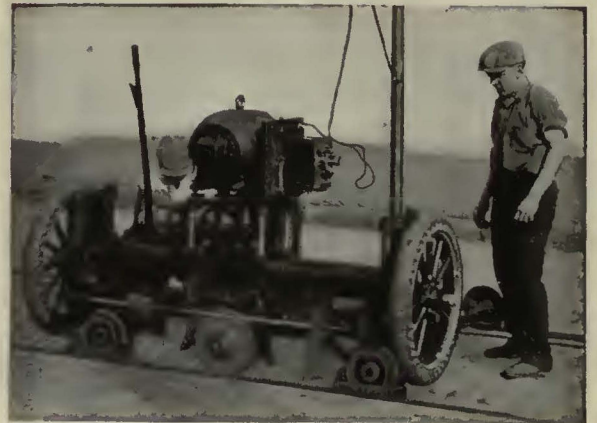
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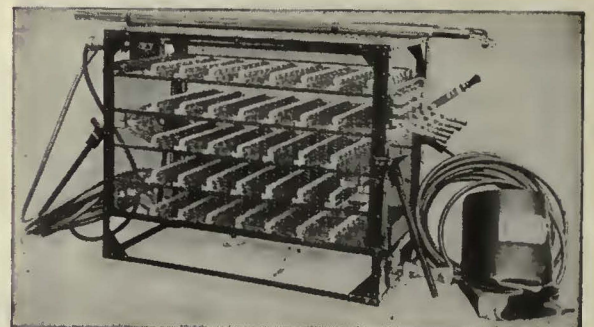
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

1266

SAVING THE RAIL SAVES THE RAILWAY

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STRAINS OF
COUPLING
TRAINS



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M. C. B. Coupler

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Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

188C



The new O-B General Catalog No. 20, contains the complete story on modern coupler equipment. It includes information of value to every interurban operating official. Have you a copy?

Ohio Brass Co.



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INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING
MATERIALS
VALVES



Low Level Floors and Smaller Wheels

REDUCING the height of the steps is another item that helps to please the public. The tendency is in that direction! For lower floors, car designers are faced with the necessity of using wheels of smaller diameter. And here the problem of wheel wear becomes acute. Revolving at higher speeds, these smaller wheels are subjected to more rapid wear. The effects of rapid acceleration and braking are more severe.

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Only one such wheel exists—the Davis "One-Wear" Steel Wheel.

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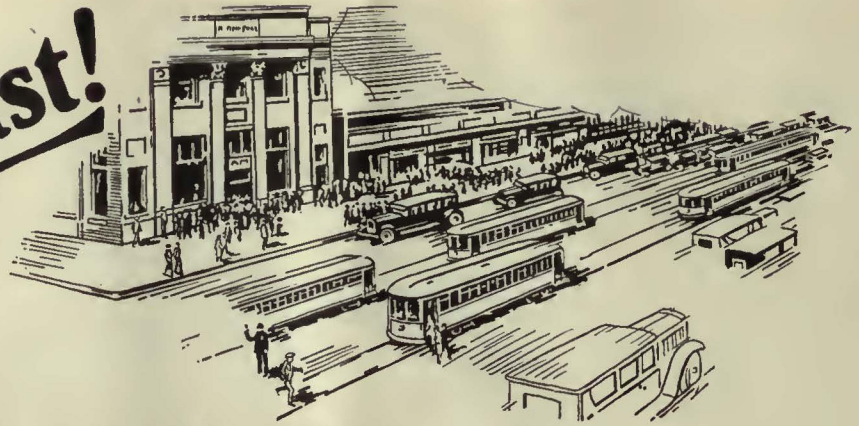
Construction and cost data and information or quotations on your requirements will be gladly furnished.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

Built to Last!



TO USE *International* Creosoted Ties is to have ties that will last as long as the rail itself. This unusual long life is due to the careful selection and seasoning of the timber, and to the thorough treatment of that timber with high grade creosote oil.

High grade creosoted ties are giving twenty year service on railroad traffic. They will therefore easily withstand the much less severe wear of electric railway service.

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Use *International* Ties—they are made to last—and are cheapest because they last longest.]

Let us quote you on your requirements.

International Creosoting & Construction Co.
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CREOSOTED TIES**

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the New*

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High Voltage Porcelain

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No. 208

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Designed especially for bus service this seat has divided back, spring cushions and air cushion pads upholstered in leather or imitation leather as specified.



No. 199-F

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Made to meet the demand for an inexpensive but comfortable seat for suburban and light weight interurban cars, this type has plush upholstered spring edge cushion and detachable back.

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Hale and Kilburn SEATS

*A million
people a
year ride
in
**YELLOW
COACHES**
in Providence R.I.*



What **YELLOW COACHES** are doing on four routes for the United Electric Railways Co.



linking motor coach operation with street car service to extend transportation facilities to communities not reached by car lines, to furnish auxiliary service to street car routes and to save money by cutting down losses on unprofitable lines of operation by substituting motor coaches for cars. Their buying trend shows also that they are standardizing on Yellow Coaches to bring about maximum economies of motor coach operation.

THE United Electric Railways Company, at Providence, R. I., know the value of motor coach operation as a solution to transportation and cost problems. That they know the meaning of Yellow Coach performance is proven by the fact that their last three orders for motor coach equipment have been for Yellow Coaches.

United Electric Railways Company are adopting the logical practice of



ROUTE 1

Chepachet, Pascoag and Wallum Lake Line

On this 24-mile route, a real problem is being solved by Yellow Coaches.

Losses incurred by the traction line were heavy, the street cars running to Chepachet. Three miles beyond lay Pascoag, a community which the traction company desired to serve. How to save money and still extend service was answered by discontinuing the street cars and operating motor coaches—thus Yellow Coaches did two things—cut down expenses and won new passengers from a growing community.

Following the solution to this problem, Yellow Coaches soon extended three miles further to Wallum Lake, where the state Sanatorium is located. The extended route is now being served by Yellow Coaches and enables the company to turn in a profit that was formerly lost.

ROUTE 2

Arctic Bus Line

Here was the problem of a busy center located in Arctic, thickly populated but with a motor highway shorter than the trolley line. This condition invited possible street car patrons to use private automobiles in preference to the street cars.

To win back this patronage, Yellow Coaches were placed in operation on an 11½ mile limited stop route, making the run in 40 minutes, and the trolley line was placed on a reduced operating schedule.

Yellow Coaches operate over this route on a 12 minute headway. Two extremely bad hills test performance, but Yellow Coaches take the grades easily, at all times.

Thus another specific problem was successfully solved through Yellow Coach operation and revenue which formerly had slipped away is now being regained.

ROUTE 3

North Scituate Bus Line

There was no mistake here about the problem, nor its need for solution. The issue faced was clear cut and demanded action. Traction service was costing too much, and again Yellow Coach economy was enlisted.

On January 11, 1925, the trolley service was discontinued and Yellow Coaches began saving money, effecting an immediate and profitable reduction in expenses.

This 10.10 mile route is looked upon as a difficult run. Steep hills must be climbed and a hard schedule maintained. As usual Yellow Coaches are coming through and going over the top. The economy of their operation as against trolley service is reflected on the profit side of the company's books.

ROUTE 4

Pawtucket and Woonsocket

Pawtucket and Woonsocket, two busy cities, with many interlocking interests, were dependent on connection by trolley until Yellow Coaches, for the first time, gave them service by motor coach over the connecting 12.20 mile highway.

Until this move was made, the service rendered by the street cars had been operated at a loss, and to save money the traction company pulled off the trolley line on February 7, 1926. The difference in cost between street car and motor coach operation represents a clear gain and enables the company to earn a profit on its Pawtucket-Woonsocket route.

Thus, Yellow Coaches are solving an inter-city problem on this route, winning public favor and reducing expenses.

Also

The United Electric Railways Company keep two Yellow Parlor Coaches in service to build up their charter business and for Sunday trips to Plymouth—a tour of 130 miles.

Last year, twenty-two successful trips were conducted, Yellow Coaches standing the gaff and operating with comfort to passengers and at a profit to the company.

The United Electric Railway Company operate other makes of motor coaches, thus establishing a good basis on which to test and compare Yellow Coach performance. That they are now standardizing on Yellow Coach equipment is the best evidence that Yellow Coaches win by the successful low-cost service they render on the highway.

Two great institutions, Yellow Coach and General Motors, welded together for better service stand ready to serve you with—

1. Transportation experience.
2. Equipment designed and built to render low-cost, profitable miles.
3. Research that covers every phase of operation.
4. Manufacturing facilities that save you money.
5. Financial stability that protects you from "orphan equipment."

Let **YELLOW COACH** *plus*
General Motors solve
your transportation problem.

YELLOW TRUCK & COACH MANUFACTURING CO.
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22 successful trips conducted last year.

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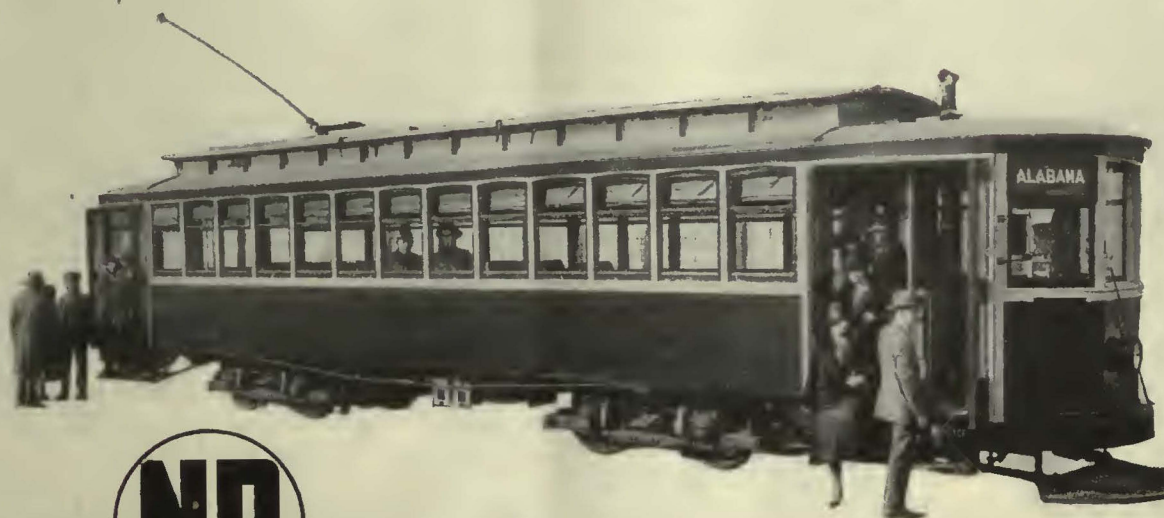
You are advised to obtain tickets early. All seats reserved. Buses leave from 104 Fountain street, Providence

Information and reservations, phone Union 7940.

United Electric Railways Co.

The
Simple
Efficient
and Automatic

OPERATION OF CAR DOORS



— is essential where peak-load congestion calls for rapid interchange of passengers and for lessening both physical and mental labor on the part of your car operators. Operation of this kind is obtained by the Indianapolis Street Railways.

National Pneumatic Systems apply to every possible condition of service.

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Georgia Railway & Power Company

has recently put into service ten new modern type cars on their Marietta and Stone Mountain interurban lines to furnish high class transportation for outlying districts of Atlanta.

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Uniform Braking
with
Varying Load

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—
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**The result
of 6 years
development**

See it at the Cleveland Show.

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Bodies ~

applied for in foreign countries



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Reo

Safeway Six Wheel


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LANSING, MICHIGAN



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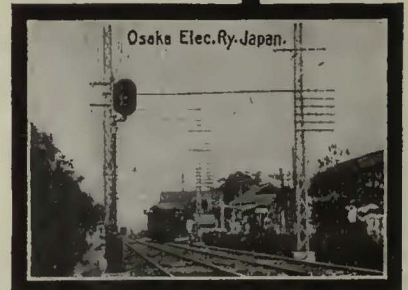
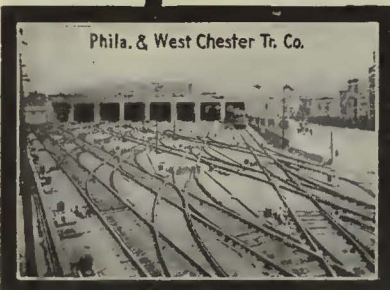
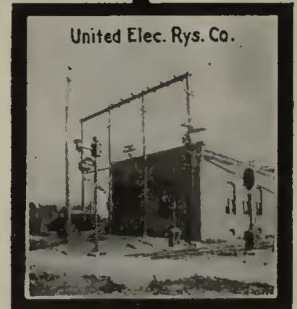
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Signals and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?

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- 4.—Remotely controlled switches at outlying sidings.



A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.

Electric Railways which are large users of Union automatic signal and interlocking systems are:

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Mack

Bus

Not just another six
— a Mack **G**™

Mack Trucks Inc.

International Motor Company
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*For Evansville
Nashville
Chattanooga*

Catching the spirit of standardization

By experience we progress. By the experience gained in Grand Rapids, Hodenpyl, Hardy & Company is fast extending the use of modern cars on its other properties.

Thirty-three more ultra-modern cars, *every one G-E equipped*, are now being operated:

- in Evansville by the Southern Indiana Gas & Electric Company
- in Nashville by the Nashville Railway & Light Company
- in Chattanooga by the Tennessee Electric Power Company



Recognizing that the modernization of car equipment is one of the most profitable and stabilizing opportunities open to the industry today, General Electric is giving a large measure of attention to this subject. Its engineers will co-operate in the production of modern motive power that will insure the maximum success of your modern cars.

This is an important forward step in the much-needed standardization of electric rolling stock. It is an instance of how the adoption of G-E Modern Car Equipment goes hand in hand with the growing desire to obtain the advantages of modern cars.

The average citizen, noting attractive, up-to-date cars on his electric railway, visualizes a transportation service that is comfortable, speedy, and satisfactory—and progressive. Such is the personal reaction that makes patrons and friends.

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 68

New York, Saturday, September 4, 1926

Number 10

Invite Your Public Officials to Attend the Cleveland Convention

OVER the signature of President Frank R. Coates, letters of invitation to attend the Cleveland convention are being sent out by the American Electric Railway Association to the Mayors of all cities in the country having a population of 25,000 or over. The letter calls attention to the fact that there is no diminution in the need for public transportation service, notwithstanding the increased use of the private automobile. It describes the character of exhibits that will be displayed and explains that there will be examples of typical forms of modern transportation equipment used in public service from all parts of the country, which will be of greatest possible educational value to city officials interested in the safeguarding of their public transportation service. The letter also makes specific reference to the program of meetings. Among the various subjects attention is called particularly to that of traffic congestion and the efforts which electric railways are making in various parts of the country to solve it. The invitation is extended not only to the Mayor but to any representative from the city's council or governing body.

Electric railway men throughout the country should supplement this letter by personal invitation. Get your Mayor, members of your city council or regulatory body to attend the convention as your guests. Urge your local improvement club, representative business men and other civic leaders to attend. Make it a personally conducted trip. Take them through the exhibits and to the meetings in which they will be interested. There will be an unusual exhibit of the latest developments in street cars and buses. They will quickly realize that street cars are a long way from the scrap heap. Show them the kind of equipment your town ought to have and then explain how it can easily be obtained by providing adequate fares and modern franchises. Here is a complete transportation education in itself. Make every effort to see that *your* public officials get it.

Sell More Rides by Making Them Easier to Buy

ONE of the fundamentals of successful selling is that of making the product easy to buy. This applies in the selling of rides in these days of much competition in transportation and of high standards as to speed and comfort just as it does in the case of merchandise. More and more are the principles of merchandising becoming necessary in transportation management. In the discharge of this selling function publicity is indispensable.

The sign on a car, like the label on a can, constitutes publicity of the basic variety. But it isn't enough simply to mark cars with the usual destination signs if more can be done to direct the traveling public in its fullest use of them; that is, to make a car ride more

easily purchased. Signs on the street also can be utilized to advantage at good strategic locations. There are heavy loading points where only regular patrons can be expected to be familiar with car movements. There are important centers where the various cars leave from sufficiently different points to cause confusion. There are main streets where information as to the destination and the time of cars passing would be a boon to many. In other words, the usual "Car Stop" and "Transfer Point" signs may well be expanded so as to be of real service, not only to solicit the stranger's patronage but to serve shoppers and other infrequent local riders as well.

The need for having schedule information more widely posted is manifest by questions frequently heard: "Do I get a Bellevue car here?" or "When will there be a car to the south side?" It is seen in the little disappointments occasioned by changes in the routing of cars, which were announced to the public, but forgotten. It is felt by taxi customers who would prefer the trolley, if the way were pointed out. And every such sign on a board or a pole, helping to sell more rides, by making them easy to buy, carries with it the thought that the railway company has the interest of its patrons at heart; that it is anxious to render the largest possible measure of service.

In Chicago and Detroit Special Assessment Is Recommended

RECOMMENDATIONS just made by the Subway Advisory Commission in Chicago and the Rapid Transit Commission in Detroit both provide for the financing of a relatively large part of rapid transit construction by special assessment against benefited property. In St. Louis, also, those in charge of rapid transit investigations for the city favor this method of financing.

The Chicago recommendations are particularly significant in that those who make the report propose to assess themselves. The Advisory Commission is made up of large property owners and merchants in the Loop district, whose property would be directly affected by the recommendations. It is indeed a long step forward in providing adequate transportation on a self-supporting basis when property owners recognize the equity of financing construction out of the increased property value which comes from the improvement.

It is high time that the owners of centrally located business property recognize not only the equity but the business wisdom of subscribing to this method of financing transit construction. Although such construction is usually considered expensive, when analyzed in comparison with street widening projects in terms of the number of people served for transportation it becomes relatively low in cost.

Provision of rapid transit in central business dis-

tricts, where congestion makes grade separation most imperative, is usually not favored by outlying districts. The common contention is that such facilities benefit the central district at the expense of outlying sections. When construction is financed by general corporate securities this contention is in a sense justified. But when the benefited property is made to carry a large part of the cost this position on the part of outlying property becomes no longer tenable.

Thus do the downtown property owners on the Chicago Commission demonstrate wisdom in their recommendations. Obviously, expensive subways should be constructed only in that area in which traffic density justifies the expense. But when general corporate funds are used there is always an intense pressure to build many miles of subways where they are economically not justified.

A rapid transit system built by special assessment is soon paid for by the benefited property and becomes a heritage to posterity. When financed from general corporate funds an enormous floating debt is passed on to future generations, and needed future additions to facilities are consequently curtailed. This has happened in New York. Although many times the subway cost is represented in the increased property values created, failure to utilize part of this created value for the subways themselves has brought about a most serious situation. If transportation construction creates property value over and above its cost, why should not a portion of the increase be diverted to provide transportation facilities? The electric railway industry may well afford to give increased attention to this important question.

Much Sound Thinking Contained in Chicago Report

COMING as it does from a group of Chicago merchants and owners of real estate in the busy Loop district, the Subway Advisory Commission's report published in this issue contains much sound thinking that may well be quoted by electric railway men throughout the country. Among other things, it carries a remarkable testimonial to the street car. One paragraph alone expresses the views of these men with such force that it bears repetition:

"The trolley or surface car is and probably always will be, so far as economics alone are concerned, the logical type of transportation. However much a district may increase in population, that population can be most cheaply transported by trolley cars. Motor buses are eliminated by economic considerations, as population increases. Trolley cars are never eliminated by economic considerations—that is, by consideration of the rate of fare."

To electric railway men this is most significant. Here, for once, is a group of representative citizens who seem to have succeeded in getting to the bottom of transportation economics. Not only in its clear-cut analysis of the advantages and limitations of street cars but also in its treatment of the other factors in local transportation, such as elevated lines and subways, this committee refuses to be swayed by popular fetish for one agency or another. It insists on approaching the use of each available form of transit on a basis of providing maximum service and convenience at minimum cost. To accomplish this it strongly advocates the policy of consolidation and co-ordination.

It augurs well for Chicago's future that some of its active leading business men are approaching its transportation problem on a basis so broad and sound. The committee studied the situation in Boston, New York and Philadelphia. It reviewed the many reports and plans that have been proposed for Chicago. Out of all this it prepared a set of underlying principles which would form a sound basis for transportation development in any city. Since these are the expressions of laymen—real estate owners and merchants—who have actually taken the trouble to study the situation broadly, their recommendations offer transportation men elsewhere a means of enlisting similar constructive interest in their own cities.

Promiscuous Competition Destructive to Both Car and Bus

IN THE development days of any industry there grow up inconsequential operations, uneconomically constructed or planned. The electric railway industry is not an exception. Even before the days of private automobiles or motor coaches, there were in existence many lines barely able to live. It is a surprising thing that many of these electric railways have survived so long. It is likewise a surprising thing that many of the bus operations started in the last two or three years have been able to continue existence in territory which indicates more enthusiasm than judgment on the part of their promoters. Progressive transportation men today do not divide themselves as electric car advocates or as bus advocates. They recognize in each type of vehicle certain advantages and limitations. The success with which each is utilized to render transportation service in any given community depends on the extent to which underlying economic factors are considered.

A recent news report in Dallas, Tex., carried a brief account of the sale of \$80,000 worth of buses for \$5,000 after two unsuccessful years of operation between Dallas and Fort Worth. Setting aside for the moment the question of whether a bus line between these two cities was justified in the face of the excellent service provided by the "Crimson Limiteds" of the Northern Texas Traction Company, the fact remains that neither the Northern Texas Traction Company nor the Dallas-Fort Worth Safety Coach Company could give an economically sound service in the face of the unregulated and promiscuous transportation that grew up between these two cities by the operation of innumerable touring cars and pleasure vehicles at a 50-cent fare.

The motor bus has performed a service in many parts of the United States too valuable to suffer such calamities as this. Likewise, electric railways, rendering as they do a transportation service vital to the development of modern communities, should be protected from unwarranted assault by individuals with no conception of the responsibilities of public service. Texas has no regulation to protect its local transportation lines. Under this condition there is a constant temptation for promiscuous transportation competition to spring up in the hope of reaping a quick profit at the expense of established carriers. The public must be made to realize that such competition either raises the cost of transportation or retards the improvement of the service that would be possible were only a single agent in the field. In this objective both car and bus have a common interest.

Because Habit Is Stronger than Common Sense

WHEN the first auto owner conceived the idea of "rolling his own" to business the highways were fairly clear of fast-moving vehicles and parking space in front of his office or near by was ample. The pioneer autoist experienced a glorious exhilaration, vowing that never again would he willingly ride a public vehicle.

As fellow autoists grew more and more common the glory began to dim. No speedy uninterrupted runs 'twixt home and office were possible. Even uptown crossings were guarded by traffic policemen, while downtown his speed was almost that of walking. Unless Mr. Autoist arrived half an hour ahead of his office opening, the attempt to find a parking place within reasonable distance was a hopeless undertaking.

Despite these disappointments, Mr. Autoist could still flatter himself that he was not compelled to ride with his fellow men. 'Twas true that the time-saving was less, that his nerves were badly frayed before the day's work was started and that he hadn't even read the stock quotations and baseball scores—but still, wasn't he the master of his movements?

Eventually the inexorable energy and liberal credits of the automobile manufacturers made the gas buggy as unaristocratic as the trolley car itself. This, in turn, produced a congestion that led to restricted parking in the business district.

So here we reach the *reductio ad absurdum* of automobile driving to business in large cities: Spend more money and time when the walk to and from the daily parking ground is considered, or, more delicious still, change at the parking ground to a public transportation vehicle to complete the trip. Several electric railways have themselves gone into the parking business and others no doubt will follow. Then we will have the spectacle of the railway collecting a parking fee equivalent to several fares plus, possibly, a full fare each way for the short haul involved.

Great is the force of habit which makes so many citizens insist so strenuously on their daily gallon of gasoline, but more and more of them are waking up to the foolishness of this practice.

Memphis Goes In for Modernization

MEMPHIS has long had reason to be proud of its street railway. It now has more reason than ever before to be so, for twelve of the 32 new rail coaches recently ordered for service there have been placed in operation. The expenditure involved is \$475,000. This is no inconsiderable sum, and Memphis is fully appreciative of it, if reflections of praise contained in the daily press mean anything. Some of this comment is reproduced elsewhere in this issue.

In its magnitude the installation at Memphis exceeds that at Grand Rapids. The cities are fairly comparable as to size, but that as a criterion means very little in this instance. It is always difficult to measure one city or its needs in terms of another. Still, if experience in Grand Rapids means anything, then Memphis may look forward to increased patronage on the new cars.

As stated previously, the Memphis papers have not been slow in the past to accord their street railway favorable treatment. Even now an editorial written by

the editor of the *Memphis Commercial Appeal* on the essentiality of the electric railway is going the rounds of the country. It is one of the most forceful things of the kind ever written because it reduces the place of the street car to the understanding of the man in the street. Similarly the news article elsewhere in this issue on the new Memphis cars has behind it the three-fold idea of showing the type of cars being used, the nature of the comment received and the way in which the announcement was made. In this there may be ideas for other companies.

All this, however, relates to Memphis and Memphis alone. So far as the electric railway field is concerned the installation is of very great interest. It shows that appreciation is growing of the value of modernization and that the willingness is there to spend liberally to attain the desired end. Compared with recent installations of modern cars in Brooklyn, Pittsburgh, Chicago and other big cities, the Memphis installation does not bulk large, but Memphis itself is not large. The important point is that in the cities of moderate size, the ones that in the past have been hardest hit, the gospel of modernization is spreading.

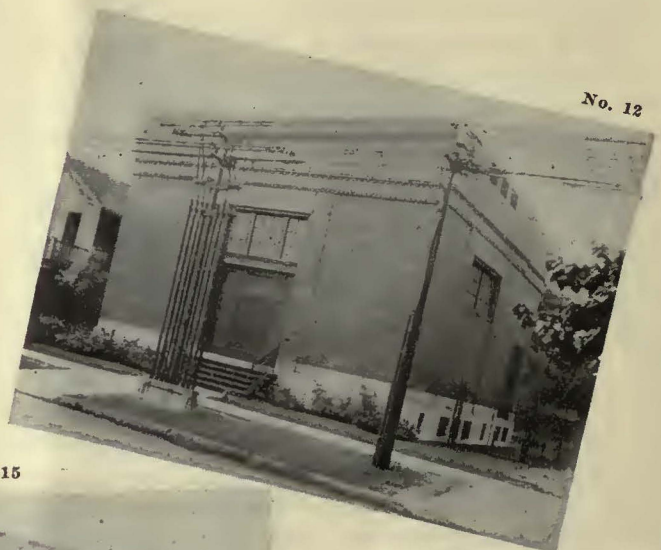
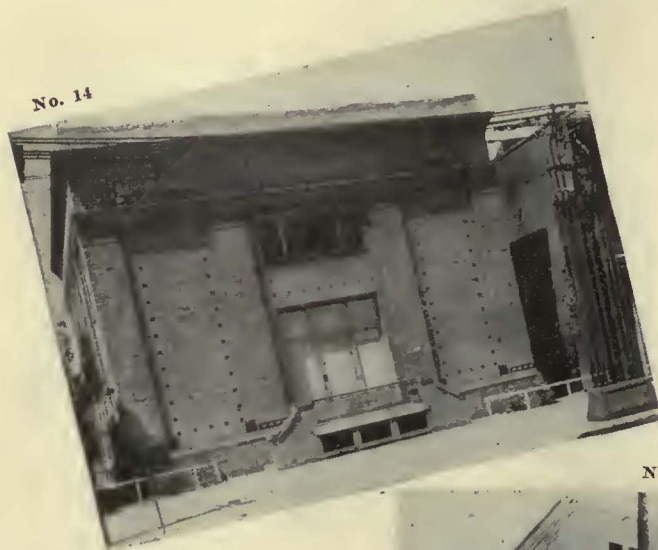
Why Florida Realtors Make Gift of Railway Extension

NOT so long ago these columns recorded the curious fact that a Florida land development out of Miami deliberately chose to build an interurban electric railway instead of using buses over smooth and snowless highways. Now comes an even stronger example of the same choice in connection with suburban development at St. Petersburg. The realtors have not only built a railway, but have made a gift of their \$90,000 expenditure to the St. Petersburg Municipal Railway!

The Shore Acres organization, headed by a past-president (N. J. Upham) of the National Association of Real Estate Boards, evidently had good reasons for its broad-minded action. Developers of subdivisions know that about the first question the prospect asks is, "What kind of railway service have you got here?" Realtors who do business in a big way understand the prospect's point of view. They also understand that the day of railway-paid extensions into new territory has gone by. If \$90,000 put into 3 miles of track construction can add hundreds of thousands of dollars value to their subdivision, such an investment is mighty good business if the extension does not have to be separately operated.

What is more logical, then, than the presentation of the extension to the existing city-wide railway system? The residents of the new area are not compelled to pay the higher fares that a separate bus route would entail and they enjoy the further advantage of free transfer to the remainder of a system whose reliability is beyond doubt. On the other hand, the railway is much more willing to take over such an extension than if it had to find new capital for track and line in addition to new cars.

Not the least interesting fact about St. Petersburg is that the municipality took over the railway on July 1, 1919, from the then owners who were on the point of junking the lines. One-man operation with light-weight cars soon followed the purchase. Careful management plus the continued healthy growth of St. Petersburg produced the confidence in the local railway so strikingly manifested by Mr. Upham and his associates.



**Latest
Cleveland Automatic
Substations**

SUBSTATIONS Nos. 12, 14 and 15, located in the central district of Cleveland, replace the Viaduct power generating station. These stations are the last three of the ten automatic substations constructed. Considerable attention has been paid to the architecture, color and the texture of the brick, in order to make it harmonize with the surrounding neighborhood. Substation No. 15 will later be incorporated with the power service department building when this is constructed.

**With
Similar Dimensions,
Varying
Architectural Treatment
Has Been Given**

THESE three automatic substations, Nos. 11, 13 and 16, serve areas adjacent to the downtown congested district. While they carry a proportionate share of the normal load, they have been placed as a second line of defense in case the downtown substations should fail.



Cleveland Railway Extends the Use of Automatic Substations

All Power Is Now Purchased and Converted Through a System of Manual and Automatic Substations—Ten of the Fifteen Substations Are Automatic, but All Are Supervised by a Control System Centralized in the Dispatcher's Office—Standard 1,500-Kw. Units Used in All Substations

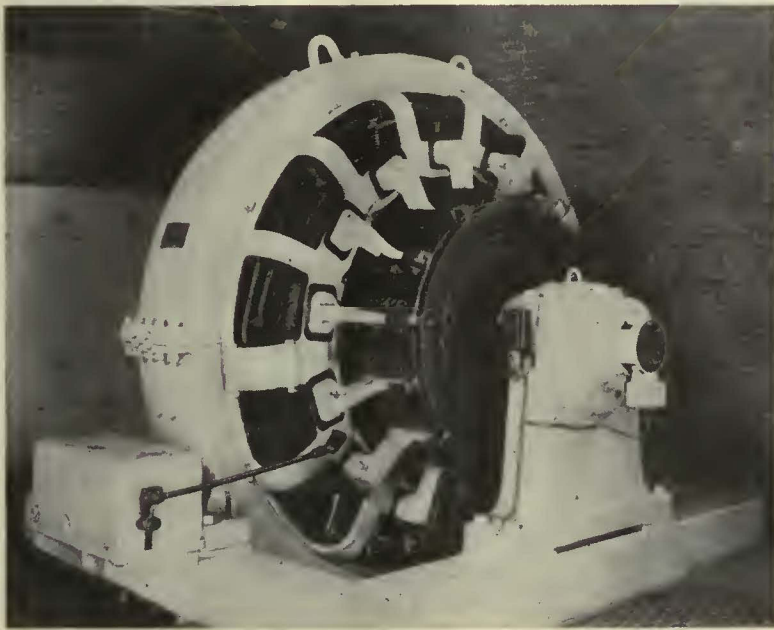
By L. D. Bale

Superintendent of Power the Cleveland Railway

WITH the assumption of its load by three automatic substations completed on Nov. 6, 1925, the remaining power generating plant owned and operated by the Cleveland Railway was discontinued from service on that date. It has since been dismantled and scrapped. This placed the railway system on an all-substation basis, operating from alternating-current purchased power.

This plant, designated as the Viaduct power plant, was located immediately adjacent to the downtown, congested area of Cleveland. Its abandonment marks the passing of an extremely interesting period of development and progress in the production of energy for electric railway transportation. In addition, it brings into prominence the automatic substation as a major source of power even for congested areas of metropolitan systems, thus making available the most modern means of economical conversion and distribution of railway energy. In this particular instance rearrangement of the power system by the addition of the new stations described in this article has made possible the retirement of approximately 200 tons of d.c. distribution copper with the accompanying elimination of energy loss and a saving of annual charges.

The retired power plant, erected in 1892 for the Woodland Avenue & West Side Railway, was the subject of favorable comment throughout the engineering fraternity at various times during its existence. The total capacity of the plant was originally 1,500 kw., made up of three triple-expansion marine engines, each direct connected to two 250-kw., 500-volt, direct-current Westinghouse generators. Steam was supplied by Scotch marine type boilers. The switchboard consisted



The Standard 1,500-Kw. Rotary Converter Installed in One of the New Automatic Substations of the Cleveland Railway

This is a six-phase, 60-cycle, 514-r.p.m. machine and is typical of the total of 37 such units installed on the system. The converters in all of the newest stations have only a slight modification, chiefly in the substitution of high-reluctance interpole fields for the straight series type.

power plant, Nos. 12, 14 and 15, are located in the area formerly served by that plant. These three stations were a part of the construction program which included seven automatic substations, involving a total capacity of 15,000 kw. Three of the four remaining new installations, Nos. 11, 13 and 16, are situated in areas adjacent to the territories served by the downtown stations. The latter three stations have practically a capacity load derived from the areas in which they are located. They are also intended to act as a safeguard to continuity of power supply in the event of failures occurring in adjacent stations and affecting the surrounding territories, particularly the downtown areas. The seventh station of the group, No. 10, is located beyond the distributing zone of an existing manual substation where low voltage conditions were experienced.

Stations Nos. 12, 14 and 15 have each an installed capacity of 3,000 kw., made up of two 1,500-kw. converters, while stations Nos. 10, 11, 13 and 16 contain but one 1,500-kw. converter each, there being room, however, for an additional unit.

It will be noted by referring to the accompanying

of a 12-in. green enameled brick wall surmounted by an ornate golden oak cornice upon which were carved the names of the directors and officers of the company.

Ensuing developments in electric railway transportation caused the plant to be increased from time to time by installation of additional equipment, in many instances replacing older equipment. This continued until at the time of its retirement the capacity had reached a total of 8,100 kw. of Corliss horizontal reciprocating steam engine-driven direct-current units.

The substations replacing the Viaduct

map, which indicates the locations of all power facilities of the company, as well as the type and capacity of each, that the five manually operated substations have an aggregate capacity of 31,500 kw. and the ten automatic substations 24,000 kw. The original automatic substations, Nos. 6, 7 and 8, were described by the writer in three articles which appeared in *ELECTRIC RAILWAY JOURNAL* for March 3, 10 and 17, 1923. The remaining seven automatic substations are those included in the recent construction program.

There still remains the erection of an equalizer or switch house, near the Public Square, to complete this

the automatic substations, also supervises the non-automatic stations through telephone communication with their attendants. This arrangement enables him to supervise and co-ordinate the operation of all power facilities of the company, thus making possible a degree of flexibility to the entire system heretofore not practicable.

Operating experience on this property has very definitely proved that the presence of a remote control and supervisory system no longer constitutes a refinement. This is particularly true where continuity of power supply is emphasized to the extent that protec-

All Power Used by the Cleveland Railway Is Purchased and Distributed Over the System Through Fifteen Substations

Five of these substations are manually operated and ten are automatic. All substations are under supervision of the load dispatcher, whose office and equipment are located in the Hanna Building, adjacent to the superintendent of power. The switch house, No. 1, is yet to be constructed.

Manual No.	Substations Rated Kw.	Automatic No.	Substations Rated Kw.
2	6,000	1	3,000
3	6,000	6	3,000
4	4,500	7	3,000
5	3,000	8	3,000
9	12,000	10	1,500
		11	1,500
		12	3,000
		13	1,500
		14	3,000
		15	3,000
		16	1,500



program. The switch house will provide facilities for interconnection of all direct-current feeders terminating at the center of the system. This will tend to equalize loading and provide means for rerouting of load under emergency conditions, thus serving as an added insurance to continuity of service.

The conditions as established in former studies and surveys preceding the rearrangement or installation of power conversion units on the system again dictated the practicability of continuing the use of the one standard size and capacity of converter, shown in one of the illustrations. However, the converters in the new stations have slight modifications which include the substitution of high-reluctance interpoles for straight series interpoles. Since the completion of these stations 37 converters are in operation on the system, each rated at 1,500 kw. and 514 r.p.m. on 60 cycles.

The remote control and supervisory system, developed immediately following the installation of the three original automatic substations, has been extended and is a part of the equipment of the seven new stations. The system load dispatcher, who controls operation of

tion to service takes precedence over protection to equipment. The necessity of a remote control and supervisory system can further be emphasized, under the above operating conditions, as the total capacity represented by the relatively small capacity automatic stations approaches or exceeds that of the manually operated equipment on the system.

Cleaner Station Campaign Elicits Fine Co-operation

THE personnel of the Chicago Rapid Transit Company is in the midst of a campaign to improve the general appearance of station platforms, yards and other Elevated Lines' properties as a phase of its public relations activities. Monthly cash prizes have now been awarded for several consecutive months to the porters who have kept their stations the cleanest and the man on each division with the best record for the month is awarded an attractive honor banner. The banner is hung in the station, telling the public about the porter's good work in improving the appearance of the company's property.

Consolidated Transportation and Subways Recommended for Chicago

Subway Advisory Commission Proposes Extension of Rapid Transit Facilities by Special Assessment and Use of Traction Fund—Enabling Legislation Is Necessary for This Purpose and for Consolidation of Present Companies—Initial Program for a Subway Under State Street and One Under Washington, Michigan and Jackson Would Cost \$36,400,000

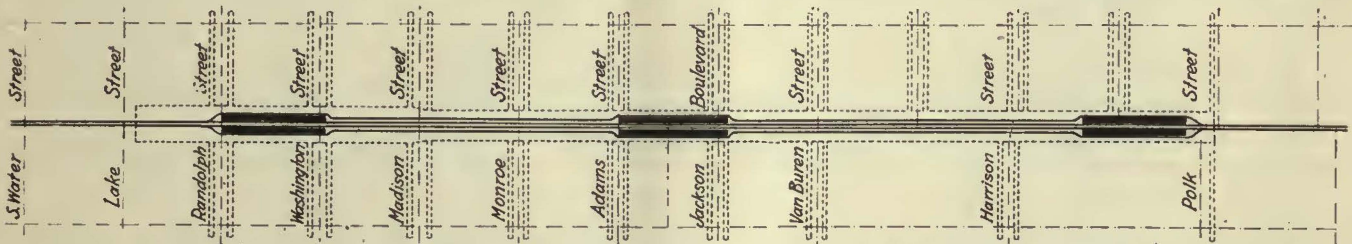
BASED on at least seven major transportation studies during the past twenty years, Chicago's latest rapid transit report recommends an initial step costing \$36,400,000, which would begin the co-ordination of all local transportation in the city.

The report is noteworthy in that, while written by a commission composed of downtown business men, it has recommended assessment of the benefited property as a means of raising funds for rapid transit construction. It further proposes that these property owners can assist by making voluntary contributions in case the assessments do not raise sufficient capital for the construction program. It is noteworthy that elevated construction is recommended in all cases as being more desirable than subways except in the central congested district.

The Subway Advisory Commission, which made the

transportation systems for Chicago. Likewise the previous engineering reports for subways in Chicago are reviewed briefly. Comparable charts show the earlier plans recommended in seven major reports since 1902.

Primarily this is a citizens' report, although guided by excellent engineering and legal talent. The Subway Advisory Commission was appointed on March 23, 1926, by Alderman Arthur F. Albert, chairman of the subcommittee on subways of the City Council's transportation committee. Its members are Russell Tyson, member of the firm of Aldis & Company; Gordon Strong of Gordon Strong & Company; Earl Shultz, manager of the Edison & Chicago Trust Building; Ernest J. Stevens, vice-president and manager of the Hotel La Salle and the New Stevens; Harry J. Powers of the Illinois and Blackstone Theaters; Barney Balaban, president of Balaban & Katz, and Elmer T. Stevens of Charles A. Stevens &



Discharge Area of Rapid Transit Subway in State Street. Three Stations Are Planned with a Mezzanine Concourse Between Randolph and Polk Streets, with Branches on Lateral Streets Under the Sidewalks as Shown by Dotted Lines

report, states that no less than 55 per cent of the cost of building the two subways recommended should be paid by direct assessment of the benefited property, and for this purpose has designated areas of four different grades. Should the amount raised by assessment be insufficient, it is suggested that the deficit may be made up by voluntary contributions on the part of business men. The plan contemplates that the remaining part of the construction cost be taken from the traction fund, which at present amounts to \$45,000,000, representing the city's share of the residue receipts of the Chicago Surface Lines in accordance with its contract.

Consolidation of the Chicago Rapid Transit Company, operating the present elevated system, and the surface line companies now jointly operated by the Chicago Surface Lines is considered of paramount importance. It is recommended that the city immediately take steps to obtain the enabling legislation required to effect this consolidation and also the legislation needed in all probability to allow the city to levy the special assessment.

Not only did the commission make a study of the subway, elevated and rapid transit facilities in New York, Boston and Philadelphia, but the report devoted considerable space to an analysis of these types of

Brothers. George M. Tobey was secretary of the commission. R. F. Kelker, Jr., was selected as engineering counsel. Mr. Kelker prepared the report on subways submitted in 1923. Eugene H. Dupee and F. D. P. Snelling were legal advisers to the commission in the preparation of this report. The text was drafted by Messrs. Strong and Tobey.

Four general sections comprise the report. The first, on general principles, lays down a basis for the consideration of all forms of urban transportation; the second is devoted to the specific plan recommended; the third is devoted to finance, the cost of the subway units recommended, the discussion of the assessment plans, the use of the \$45,000,000 traction fund and the legal obstacles that lie in the way of accomplishing what the commission feels to be of paramount importance—the consolidation of the companies and the levying of the special assessment. The fourth chapter contains some sixteen specific recommendations for putting in effect the proposed plan. The first and second sections are abstracted below at some length.

URBAN TRANSPORTATION A PRESSING PROBLEM

Grouping of workers for collective effort, which forms the economic basis of our cities, has but one limiting factor in the future—that of transportation. The

growth of our cities involves greater distances to be covered, and at any given rate of speed, greater time to cover them. It is the function of urban transportation to overcome these increasing distances and to give to the city of 1,000,000, 5,000,000 or 10,000,000 the same facilities of intercourse. The problem, great already, becomes greater each year and will become greater into an indefinite future.

Since a city depends in great part for its efficiency on the plan and the operation of its transportation, it is fair and right that its citizens should demand the maximum of speed consistent with the progress of engineering and with safety, the maximum of convenience and comfort and even of pleasure, and finally that they should demand this service at the lowest price commensurate with the labor, the management and the capital required.

In the development of urban transportation, up to date three different types have been established, the motor bus, the trolley car and the rapid transit train.

The motor bus requires a minimum of capital investment, so for a limited population served, even at a greater cost of operation per passenger carried, it will be cheaper. In such a district the bus will perform two functions: (1) Furnish transportation within the district itself; (2) serve as a feeder to transportation lines leading into the body of the city.

With growth of the district which it has been serving, the bus, with its greater per capita cost of operation, is forced outward and into districts of less population. In such a capacity it usually is the adjunct to the adjoining trolley car system. In the report, no further consideration is given to the bus, as it is not deemed suitable for the mass transportation under consideration.

However, a specialized type of bus, which may be called a pleasure bus, serves in quite a different capacity, somewhere between a transportation unit and a sightseeing means. It is principally important as showing the disposition of the citizen toward the "amenities" of transportation—a disposition which should be considered in planning any transportation system.

TROLLEY A LOGICAL TYPE OF TRANSPORTATION

With the population of a district sufficient to warrant a more highly developed transportation, for the sake of cheaper per capita operation, the trolley car becomes appropriate. While it requires a permanent plant and greater capital, by virtue of the greater number of passengers carried per car, with no increase in employees, the per capita cost of operation becomes less than with the motor bus. However much such a district may increase in population, that population can be most cheaply transported by trolley cars. They are never eliminated by the economic consideration of the rate of fare. The limiting consideration which does apply is rather one of engineering, that of rate of speed.

If a passenger makes but an occasional trip, the time consumed is not vital. But if he has a daily trip to make, such as one to and from work, it becomes vital. It is the best opinion that the time each way should not

exceed 45 minutes, including walking to and from the car at each end of the trip. Accordingly, if one is to spend a maximum of 30 minutes on a trip, with a speed of 8 m.p.h. the maximum distance that can be traveled is 4 miles. The trolley car, under average conditions, offers a little more than this radius to the daily passenger.

In a town of 10,000 the average distances between one citizen and another and the places where they work might be placed roughly at $\frac{1}{2}$ mile, so that no transportation at all is really necessary. In a city of 100,000, this average distance may be placed at 2 to 3 miles, which can be covered by trolley in fifteen to twenty minutes. No other transportation is necessary. But in a city of 1,000,000 the average distance may be placed at 5 to 6 miles. The trolley car requires some 37 to 45 minutes, so that the citizen who has to make this daily trip is entitled to a type of transportation at greater speed. This introduces the rapid transit train.

Car speed is uniform only when cross traffic is uni-

form. With no cross traffic, the trolley could make the same speed as the rapid transit line, so cross traffic becomes the limiting factor in the speed of the trolley car. As the size of the city increases this cross traffic increases as the center of the city is approached. This gives a second engineering reason for the introduction of the rapid transit train.

The rapid transit train is not to be expected to sup-

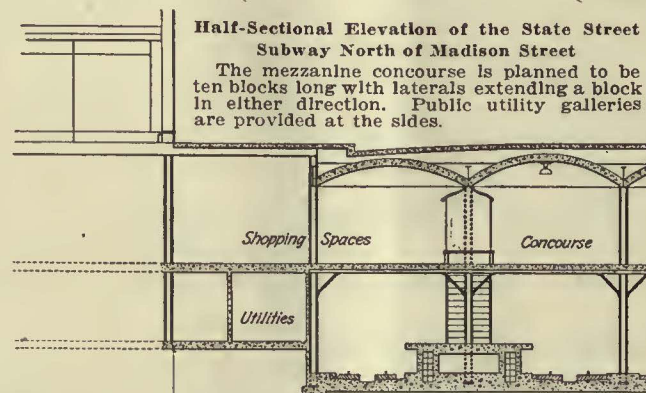
plant the trolley car, except for long hauls or through the more central districts, with cross traffic to be avoided. As one function of the bus is to be a feeder to the trolley car, so in a properly co-ordinated system one function of the trolley car is that of feeder to the rapid transit train.

RAPID TRANSIT NEEDED FOR LARGEST CITIES

When a city approaches a population of 1,000,000 its citizens are entitled to the rapid transit train. Its two characteristics are rapidity of movement, made possible by a tracking that avoids cross traffic, and grouping of several cars in a train, with several doors, requiring a minimum of time for loading and unloading.

To avoid cross traffic, the tracks may be laid to one side, or above or below it. The first location, to one side of the cross traffic, is special, the Illinois Central system in Chicago being an example. A rapid transit system may be laid above the cross traffic either with masonry walls and an earth fill, or with steel columns and girders, known as "elevated." The former construction is used mainly by steam railroads, and is also in contemplation for the "super-highways" planned for Detroit. The elevated does not interfere materially with the street and alley system of a settled city.

Three serious criticisms of the elevated construction of the past are location in the street in place of the alley, unpleasing appearance and unnecessary noise. Where possible, except perhaps in industrial districts, such a structure should be located in an alley or on a private right-of-way. The damage to abutting property when elevated structures are erected on streets is serious and must be given more attention in the future than in the



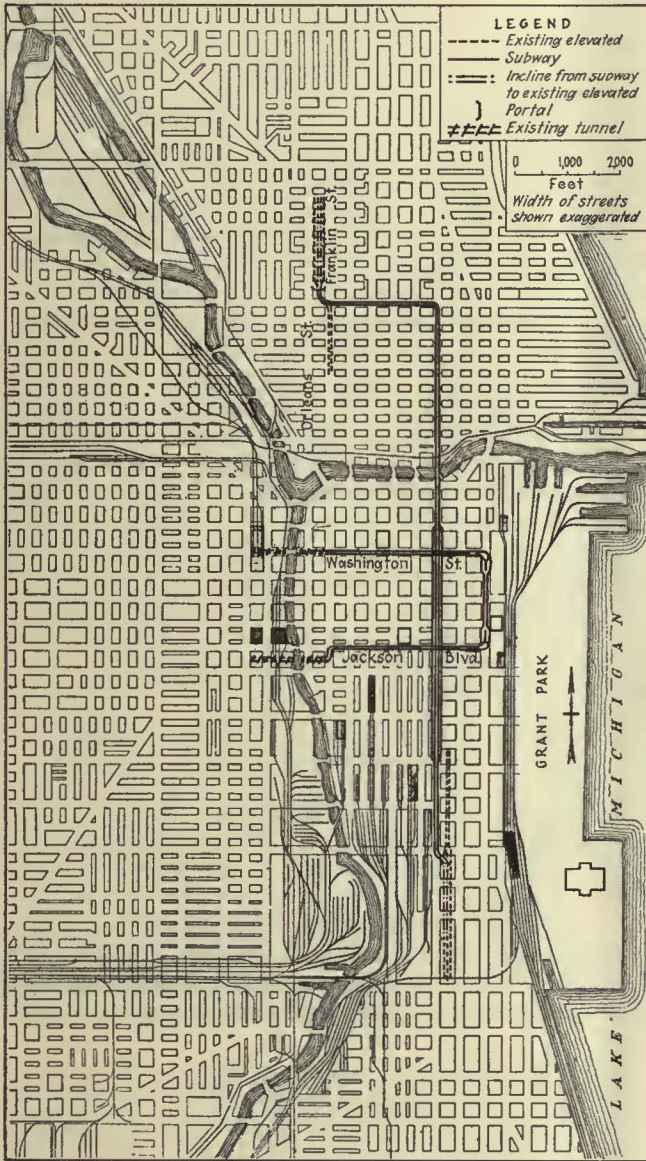
past. When the value of abutting property and the damage to the owners are sufficiently great this damage becomes the limiting factor in the use of elevated structures.

Elevated structures of the past have apparently been given no attention as to appearance. The elevated structures that have been built in Chicago may have been excusable in the past, but should be considered obsolete. While an elevated cannot rise to standards of

the economic, the engineering and the passenger or human viewpoint.

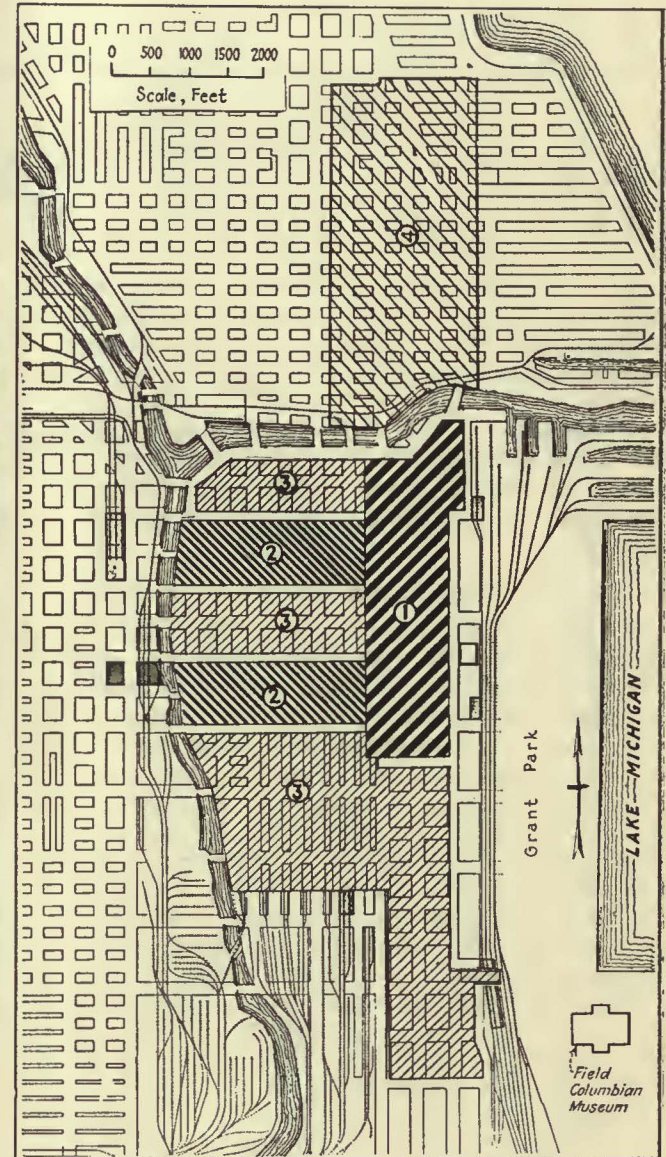
The average cost of an elevated structure complying with the principles expressed, with two tracks and reasonable allowance for stations, can be considered to be, at present prices, \$1,600,000 per mile. The cost of the only other possibility for rapid transit, a subway, may be considered to be \$5,600,000 per mile.

The foundation of rapid transit, speed, can be had



Basic Subway Plan of Chicago Subway Advisory Commission

The construction contemplated consists of a north-and-south rapid transit subway under State Street with four tracks in the congested area between Randolph and Eighth Streets and a double-track subway loop for surface cars under Washington Street, Michigan Avenue and Jackson Boulevard.



Assessment Zones for Chicago Subway Construction

The plan given in the report contemplates raising a large part of the cost by special assessment. It is proposed to divide the amount so levied in proportion to the direct benefits. The assessment area is in four classes: (1) to bear 65 per cent of the assessment; (2) to bear 20 per cent; (3) to bear 12½ per cent; (4) to bear 2½ per cent.

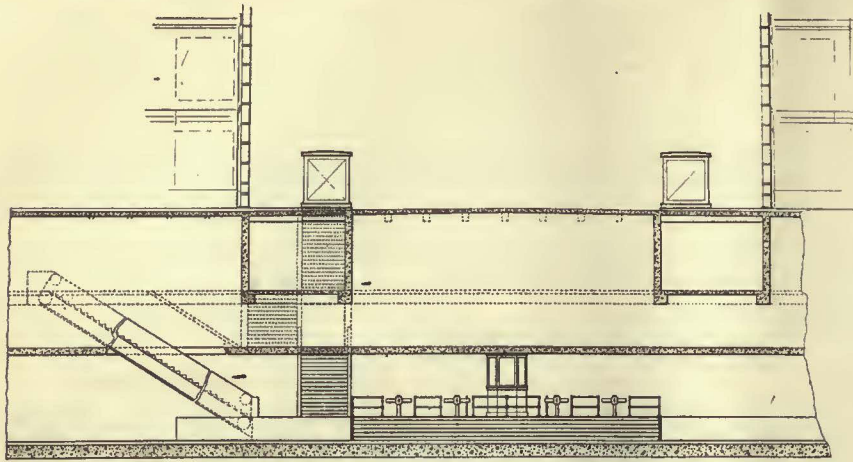
some bridges, it, however, can show a genuine effort to be pleasing in appearance and worthy of the city of the future.

As to noise, it is understood that the track of an elevated structure can be bedded so as to develop but a fraction of the noise experienced at present. Until this improvement is insisted on engineers will continue to plan and erect the deafening structures of the past.

Aside from the limiting factor of damage to abutting property, the tracking of rapid transit trains on an elevated structure is the solution of rapid transit from

on an elevated equally as well as in a subway. The safety of an elevated is believed equal to that of the subway, depending primarily on keeping the trains on the tracks, which can be done with equal facility above ground or below.

As to the passenger or human element involved, the passenger is entitled to, and if compelled will pay for, what may be called the amenities of transportation, for the pleasantness of the time spent in being transported. Another consideration is the health of the passenger. Ventilation, light and air are far superior in the case



Cross-Section of the Washington-Michigan-Jackson Surface Car Subway
 This is planned as a low-level line with rails 35 ft. below the street. Escalators are planned to carry passengers up and down at the stations.

Estimating 4,500 ft. of private property as abutting on each side for each mile of street, 9,000 ft. of private property will be affected per mile of elevated structure. All of this property will be damaged if the elevated structure occupies the street. Assume a damage amounting to \$100 per front foot of abutting private property, the total damage will be \$900,000 per mile. But it is obvious that this charge will not warrant the increased expenditure of from \$4,000,000 to \$6,500,000 for a subway.

Assuming a damage resulting from an elevated structure of \$1,000 per front foot, the total damage will be \$9,000,000 per mile of elevated structure and it is obvious that it would

be cheaper to pay the excess cost of a subway. In general, the damage to abutting property depends principally on the value of the property, particularly if of one general class, such as commercial. Accordingly, if a damage of \$100 a front foot resulted in the case of abutting property worth \$1,000 a front foot a damage might in general be expected of \$1,000 a front foot for property worth \$10,000 a front foot. Since the higher-priced property is likely to be located in or near the business center of any city, the logical use of a subway for rapid transit will begin, at least, in and near the business center of the city. It will stop and will be replaced by elevated tracking at points where the lower abutting property values do not warrant the cost of subway construction.

According to the report, for Chicago, except in such limited districts as may be proved absolutely to require subway tracking for rapid transit trains, the citizens have reason to condemn any proposal of subway construction.

RAPID TRANSIT BELOW GROUND CONSIDERED

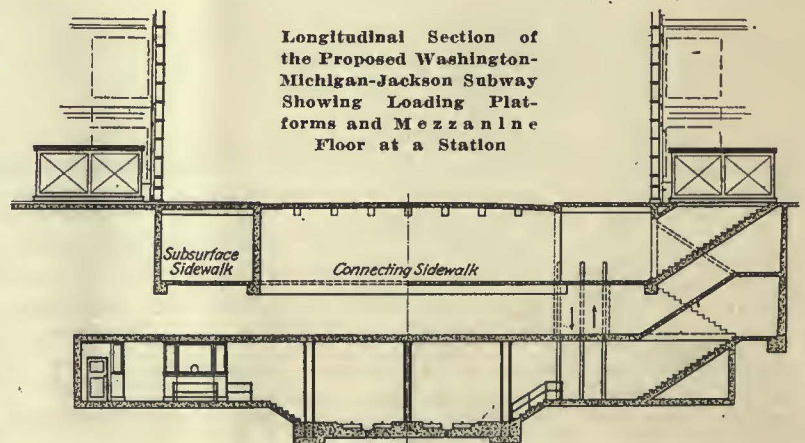
The tracking for a rapid transit line may be laid below the cross traffic, either in an excavation open at the top, usually known as "open cut," or in an excavation covered on top, usually known as "subway." Use of the open cut is confined to private right-of-way, entirely separate from the street and alley system of the city. The subway constitutes no interference with the street and alley systems. So far as transportation is concerned, it differs from the elevated only in matters of engineering detail. So far as benefit to the city at large or to the neighboring property is concerned, it makes no difference whether rapid transit trains run on an elevated structure or on a subway structure. It is of utmost importance that the subway should be thought of, not as a new and entirely different type of transportation, but merely as a different location for the tracking of rapid transit trains.

To find a justification for the subway tracking, we must leave the field of transportation and consider the effect on abutting property. Since practically the whole case for subways rests upon the damage to adjoining property by elevated structures, the relative cost of construction must be considered. The average cost per mile of subway construction, \$5,600,000, will be materially increased in the central business district by reason of the necessity of supporting high buildings without adequate foundations and by reason of the amount and complexity of sewerage, water, gas, electric, telephone and other similar equipment. It has been estimated that such cost in a central business district may run as high as \$8,100,000 per mile. Accordingly, the excess cost of subway tracking over elevated tracking of rapid transit trains may run from \$4,000,000 to \$6,500,000 per mile.

CO-ORDINATION OF TRANSPORTATION IN A REGULATED MONOPOLY ESSENTIAL

While in the general field of business the public policy has been to encourage competition, in the field of public service we have inclined toward monopoly under government regulation. Coming to transportation, we have not been guided by any generally recognized principles and have not adopted any uniformity of policy. Since the defeat of the Chicago traction ordinance of 1925, municipal ownership does not seem to be a live issue there.

The question of a single or consolidated transportation company under governmental control, as compared with mutually independent and competing companies, should be considered. The engineers are convinced that a single and consolidated company under reasonable



Longitudinal Section of the Proposed Washington-Michigan-Jackson Subway Showing Loading Platforms and Mezzanine Floor at a Station

TABLE I—ALLOCATION OF COSTS FOR THE PROPOSED CHICAGO SUBWAYS

Subway	Train Level (Including Stations)	Pedestrian Level	Total Structure	Operating Equipment	Total
State Street.....	\$16,900,000	\$4,050,000	\$20,950,000	\$3,000,000	\$23,950,000
Washington-Michigan-Jackson.....	9,900,000	1,450,000	11,350,000	1,100,000	12,450,000
	\$26,800,000	\$5,500,000	\$32,300,000	\$4,100,000	\$36,400,000

TABLE II—DIVISION OF PROPOSED CHICAGO SUBWAY COSTS ON BASIS OF 35 PER CENT ASSESSMENT ON BENEFITED PROPERTY

	Total Structure	Amount Payable by—		Operating Equipment Payable by Transportation Company
		Special Assessment 35 per Cent	Traction Fund 65 per Cent	
State Street.....	\$20,950,000	\$7,332,500	\$13,617,500	\$3,000,000
Washington-Michigan-Jackson.....	11,350,000	3,970,500	7,377,500	1,100,000
	\$32,300,000	\$11,305,000	\$20,995,000	\$4,100,000

governmental control as to rates of fare and as to extensions is the one most important factor in the entire field of urban transportation. They also are convinced that such consolidation is a necessary preliminary to subway construction, and that the tracking of rapid transit trains in the very expensive subway form of construction can be justified only if those rapid transit trains operate under adequate load. This is to be had only by a consolidation and co-ordination of the entire transportation system.

The sole argument for competing transportation companies is that only by such competition can service be kept up and the price of such service be kept down. There appears to be no other argument than this, and this single argument is misleading and untrue. Under a single and consolidated company the citizen receives the maximum of transportation facilities at the minimum of cost.

A rather special argument for consolidation applies to this particular time and place. The city is in possession of a considerable "traction fund," subject to use for the extension of transportation facilities. Under consolidation the single company will support the best program of use of the traction fund, whether for trolley car or rapid transit construction. Without consolidation the competing companies can never agree on any program of use of the fund. This perhaps is not a legal, but is a very practical, difficulty in planning and conducting any program of new construction. For these reasons, states the report, it is recommended that the appropriate steps be taken toward effecting a consolidation of the Chicago Surface Lines and the Chicago Rapid Transit Company.

REASONS FOR SPECIAL ASSESSMENTS

The argument for the special assessment is that while the subway is a public improvement, it is a local benefit and will tend to increase property values in the Loop district disproportionately to those in outlying territory. Some questions exist as to the constitutionality of a special assessment. The constitution of Illinois permits local improvements by special assessment or by special taxation of contiguous property or otherwise. Several court decisions have interpreted this to mean that if a common improvement is more than 50 per cent local such assessments can be made, but if the local benefit is 49 per cent or less the improvement does not come within the scope of the constitutional provision.

Two alternatives are apparent: First, attempt to get a court decision that 51 per cent or more of the proposed benefit arising out of the construction of the new subway units will constitute a local improvement. The subway advisory commission recommends 55 per cent. If such a decision is not forthcoming, or the local benefit appears to be less than 50 per cent, a special assessment would be unconstitutional. The only

alternative would be to obtain an amendment to the State Constitution.

PHYSICAL CONSTRUCTION RECOMMENDED

The major recommendations of the commission are for two subway units. The one in State Street is to be used exclusively for rapid transit trains and will extend from Chicago Avenue and Franklin Street on the north to Roosevelt Road on the south, connecting with the present elevated structure of the Chicago Rapid Transit Company at either end. The second proposed subway is a loop on Washington Street, Michigan Boulevard and Jackson Boulevard, extending under the south branch of the Chicago River in two existing tunnels and coming to the surface on the west side of the river. The Washington-Michigan-Jackson subway loop is purely to facilitate the movement of the west side surface lines. This is contemplated as a low-level loop passing under the State Street rapid transit subway. As this subway would have two tracks an extensive overhead passenger concourse is not essential, although considered desirable by the commission. In the case of the four-track State Street line, necessitating steps or means of elevation from the two center platforms at each station, a passenger mezzanine is considered a necessity.

EXISTING FACILITIES ARE USED TO THE MAXIMUM

The north and south sides of Chicago will benefit by the rapid transit facilities afforded in the State Street subway. The west side will benefit directly and indirectly in that most of the existing Loop elevated facilities will be available for west side service, and in addition west side surface cars will have quick and unobstructed movement in and out of the business district.

In order that the traffic on the two legs of the surface car subway may be balanced, switching facilities are provided where each leg intersects Michigan Boulevard, so the service on one leg can be switched back if desired without negotiating the entire loop.

TABLE III—PERSONS ENTERING BUSINESS DISTRICT OF CHICAGO, WEEK-DAY AVERAGE, 1924

	Number	Per Cent
Trolley cars (Chicago Surface Lines).....	390,000	33.00
Passenger vehicles.....	234,735	19.88
Rapid transit trains (Elevated).....	204,000	17.25
Pedestrians		
From north side.....	38,203	
From west side*.....	65,871	
From south side.....	76,979	15.31
Motor buses.....	74,000	6.26
South side railroad stations		
La Salle Street.....	25,402	
Illinois Central.....	23,214	
Motor trucks, etc.....	58,616	4.96
Chicago, Aurora & Elgin.....	34,535	2.92
	5,000	0.42
Total.....	1,181,939	100.00

*Passengers coming from the west side railroad stations are included in "Pedestrians" from the west side.

Because the surface car subway on Washington, Michigan and Jackson has its loading platforms 35 ft. below the street level, escalators are planned for each of the eight stations contemplated. Three of these stations will be on Washington Street, two on Michigan Avenue and three on Jackson Boulevard. The escalators will lift the passengers from the station platform level to a mezzanine. Passengers may use this mezzanine or sub-service sidewalk for some distance and emerge to the street level through any of several short flights of steps. The exact extent of the mezzanine over this subway is not as definitely determined or recommended as in State Street.

As transportation facilities are further developed, this surface car subway can be used for rapid transit trains if desired without change in structure.

STATE STREET MEZZANINE AN IMPORTANT FACTOR

The mezzanine level under State Street and above the subway cars is contemplated for the entire length of the four-track section. From this mezzanine, steps will connect with each of the three stations. The commission recommends that the mezzanine be extended between stations in order to make a complete lower concourse for pedestrians, and suggests that until the entire street width of such a mezzanine be required for pedestrian use, it can be "limited to one broad traffic-way or concourse down the center of the street. The remaining space on each side of the concourse and adjoining the basements of the abutting properties can be licensed to the owners of those properties for retailing or other similar use."

Under the east and west sidewalks at each cross street this mezzanine would extend in narrow passageways for a block either side of State Street. Thus the entire area from Dearborn Street to Wabash Avenue and extending from Randolph to Polk Street would have a complete pedestrian level free from all kinds of interfering traffic. Short flights of stairs would lead to the street level at any of the intersecting points. Stores and buildings would provide subway entrances, and in the words of the commission's report,

it will act as a direct, convenient, and comfortable clearing house for the incoming and outgoing passengers of the north and south rapid transit system. But it will do much more. It will act as a direct, convenient and comfortable passageway from one end of the downtown district to the other. The pedestrian will walk along a brilliantly lighted corridor, lined with attractive show windows, unvexed by vehicular cross traffic, unaffected by weather. The entire street will be put under a single roof—not at the twentieth floor level, but at the basement level. The merchandise of the greatest merchandising district of the world will be concentrated on and made accessible to a single concourse—a world's fair, continuous and perpetual.

The commission elsewhere states: "The above described mezzanine pedestrian level or concourse is counted upon, in the minds of your advisory commission, materially to aid the financing (in part), by special assessment, of the proposed subway. The sum raised by special assessment from abutting property owners alone would doubtless pay for the entire cost of the mezzanine pedestrian level or concourse and constitute in addition some payment toward the cost of the train level."

ELEVATED EXTENSIONS

Two elevated extensions are cited in the report, one to connect up the present structures on Ashland Avenue, the second an extension of the present loop on Wells and Polk Streets. The purpose of this latter is

to extend the present loop area and to avoid congestion. The cost of these two loop extensions the commission believes should be financed on the special assessment principle, but does not take it into account in its final consideration of costs, which are confined to the two subway units alone.

Table I gives the cost of the two subways summarized into three general headings of train level, pedestrian level and operating equipment. Table II shows the method of allocation, on the assumption that only 35 per cent ultimately would be raised by special assessment. The per cent is assumed for illustration only.

The commission recommends that the subway structures be built in their entirety from special assessments, contributions and the traction fund. For operation they should be turned over to a consolidated company, franchised to perform the work of transportation. The rolling stock would be purchased by the operating company. The rental for the use of these city-built facilities should be moderate, but need not be negligible. While considered beyond the scope of its assignment, the commission ventures the suggestion that "without the slightest authorization" perhaps a sum of \$5,000,000 could be raised as advance rental payment, discounted for a number of years ahead.

Bus Operating Statistics Compiled by California Commission

NEARLY 30,000,000 passengers were carried during 1924 on the motor buses in California, according to the report of the Railroad Commission of California for the year ended July 30, 1925, just issued. In detail, 27,727,477 passengers were carried by Class A companies or those whose gross annual income was more than \$20,000, while the smaller companies carried 1,935,431.

Gross operating revenue of all the companies in 1924 amounted to \$19,042,161, as compared with \$17,554,981 in 1923. Operating expenses in 1924 were \$18,231,526, leaving a net revenue of \$810,635. One of the principal items of expense reported by the motor bus lines, which included both passenger and truck operators, is for gasoline. In 1924 the Class A companies paid gasoline bills totaling \$1,295,816, while the gasoline bills of the smaller companies totaled \$365,053. Class A companies paid federal income taxes of \$79,629. All other taxes amounted to \$528,995, a grand total of \$608,624. Class B companies paid taxes amounting to \$76,980.

The equipment reports of the Class A companies showed a total of 1,188 passenger buses, 1,117 trucks and 520 other vehicles, the latter being principally trailers. The Class B companies in 1924 used 537 passenger buses, 544 trucks and 24 other vehicles. This makes a total of 2,930 pieces of equipment regularly devoted to the business of transporting persons and property over the highways, as public carriers. This figure does not include peak equipment. A large percentage of the auto, stage and truck operators, at time of peak demands, lease equipment to enable them to take care of the traffic. This practice is approved by the commission, which prescribes the form of lease. Including leased cars, approximately 4,000 cars, trucks and trailers are required to meet the demands of travelers and shippers who use the public highway transportation service in California.

Virginian Railway Operates Power Plant

The 134-Mile Electrification from Mullens, W. Va., to Roanoke, Va., Is Supplied from a 40,000-Kw. Plant at Narrows, Va.—Pulverized Coal Used to Supply Steam for Four Turbo-Generators—Precautions Taken to Insure Continuity of Service

ELECTRIC haulage of coal trains, recently inaugurated by the Virginian Railway, requires the heaviest concentration of power on a moving train ever undertaken. The electrification will extend from Mullens, W. Va., to Roanoke, Va., a distance of 134 miles, and will include the heavy grade portion of the railway where it crosses the Appalachian Mountains.

The maximum yearly capacity for which apparatus is installed is 12,500,000 tons of coal, or 17,500,000 gross tons (cars and lading eastbound, with a small additional amount of manifest tonnage). The system is laid out to take care of a maximum day's traffic of 60 per cent above the average.

A steam power plant has been built for this operation on the New River at Narrows, Va. The selection of site was determined by considerations of an adequate supply of condensing water, nearness to center of gravity of load, suitability from the physical standpoint, and that of housing the operating forces. It contains four turbo-generator units, having a continuous rating of 10,000 kw. at 80 per cent power factor, with five 1,521-hp. cross-drum boilers, equipped to burn pulverized fuel. The power house is designed to permit of extension ultimately to include seven turbo-generator units and nine boilers.

The power plant building is constructed of brick and concrete. The boiler room is 217 ft. long, 62 ft. wide and 91 ft. high, giving room for six boilers, five of which are installed. The boiler ash pits, pulverizing mills and feed water heaters are located at ground level. A mezzanine gallery, 23 ft. above the lower floor, provides space for the pulverizer exhausters, the feeder blower fans and future coal-drying units. The main operating floor is located 36 ft. above the lower floor. A mezzanine gallery is located at the rear of the boilers, 12 ft. above the main operating floor, and provides access to the rear of the boilers for the removal and replacement of tubes. The electrical bay has two floors above the ground level and provides space for the high-tension bus and switch gallery, the switchboard control gallery, a machine shop, tool room, storage battery room, toilets, and administrative offices.



The Narrows Power Plant of the Virginian Railway Has Excellent Facilities for Obtaining Fuel and Water, Being on the New River in the Heart of the Coal Region

The relative areas required are shown in the table below. All allowances, including space for pulverizing units, are included.

A basement under the turbine room and electrical bay, 32 ft. below the ground floor, provides space for condensers, circulating pumps, condensate pumps, boiler feed pumps, house service pumps, filtration plant and storage space for plant supplies. A mezzanine gallery 18 ft. below the ground floor provides space for possible future reactance coils for the main turbo-generators and for a 440-volt switch gallery.

The two reinforced concrete stacks are 25 ft. 8 in. outside diameter at the bottom and 16 ft. inside diameter at the top, and rise 285 ft. above the concrete footings, making a total height of 376 ft. above the bottom of the ash pit.

The plant has been designed for the use of "bone" coal, with provision for burning high-grade bituminous coal from the mines served by the Virginian Railway, or a mixture of the two. The total annual net output of the plant should be approximately 120,000,000 kw.-hr., and the average daily fuel consumption will be approximately 390 tons of

	Total	Area, Sq.Ft.	
		Per Boiler-Hp.	Per Rated Generator Kw.
Ground area of boiler house building	13,500	1.77	0.34
Floor area of boiler house.....	32,800	4.3	0.82
Floor area of turbine room.....	11,500	0.29

"bone" coal, 275 tons high-grade bituminous, or 320 tons of a 50 per cent mixture.

A coal siding is provided for storage of 25 to 30 cars leading to a track hopper, which will receive coal either directly from cars or from outside storage. The coal-handling equipment is designed for a capacity of 85 tons of coal per hour.

The coal is first crushed and then is carried to a flight conveyor leading to six bunkers or is discharged into a chute leading to outside storage. From the bunkers the coal goes to the pulverizing equipment on the lower boiler room floor. Screw conveyors deliver the pulverized coal to bunkers.

Boilers are of the cross-drum horizontal water-tube type, built for 325 lb. pressure. They are arranged in a single row, with independent settings extending from the lower boiler room floor upward 62 ft. to the top of the boilers. An operating gallery is located 36 ft. above this lower floor and is so arranged that the operating forces have complete control of the boiler operation from one level.

The superheaters are of the inter-deck design, built for pressure of 320 lb., each having 1,770 sq.ft. of heating surface. They give 150 deg. of superheat when the boilers are operating at 160 per cent of rating.

The pulverized fuel is introduced into the furnaces by a screw feeder to ten burners so mounted as to feed it vertically into the boiler at the top of the furnace. Air at a pressure of 15 in. of water is admitted at the feeder outlet, and serves as a vehicle for carrying the finely divided coal into the furnace and imparting sufficient velocity to project it to the bottom of the furnace. The greater portion of the total air for combustion is induced by natural drafts through the air inlets at right angles to the vertical stream of coal. The flame travels downward until the lower zone of the furnace is reached, at which point the downward velocity is lost, and the flame doubles back on itself and flows upward at the rear of the furnace to the boiler heating surface, thus giving it a travel of 50 ft. and allowing sufficient time for complete combustion in the furnace proper. The refuse resulting is a finely divided granular ash, which is carried away by a sluiceway into the river.

The automatic control for regulating the supply of fuel and air is actuated by the steam pressure. A falling pressure operates a motor-driven contactor, increasing the flow of coal and air, while a rising pressure reduces it. The master contactor may be by-passed and hand push-button control substituted when desired.

FOUR TURBO-GENERATORS ARE INSTALLED

Four main turbo-generator units have been installed, each of 10,000-kw. capacity, 25 cycles, three-phase, 11,000 volts, having direct-connected exciters. The turbines are of parallel flow type, operating at 1,500 r.p.m. at 275 lb. steam pressure and 150 deg. superheat. They are guaranteed for a maximum economy of 12.48 lb. of steam per hour, when delivering 10,000 kw. at 80 per cent power factor, and with a vacuum of 29 in. The turbines are connected through a pin-type flexible coupling to the generators, each of which is designed for a continuous full-load rating of 12,500 kva. at 80 per cent power factor, and will carry, following continu-

ous full-load operation, a load of 15,000 kva. at 80 per cent power factor for one hour, and 18,750 kva. at 80 per cent power factor for five minutes following the operation at 15,000 kva., without exceeding a safe operating temperature. A 125-kw., 250-volt direct-connected exciter is mounted at the end of each generator.

The 300-kw. auxiliary turbine is of the impulse type and is direct connected through a reducing gear to a three-phase, 440-volt a.c. generator, a 100-kw., 250-volt d.c. generator and a small d.c. exciter. The 440-volt a.c. generator supplied power for the operation of the auxiliary equipment during the starting up of the power plant and is available for special service during regular operation. The 100-kw. d.c. generator can supply excitation to any one of the main units in the event of failure of the direct-connected exciters.

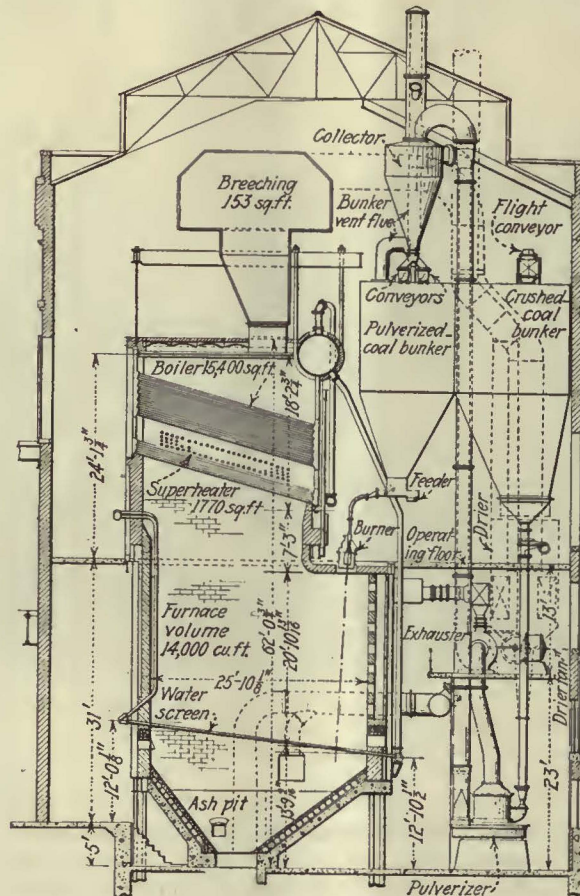
Each turbine has a surface condenser, with circulating water pump, a two-stage air ejector, and a condensate pump. The condensers are of the two-pass type. For the operation of the condensers, 20,000 gal. of water per minute is supplied through an intake tunnel taken from the upstream side of the power plant.

One phase of each generator is connected to the primary of a 10,000-kva., single-phase, 9,800/88,000-volt step-up water-cooled transformer. A three-phase, 11,000-volt bus is provided for synchronizing and for supplying power to the station auxiliary transformers. Each step-up transformer secondary is connected through an oil circuit breaker to the 88-kv. bus, which is divided into two sections with two step-up transformers connected to each.

The electrical operating gallery contains the necessary control devices. A small balcony projecting into the turbine room allows a view of the turbine room and provides space for the power director's desk in front of the control bench board. The main control and instruments are arranged on seven desk and vertical panels facing north, and the main relays and watt-hour meters on seven corresponding vertical panels facing south.

An independent rheostatic type voltage regulator is provided for each generator, the regulator receiving potential from a generator potential transformer being connected across the traction phase. The regulators are compensated to give a drooping characteristic with increase in generator wattless current, insuring parallel operation, and to give a rising characteristic with increase of wattless component of generator current, compensating for drop due to step-up transformer impedance and for part of the transmission line drop.

The three auxiliary transformers are connected to the 11,000-volt bus and are each 1,200-kva., 11,000/440-volt three phase. The entire load can be carried by



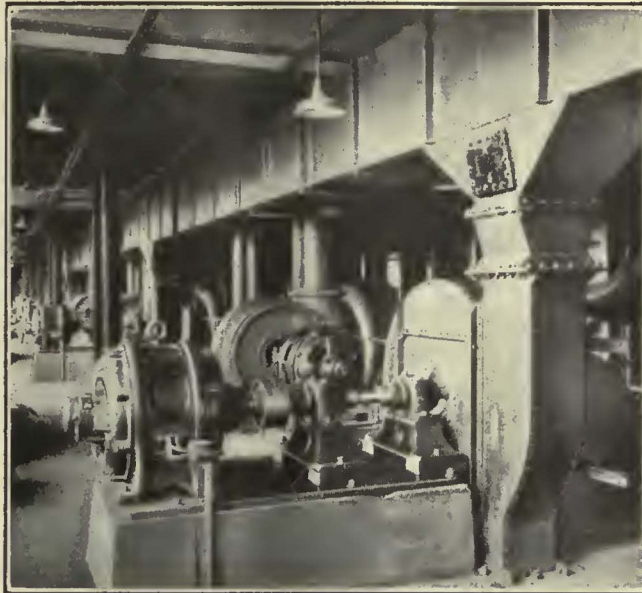
Compactness in the Boiler Room Is Obtained by Increasing Its Height. Arrangements for Firing Pulverized Coal Should Be Noted

two transformers, leaving the third in reserve. A further source of auxiliary power is the 300-kw., 440-volt, three-phase turbine-driven generator previously described.

The 11-kv. oil circuit breakers and the 88-kv. transformer oil circuit breakers are not automatic on overload. Protection against internal fault in any generator or transformer of 1,200 kva. or larger is accomplished by differentially connected current transformers and over-current relays. In case of generator or step-up transformer internal fault, the connections are such as to open simultaneously the generator 11,000-volt oil circuit breaker, the generator field circuit breaker and the transformer 88-kv. oil circuit breaker. Internal fault on one of the 1,200-kva. transformers will open simultaneously the 440-volt and the 11,000-volt auxiliary transformer circuit breakers. Internal fault on one of the 3,750-kva. step-down transformers will simultaneously open the tie circuit breaker and the 88-kv. circuit breaker connected to that transformer.

A 220-ohm resistance connected between the step-up transformer neutral bus and ground limits to 200 amp. maximum the current in case of a grounded transmission line. Each 88-kv. transmission line oil circuit breaker is opened automatically in case of a ground on its line by a low-energy over-current relay so connected in the current transformer secondary circuits as to receive current only in case of ground. Over-current relays open the 88-kv. transmission line circuit breakers in case of transmission line short circuit.

The water rheostat circuit breakers and the 88-kv. circuit breakers feeding the step-down station have short circuit protection by over-current relays.



A Part of the Pulverized Fuel System, Showing Blower for Supplying Air to the Burners

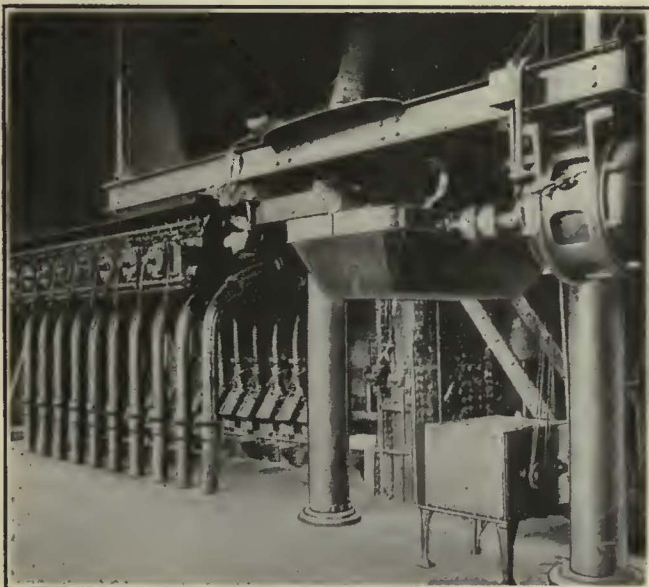
Excessive temperature, failure of water supply, or pressure relief diaphragm failure on any transformer will ring a bell on the electrical operating gallery and operate an annunciator drop, indicating which transformer is involved.

The outdoor transformer and switching station includes auxiliary and lighting transformers, main step-up transformers, and the 88-kv. transmission line lightning arresters. It also includes the step-down transformers for feeding the trolley at Narrows and the necessary switching equipment. There are duplicate 88-kv. electrolytic lightning arresters, one for each pair of transmission lines.

The four main step-up transformers are 10,000 kva., 9,800 to 88,000 volts, 25 cycles, single phase, oil insulated, water cooled. An additional full capacity tap gives a ratio of 9,310 to 88,000 volts. They are designed to carry 200 per cent load for five minutes following 150 per cent load for one hour without exceeding safe temperature, and will withstand without damage a short circuit on the secondary terminals with normal voltage maintained on the primary terminals, providing the duration of the short circuit is not sufficient to cause injurious heating. Each transformer has an inherent reactance of approximately 8 per cent at normal rating.

The station auxiliary transformers are each 1,200 kva., three phase, 25 cycle, 11,000/440 volts, oil insulated, water cooled. The primary winding is provided with eight additional full-capacity taps ranging in 2½ per cent steps above and below 11,000 volts. Each transformer has an inherent reactance of approximately 12.2 per cent at normal rating.

The electric locomotives used are of the split-phase type and provide automatic change from motoring to



Feed for the Pulverized Fuel. A Reeves Drive, with Bailey Control of Speed of Burners and Draft



Four 10,000-Kw. Turbo-Generators Are Installed in the Narrows Plant and Space Is Provided for a Fifth

regeneration as the grade changes, without action of the engineman other than a movement of a lever operating the transformer balancing switch. The regenerated power is returned to the substations and finally to the Narrows power plant, where any excess is absorbed by a water rheostat consisting of electrodes immersed in the river.

The electrical apparatus was furnished by the Westinghouse Electric & Manufacturing Company as a part of its general contract for apparatus for electrification of the railway. The power plant was designed and constructed by Gibbs & Hill, consulting engineers of New York City, as a part of their work as engineers of the electrification, under the general supervision of H. Fernstrom, chief engineer of the Virginian Railway, and Hugh Pattison, engineer of electric traction.

Many New Features on Youngstown Municipal Coaches

RECESSED number plates, such as are now required in certain states, are used on the latest coaches to be put in operation by the Youngstown Municipal Railway. A cast aluminum frame is set in the body, as shown in the illustration, reproduced herewith, into which the standard license tag is fastened at a slight angle with the vertical. The tail light, just above, has



New Features Protect Against Rear-End Bumps

New Youngstown Municipal coaches have recessed number plates, combined with tail lamps. A guard rail at the side protects against damage due to sidwiping in traffic. Wire glass is also used in the two rear windows, so they will not shatter in case of a serious collision.

its lower part covered with a flexible transparent strip that allows the plate to be fully illuminated at night. In this way the tail light and plate are not exposed to damage from rear-end collisions. The rear bumper, constructed of spring steel, is adequate protection against minor rear-end collisions.

At the side is seen the end of a small steel rail designed to protect the aluminum panels from damage due to sidwiping. Before these rails were added it was almost impossible to avoid scratched or dented plates. While the last lot of ten coaches delivered this year were constructed in this manner, the old coaches are being rapidly equipped with these rails.

The two rear windows are also set with wire glass to avoid shattering in case of a serious rear-end collision.

Women Employees Can Be Helpmates in Utility Organizations

BY ALICE SCHUETZE

San Antonio Public Service Company, San Antonio, Tex.

SEATED behind a polished desk and answering to the name of "manager" or "superintendent," a well-dressed young woman is a bit out of the ordinary, isn't she? The fact that women liked business, were making a success of it and were there to stay has been hard to recognize. It seems as though a new discovery has been made. Women in public utility work can fill many positions other than those of typists and stenographers. Of course, they will always make the best typists, but why not utilize their natural abilities to bring more far-reaching results?

There is a plan in effect in some companies whereby all women in the utility companies are organized. They are taught the standards and policies of their company. They are made thoroughly familiar with their company and are able to tell the public about one and two man operated cars, the use of buses, costs of operation and many details regarding schedules. They are taught to speak distinctly and courageously and, after learning their lessons, to use their natural ability to talk and spread their knowledge of their company to public gatherings.

They are sent to schools and to make talks to the children on safety of riding to school on street cars and buses. They are sent to mothers' clubs and civic organizations, where they stress the points of economy and cleanliness as well as safety of our common carriers to the mothers. What mother will not listen to a talk about anything safe and reliable as well as economical, especially if it is in the interest of her children?

We hear a great deal about traffic congestion. Women are easily impressed, so what better plan could be devised than to reach them through their clubs, their schools and their civic organizations and impress upon them the value of leaving their autos at home, or at least on a side street where there are no street cars, when they do their shopping? Show them the reason for so many accidents, to say nothing of the loss of time and money, by parking in front of retail stores. Incidentally, who but a wife could persuade friend husband to do likewise?

Education costs money, and it will take time before the plan for placing the woman employee before the public can be successful. There is the chance of our women leaving the industry for marriage, which seems a loss of time and money to some of the officials. But it cannot be a total loss, for they will continue to carry the message on to their neighbors, their club members, their families and their friends. Women are realizing the responsibilities of their positions more every day and are no longer feeling as if they were working for their manager, but rather with him for their company. This makes each of them proud of her position, anxious to become a better employee, and consequently bring about better co-operation among the employees as a whole.

The organization of women is young and inexperienced. Some managers are skeptical and will not even try out the plan. The only suggestion that can be offered is to give it a fair chance, help it along and the company will be returned threefold for its patience and its expense.

On our property in San Antonio the women's work is

being given more than a chance. It has the encouragement of all the officials as well as the full co-operation of all the girls. So far the most important accomplishment has been to educate them through lectures by various department heads. Many questions have been asked and essays written by the girls. At one of our meetings five young women prepared five-minute talks on "What I consider the best way of increasing street car riders," thereby getting a woman's view of what was needed to gain revenue. At this meeting the officers of the transportation department were present and later remarked that every idea was practical, as well as new.

It has been only recently that the women of our company have been placed before the public as spokesmen for the company. We have a representative in the largest professional women's club in the city. A very successful pageant of "Fifty Years of Progress" was given to some 500 employees. A dialogue between a company clerk and an irate customer is being proposed and is nearly ready for presentation.

Within the next few months the company is planning to send more women to speak before clubs. A course in public

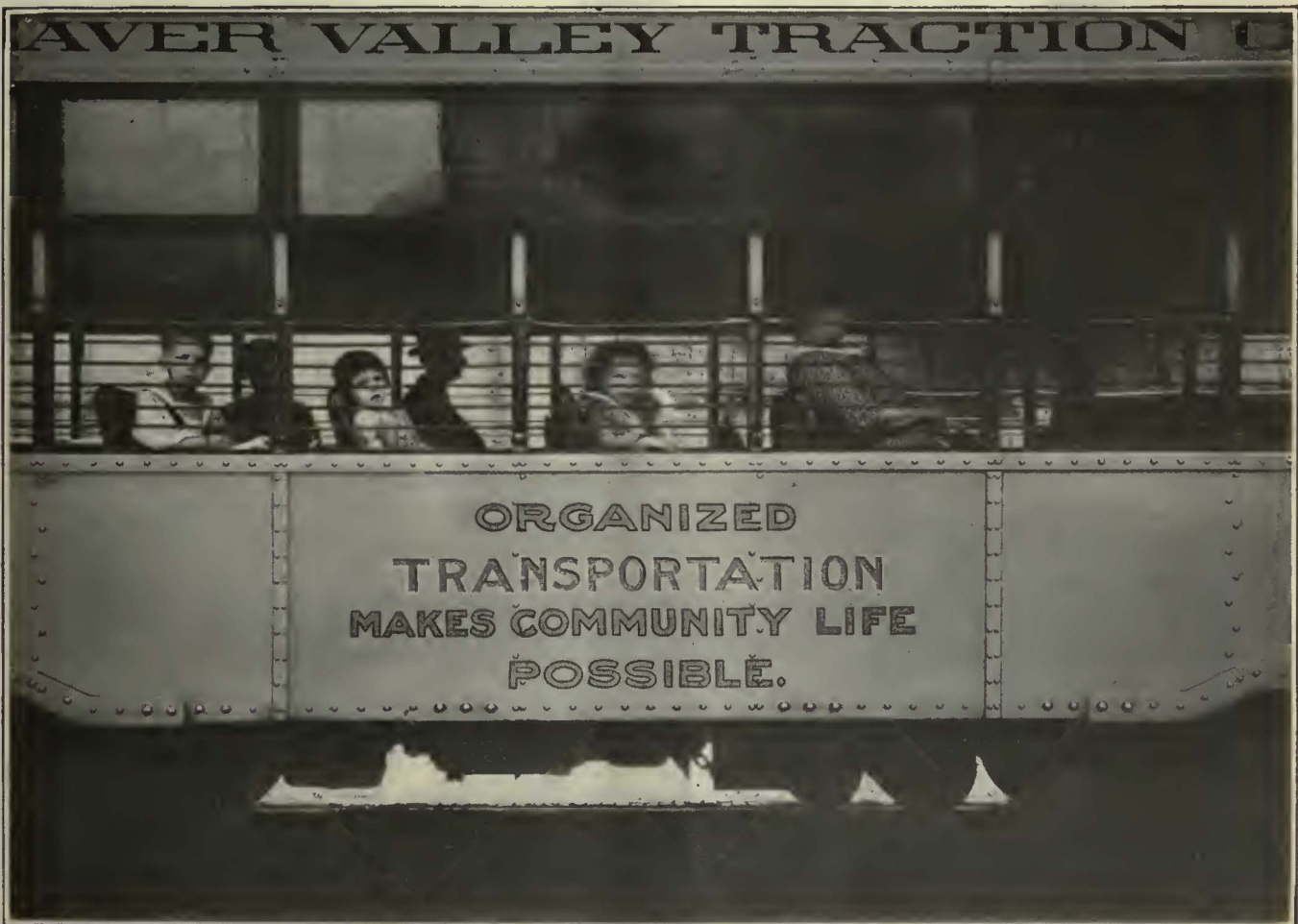
speaking has just been completed which helped a great deal, and in the fall we plan to continue this work in preparation for a more extended contact with our patrons.

Some one has said that a chain is as strong as its weakest link. Strengthen the women employees and better relations with the public will certainly result, since women form one of the greatest group of our street car patrons. Satisfy your women patrons by letting a woman employee tell the company's story.

Beaver Valley Traction Again Employs Advertising Slogans

THE opportunity open to all traction companies to employ the most direct of all possible advertising mediums, namely, the trolley cars themselves, has again been recognized by the Beaver Valley Traction Company, New Brighton, Pa. The accompanying illustrations show the various slogans which the company has painted on its cars in order to educate the public to a realization of the indirect, as well as the direct, value of the company's service.

You do not have to worry where to park your car, or about its safety if you
RIDE ON THE TROLLEYS.



800,000 MEN and WOMEN
 are employed in the manufacture of products for, and in the operation of the electric street railways.

Our local **STEEL** and **GLASS** plants manufacture products used by the electric railways — when we buy supplies you are kept at work.

Maintenance Notes

Window Guards Painted by Machine in Cleveland

PAINTING heavy wire mesh window guards always was a messy job in the Cleveland Railway shops until Terence Scullen, master mechanic, developed a simple device to do this quickly and completely. As can be seen in the view, a trough is partially filled with black paint. The window guard to be painted is pushed by hand into the left end of the trough and under a roller, the support of which can be seen in the center of the trough. This bends the guard down slightly, dipping it into the paint. The guard is then pushed beyond this roller and it strikes the sloping bottom of the tank, bending it upward and between two brushes at the right-hand end of the tank. These brushes are revolved rapidly by means of a motor mounted underneath and connected to them by a belt. After the window guard is pushed partially through this device a workman grapples it on the painted side with an iron hook and pulls it through the rest of the way. The window guard is thus dipped into the paint, the surplus being brushed off as it emerges. After painting, the guards are hung up on racks

for drying, as can be seen in the background.

Window guards extending the full length of the car can be painted in a few seconds by this machine.

Testing Track Department Shovels

MANY shovels are purchased each year by the Los Angeles Railway, Los Angeles, Cal. Different types are offered by the various manufacturers, so in order to decide the best type for the railway company's use, a machine for testing shovels has been developed. Each shovel is tested in this machine before purchases are made.

The shovel-testing machine consists of a bin of heavy planking, with a slide or crosshead arranged at the top at one end. In operation this slide is given a reciprocating movement by two connecting rods attached to a crankshaft driven by belts from one of the shop line shafts. A large grindstone acts as a flywheel for this crankshaft.

To test a shovel its handle is fastened to the reciprocating crosshead of the testing machine and a heavy piece of rail is attached securely to the handle. A quantity of loose rock

is placed in the bin. The reciprocating movement of the crosshead forces the shovel into the loose rock and withdraws it in a manner similar to actual service conditions. After a shovel has been connected the machinery is set in motion and is allowed to run until the shovel breaks down in some way.

The wear on the blade is meas-



Shovel Testing Machine Used by the Los Angeles Railway



Window Guards Are Painted in a Few Seconds in the Cleveland Shops by the Use of This Paint Tank. As the Guard Emerges the Motor-Driven Brushes at the Right-Hand Side Thoroughly Brush the Paint into All Parts of the Guard and Remove the Surplus

ured, and the number of hours that the shovel is on test is recorded. By this method a comparison of the merits of different types of shovels can be obtained. This machine has been used almost continuously since 1914, and tests in the field with shovels purchased when compared with the showing made by the tests in this machine have indicated that the method is very reliable.

"Enter Front-Rear" Signs

AS THE cars of the Springfield Street Railway, Springfield, Mass., are operated over various types of routes, embodying both heavy and light traffic and under one and two man operation, it was considered desirable to develop a simple sign which would inform the patrons whether entrance to the cars should be by front or rear doors. Accordingly, a metal sign has been mounted on supports placed on the right sides



The Two Positions of the Signs Are Shown Here, Together with the Messages Which the Positions Convey

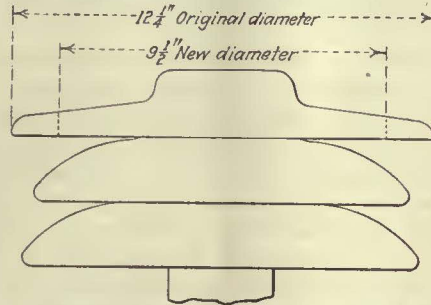
of the dashers. When the sign is in the down position it indicates that entrance shall be by the front door and when in the up position the opposite is true. A clip is provided to hold the sign in the up position when desired.

The signs are painted with yellow lettering upon a black background, thus being of a sufficiently arresting nature to attract the attention of patrons. Stencils are used for the painting, after which the signs are finished with a coat of protecting varnish. All of the cars on the Springfield system are equipped with holders for these signs, excepting, of course, the open cars, which are used only in the summer and to which the injunctions "Enter Front" or "Enter Rear" would be inapplicable.

Preventing Water Grounds on Insulators

FOR insulation at the operating potential used by the New York, Westchester & Boston Railway of 11,000 volts, the cable running from the pantograph trolley to the car transformer is supported on double petticoat insulators. The maximum diameter of these insulators is 11½ in. A metal cap at the top is 12¼ in. in diameter so that it extends over the edges of porcelain. Some trouble was experienced during heavy rains from grounding due to the water running in a continuous stream from the metal cap to the car roof, the distance from the edge of the cap to the supporting base on the roof being about 7 in. Troubles from this source have been overcome by turning off the edge of the metal cap so

as to reduce its diameter to 9½ in. With the reduced diameter of the cap the water drips down onto the



By Reducing the Diameter of the Metal Cap Used with Double Petticoat Insulators for Supporting High-Tension Cables on Its Cars, the New York, Westchester & Boston Railway Has Prevented Grounding

insulator and the stream is broken before it reaches the roof, so that grounding is prevented.

Moving 576 Iron Trolley Poles

WHEN the officials of the city of St. Louis, Mo., decided to embark upon an extensive street widening program the United Railways in that city was confronted with the task of moving 576 iron trolley poles back from the curb line. In some sections of the city where streets were narrow and traffic conditions very heavy the construction gangs worked under very trying conditions. These poles were moved without interrupting the trolley service and without any serious accidents.

Tower trucks of the line department were equipped with gibs to which block and tackle were attached for hoisting and shifting the poles to their new locations. In addition to these there was necessarily a large amount of detail work which included the transferring of pole attachments, installing new feed wires and the lengthening of guy lines. The pole shifting was done on five streets and the cost to the railway was approximately \$12,865. About 50 men were used during the progress of the work.

Oven Keeps Wood Stock at Gluing Temperature

STEAM heat is used in a sheet steel oven installed in the cabinet section of the Department of Street Railways, Detroit, Mich., for keeping wood stock to be glued at a temperature suitable for the gluing process. This oven was built in the company's shops. It is 6 ft. high, 10 ft. long and 6 ft. wide. One end



Sheet Iron Oven Installed in the Wood-Working Section of the Department of Street Railways, Detroit, for Keeping Wood Stock at a Temperature Suitable for Gluing

has hinged double doors. Inside a pipe rack is arranged to hold different classes and sizes of wood. Not only has this oven been found convenient but it is a great time saver in facilitating the gluing, as the oven is located in the cabinet section. Pieces can be placed inside as desired and much time is saved in the gluing operation. When the work is completed a much more satisfactory job is obtained.

Threaded Axle Collar

CONSIDERABLE difficulty was experienced by the Levis County Railway, Levis, Que., with the loosening of axle collars, resulting in excessive end play of the motors. To remedy the condition H. E. Weyman, manager, and D. Chenard,



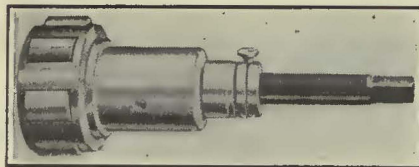
Loosening of Axle Collars Is Prevented on the Levis Tramways by Threading Them

master mechanic, devised the collar illustrated. The seat on the axle and the split axle collar are threaded. The collar is screwed up as tightly as needed to place the motor in alignment. Tightening the holding bolts of the collar secures it so that no loosening can take place.

New Equipment Available

Expanding Bushings to Provide Tight Fit

BRASS bushings and bearings in rods or housings can be inserted by a new method called the Faessler-Maupin process, which is claimed to offer an improved means over that of inserting an oversized bushing and forcing it into place. The old method is said to leave bushings soft and spongy, while the pressing frequently forces the inside hole out of shape so that re boring is necessary. The new process uses a combined expander and roller for this work, which is manufactured by the J. Faessler Manufacturing Company, Moberly, Mo. When installing a bushing by this process it is first turned on the outside to an easy driving fit or loose enough to enter the hole by hand.



Roller Type Expander Used for Applying Bushings

The hole in the bushing is bored a trifle smaller than the pin diameter on which it is to fit. Experience in the application of these bushings has shown that for a 5-in. diameter pin the hole should be bored $4\frac{1}{8}$ in.

After the bushing is inserted in the rod the expander and roller is

entered at one end to about one-half the depth of the rollers. The mandrel is turned and its construction causes it to feed lengthwise as the turning progresses. This forces the rollers outward until they bear against the inside surface of the bushing, when the mandrel will begin to turn hard. An adjusting stop on the mandrel is set against a thrust ball bearing on the cage end, which locks the mandrel so that the rollers will maintain the desired diameter. By continuing to turn the mandrel to the right the tool travels lengthwise through the entire bore of the bushing, gradually expanding its entire length. After withdrawing the tool the diameter of the roller is increased slightly and the operation is repeated for several passes until the bearing has been rolled to the desired size.

The tools provide for adjustment of size in graduated measurements of 0.0001 in. and the finished hole is said to be absolutely true both circumferentially and longitudinally and is finished with a smoothness of surface that cannot be obtained by boring. Another advantage claimed for the process is that a portion of the lubricant used in the rolling is forced into the pores of the metal. This assists in improving the operation of the bushing.

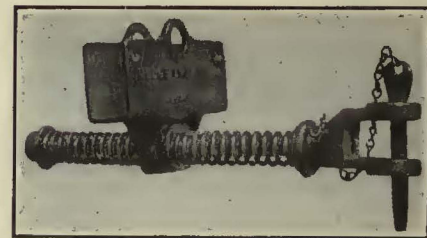
It is claimed that the gradual rolling and expanding during the process insures an absolutely tight fit along the entire outside surface of the

bushing and eliminates all danger of its coming loose while in service. Tests on bushings installed by this process showed that it required pressure of 20 tons to start a brass from a 5-in. bushing.

The pressure expanding and rolling tools used in this process are made in sizes of $\frac{1}{4}$ in. up by steps of $\frac{1}{4}$ in.

Spring Drawbar for Railway Section Cars

JERKS from starting and stopping of a motor car coupled to a trailer, such as are used in section work on electric interurban lines, are eliminated by a new type of spring drawbar just placed on the market by Mudge & Company, Chicago, Ill. This drawbar was designed particularly for use with small electric motor cars and trailers. It consists of a steel bar attached to a hanger which is bolted to the underframe of the car. Surrounding the bar on each side of the hanger, back and front, is a special coil spring. When starting under load the spring com-



Spring Drawbar Designed to Eliminate Jerks and Slams

presses, giving the motor car several inches start and consequent momentum.

With this drawbar in use the motor car is not forced to start a heavy load from standstill, but it is moving when the load is taken hold of. The frame of the drawbar transfers the load gradually as the car gains momentum instead of with a jerk as is sometimes the case with rigid drawbars. In stopping, the spring on the other end of the drawbar is compressed, which prevents the trailer from crashing suddenly against the motor car frame.

The new spring drawbar eliminates the jerk at the start and the slam at the end of the run and so makes starting and stopping easier. It also eliminates wear and tear on the equipment. The drawbar is designed so that it can be applied to motor cars and trailers of different height, the difference in height being taken care of by changing the position of the U clamp.

American Association News

Many Cars to Be Shown

SPACE for the Cleveland exhibit is being contracted for rapidly. Yesterday Director of Exhibits Fred C. J. Dell stated that contracts have been received from 228 exhibitors for a total of 116,415 sq.ft. of space. This is far in excess of any previous exhibit held in connection with a convention of the American Electric Railway Association.

Fourteen exhibitors are arranging to show electric railway cars. Of these six are railway companies. It is anticipated that the Cleveland Railway will have an exceptionally fine exhibit.

"All car exhibitors should bear in mind the delays incident to freight shipments," said Mr. Dell. "It will be possible to place the cars in position on the exhibit tracks any time after Sept. 20, when the construction will be finished.

"In case any exhibitor desires to ship a car to arrive in Cleveland earlier than Sept. 20, I understand the Cleveland Railway will store it on the company's tracks without additional charge, and will move it into the exhibit space when that is ready. This will insure having the car in Cleveland and give plenty of time to do any necessary work to set it up and inspect it, particularly if it has required partial dismantling for shipment.

"It would not be a bad idea to have an attendant ride with the car on its railroad journey. This would insure correct routing and prevent careless handling with possibility of damage."

Mr. Dell expects to leave New York for Cleveland about the middle of September, and from that time on will be in personal charge of the exhibit. It is expected that the progress of the annex will be such that it can be turned over to the exhibit committee today, or at latest early next week.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Sept. 9—Central Electric Railway Master Mechanics' Association, annual convention, Hotel Rieger, Sandusky, Ohio.

Sept. 10-11—Central Electric Traffic Association, annual meeting, Yellow Banks Hotel, Webster Lake, Ind.

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

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

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

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

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

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

Much Progress in Cleveland Last Week

SINCE the picture reproduced in last week's JOURNAL was taken, the scene of the new exhibit building for the A.E.R.A. convention has been

transformed. All the steel has been erected and the studding is all up. The roof is complete, the skylights and stucco work are 50 per cent done and 80 per cent of the floor is laid. The connection to the steam railroads is in and the Cleveland Railway tracks on the extreme right are completed and paved.

This view, taken Aug. 27, was from approximately the same point as the previous ones, but the building is now of such proportions that other exhibit facilities in the area cannot be seen.

Reach Cleveland Sunday

MONDAY, Oct. 4, the opening day of the A.E.R.A. convention, has a full program scheduled, covering all the associations. The first American session will begin at 10 a.m.

It is urged by the executive committee that all delegates who can should plan their itineraries so that they can reach Cleveland Sunday, Oct. 3. This will allow them to get comfortably settled and so avoid congestion at the registration booth and delay in reaching the meetings on Monday.

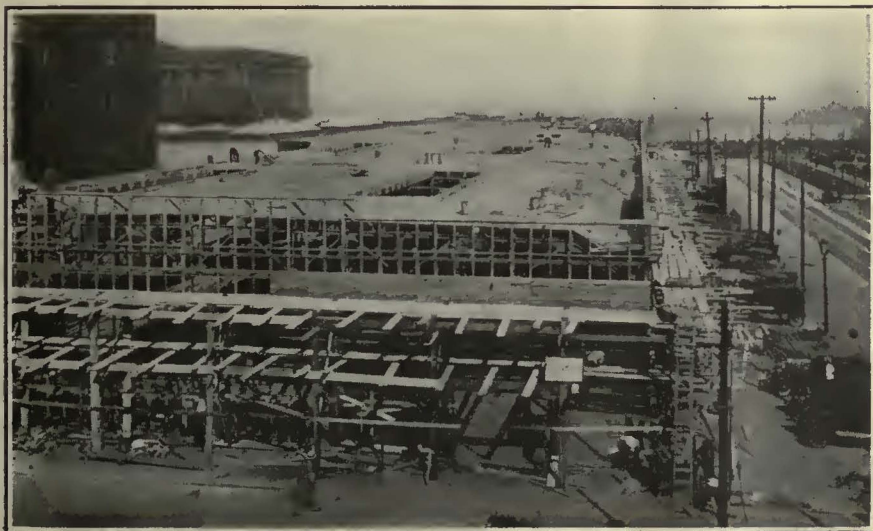
Bring Your Clubs to Cleveland

GOLF at the Cleveland convention will be somewhat unconventional. In days gone by it has been the custom to hold an official tournament on the Sunday preceding the convention. This, however, scarcely whets the appetite of an inveterate player, while it does crowd the local courses to the exclusion and discomfort of club members. The official tournament will, therefore, be dispensed with this year. Delegates and guests will be given opportunity to play in their own time and fashion without the usual congestion and delay.

There are many splendid private courses in and about Cleveland. The committee in charge will make arrangements for the delegates to play these various courses, thereby "distributing the load." There are also a number of public and semi-public courses, so that on Sunday or at other times outside the periods set aside for convention business and inspection of exhibits golf in all its forms and under "all operating conditions" may be thoroughly enjoyed.

Mayors Invited to Convention

MAYORS of all cities of 25,000 population or over are being sent individual invitations from President Frank R. Coates of the American Association to attend the Cleveland convention and exhibit. In his letter Mr. Coates points out the educational value of the exhibits to public officials, and the even greater interest to them in the questions to be discussed in the sessions, primarily the perplexing traffic problem.



Appearance of the Cleveland Exhibit Building on Aug. 27

The News of the Industry

Modernization in Memphis

First of Thirty-two de Luxe Cars in Service—Public and Newspaper Reaction Favorable—Full Publicity to the Event in Company Advertising

THE new electric rail coaches, operated by one man, have been received with favor by the public of Memphis, Tenn. Thirty-two coaches of the low-level, double-truck, semi-noiseless type were recently purchased by the Memphis Street Railway and twelve of the new model cars have been placed in service on one line of the system. The remaining twenty have been received, but are now being conditioned for service at the company's shops.

The cars represent an investment of \$475,000 in additional equipment for the company's rolling stock. Numerous automatic and safety features are embodied in these cars. The exit doors, both front and rear, are automatically operated by a treadle that goes into action when the passenger steps on it, but only when the car is at a complete stop. The step slowly folds up when the passenger alights.

The cars are equipped with deep de luxe seats, upholstered in taupe plush, with Nachmann spring units.

A 9-in. numeral displayed above the right window on the front of the car indicates the route or line on which it operates.

Mosaic rubberoid tiling, $\frac{1}{4}$ in. thick, laid on a $\frac{1}{2}$ -in. thickness of Celotex, which rests on a $\frac{3}{4}$ -in. wood floor, helps to deaden sounds emanating from the trucks, rendering them semi-noiseless.

Rex metal sash increase the size of the glass and render it easier to operate the windows.

Pneumatic rotary gongs and electric registers are governed by a pedal by the operator.

Five 100-watt lamps afford illumination.

Artistic painting, "streamline effect," both interior and exterior, gives an unusually attractive appearance to the cars.

Shipment of the cars was made direct from the St. Louis Car Company, St. Louis, which built the bodies. The electrical and air brake equipment was furnished by the General Electric Company, Schenectady, N. Y. The trucks were furnished by the J. G. Brill Company, Philadelphia; the wheels by the Southern Wheel Company, Pittsburgh, Pa.; the automatic step and door equipment by the Safety Car Devices Company, Chicago. Other details of the car were published in the JOURNAL for Aug. 21, page 330.

NEWSPAPER COMMENT FAVORABLE

Each of the newspapers of the city, following installation of the cars in

service, reported the first day's operation, showing favorable acceptance.

On the second day after the service started the *News-Scimitar*, an afternoon publication, had a long editorial regarding the cars. The comment opened with these remarks:

Wednesday the Memphis Street Railway started its one-man cars on one line. They were an immediate success. The cars are new, the seats are plush and the paint is fresh. The cars are long and commodious. The aisles are wide. Plenty of standing room. There are no finer cars in any city. The cars are so equipped that the power cannot be turned on until the doors are closed. The doors do not open until the car stops. The passenger standing on the exit platform causes the door to open when the car stops for passengers to alight.

The *Memphis Press*, another afternoon paper, in a semi-editorial column that appears on its front page, under the caption "Among Us Folks," had this personal sort of expression regarding the cars:

I rode on one of the new one-man street cars yesterday. I was surprised at its beauty and its elaborate furnishings.

The seats on this car were of clean, soft plush. They are comfortable, and I enjoyed sitting in one of them.

The floor was covered with a rubberoid material. It was not dirty, and so far no one had spit on it.

I gazed at the cream-colored ceiling as the car glided easily along and felt that I was getting my money's worth.

In the *Commercial Appeal*, the morning paper of the city, the following remarks constituted a part of the story regarding the cars:

The coaches—for coaches they are—are big, airy and easy-riding.

"As delightful and comfortable as a parlor car," remarked a woman to her escort. Plush upholstery in taupe, somebody said. Anyway, it was a nice, rich color.

The windows are large, the window sills low, and it is just like riding in a club car.

Five ceiling lights illuminate the coach so brightly that one can read as comfortably as at home under a bridge lamp.

They are wonderful trolley cars in every detail. They are painted in attractive colors, and the interior arrangement illustrates the last word in modern car comfort.

Now, here's a tip to the trolley-riding public, as a suggestion to facilitate travel: Have your 7 cents ready. Drop it into the box and pass on in.

THE COMPANY'S ANNOUNCEMENT

On the day before the cars were put in service and also on the day operations began the company used large advertisements in each of the newspapers announcing them and directions for passengers. These were crash advertisements in that each occupied space equal to about three-fourths of the whole page.

The first advertisement was devoted

principally to a description of the new type of cars and the second mainly to a request for public co-operation in making their operation most beneficial to patrons. A part of the second advertisement stated:

For Better Street Car Service—We are adding 32 modern electric rail coaches and want patrons to profit by the conveniences they afford. We ask you to observe these suggestions:

Enter cars at front.
Have exact fare, or metal token, ready to deposit in fare box.

If transfer is desired, ask for it when paying fare.

Pass into car promptly to allow other passengers to board.

White passengers seat from front toward rear. Colored passengers seat from rear toward front.

White passengers leave car by either front or rear exits.
Colored passengers leave car by rear exit.

When destination is reached, step onto treadle at exit door. This causes the door to open automatically when the car stops.

Doors cannot open when car is in motion. Nor can the car start until doors are closed.

Avoid standing on treadle unless preparing to leave car—to do so prevents the operator from starting car when at a stop.

Subsequent advertisements by the company, using smaller space than the opening announcements, have taken up the various thoughts suggested previously, and treated each separately and more fully, in explanation of how compliance with them facilitates service in the mutual interests of patrons and the company.

Company officials have expressed satisfaction at the favorable reception accorded the cars during initial days of operation.

Toledo Grant Under Discussion

In informal discussions of the new franchise proposals at Toledo, Ohio, the members of the board of control indicated it was their opinion that there would have to be some scaling down of the capital of the Community Traction Company under the new plan if fares were to be kept at a reasonably low level. Just how this could be achieved is not evident, particularly as under the terms of the former settlement capitalization and value are believed to have been brought to approximate each other.

A special election will probably be necessary for the submission to Toledo voters of the new amendments to the Milner ordinance to put into operation recommendations of Prof. H. E. Riggs and Attorney Newton D. Baker.

City officials declared that it was impossible to have the completed text of the proposal ready for Council on Aug. 30, the final date to put the measure through in time for the regular November election.

Meanwhile Law Director Frank M. Dotson has been working to bring various proposals together into the com-

pleted document. Dewey C. Bailey, attorney for Henry L. Doherty & Company, operators of the property, has been in Toledo at work upon the plan. One of the sticklers in the final draft was a clause involving the power rate.

It is now thought that the special railway election may be held a few weeks after the November election. In that event the voting booths and machinery would be preserved intact in the meantime.

T. E. Mitten Discusses Industrial Peace

Head of Philadelphia Rapid Transit Company Outlines Present and Future Work at Annual Outing

Speaking with enthusiasm on the subject of industrial peace and the means by which it might be generally effected, Thomas E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company, Philadelphia, Pa., made a deep impression upon his hearers on the occasion of his annual banquet to the employer and employee committeemen of the company. This event is held simultaneously with the annual outing at Willow Grove Park, near Philadelphia, which the employees of the company attend en masse with their families. Aug. 31 and Sept. 1 were the dates for the picnic this year, half of the employees attending on each of the days with the committeemen's banquet taking place on the evening of the second day.

Mr. Mitten discussed the manner in which the co-operative plan, upon which the present structure of the Philadelphia Rapid Transit Company is founded, has gradually evolved, from the hopeless confusion of 1911 to the "Market Basket" wage and participation in profits which the men have today. His hope, he declared, is to have labor everywhere continue this metamorphosis into the rôle of capital along the lines which have been proved as practicable by the Philadelphia company. Only in this way may strikes and their resulting hardships be eliminated for once and all, since a man who owns a share in the company for which he works will not strike and imperil that which is his own.

Reaffirming the remarks which he made earlier in the day before the mass meeting of employees and their families, he decried the widespread adoption of installment buying, with its consequent urge to live beyond one's income and the feeling that it is necessary to keep up with "Mrs. Jones" next door. At the mass meeting he had appealed particularly to the women to curb these fallacious practices; at the evening banquet he urged his committeemen to throw their every effort into the campaign to build up the saving habit.

Mr. Mitten went into some detail in discussing the co-ordinated transportation service which exists in Philadelphia and complimented the various branches of the service on the diligence with which they have applied themselves to their respective jobs and the enthusiasm which they have for those jobs. Mr.

Romance in Milwaukee Street Car Movie

HAVING told the people of Milwaukee about its transportation and electrical services through the medium of the spoken word, together with publicity and advertising in the newspapers, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has entered the field of motion pictures. Camera men are already "on location" shooting scenes for the new film which will consist of three reels. As yet no title has been selected but the film will be shown in Milwaukee theaters next autumn and winter. The scenes, all of which will be taken in Milwaukee, will be developed around the romance of Jimmie, a motorman, and his sweetheart. Kelsey Cook and Gladys Moore (Miss New Orleans, 1925), of Rothacker Industrial Films, Inc., take the leading parts. George Bainbridge of the Rothacker firm is directing the film.

Mitten mentioned again the figures which had been quoted in the afternoon meeting by President W. K. Meyers to the effect that \$20,000,000 a year has been saved out of a gross income of \$50,000,000 by the economies carried out by the company's employees. Of this startling amount \$2,000,000 is shared equally between Mitten men and management, while the public receives the balance in improved service, reduced fares and similar items.

The speaker went into some detail on the results obtained with the P.R.T. air service and discussed generally the future of aerial transportation in this country. He closed with a pledge to devote his every effort in future years to furthering industrial peace and transforming labor into capital throughout the country.

Dr. A. A. Mitten was the toastmaster at the banquet, at which, in addition to Mr. Mitten, a number of the committee chairmen and of visiting guests from the International Railway, Buffalo, discussed the work of the co-operative associations. More than 60,000 people attended the outing during the two-day period.

Another Step Toward Enactment of Louisville Ordinance

After being passed about two weeks ago by the Board of Councilmen, the new franchise ordinance of the Louisville Railway, Louisville, Ky., went to the upper board, or Board of Aldermen, on Aug. 24, and with certain amendments was unanimously passed. On account of these amendments the bill will now have to go back to the Board of Councilmen. It is reported that the lower board will pass the amended bill, it having been approved by the president of the Board of Councilmen, in amended

form, prior to final action by the Board of Aldermen. The Mayor has indicated that he will sign it. As it stands the ordinance provides among other things:

Continuation of present 7-cent fare for two years, with general transfer privileges.

Half-fare for school children, with free rides for police, firemen and park guards when in uniform.

Combine ride by street car and buses for the same fare charged on buses not to exceed 10 cents.

Appraisal of the street railway property by a competent appraiser to be appointed by the Mayor.

Change in rates may be made by the General Council after the expiration of two years.

The railway is required to make monthly operating reports to the Board of Works.

Board of Works is required to supervise the management of the railway, although nothing in the ordinance is to be construed as relieving the company of the private management.

Adequate service is required of the company at all times.

The company is required as an expense of operation to accrue adequate sums for depreciation and amortization and to set up these sums in the form of reserves under the accounting system then in force.

To obtain new money for improvements, extensions or betterment of the service, the company may, from time to time, issue and sell new securities in such amounts as may be necessary to meet the demands.

The company is required to construct and maintain the supporting substructures of the streets, and make repairs to any streets damaged in the laying or repairing of the company's tracks.

In the event the company knowingly fails or refuses to abide by the terms of the ordinance it shall be subject to a fine of not less than \$50 nor more than \$100 for each offense, and each day's failure or refusal constitutes a separate offense.

Chicago Aldermen to Hear New York Traction Offer Sept. 9

The New York bankers who propose to finance the Chicago Surface Lines under a new twenty-year franchise will be heard by the local transportation committee of the Chicago City Council on Sept. 9, it was announced after a conference between Judge John M. Harlan, who tendered the offer to Mayor Dever on Aug. 26, and Alderman Joseph McDonough, chairman of the committee.

According to the proposal as outlined by Judge Harlan, their go-between, the Eastern financiers are willing to put up in the neighborhood of \$40,000,000 in new capital on a 20-year agreement, refund the outstanding securities and pledge themselves to accept a new ordinance providing for unification of elevated, surface and bus lines at a single fare, and subways if the needed legislation is secured.

Several prominent Chicago bankers who refuse to take the proposal seriously say that a 20-year franchise is inadequate, that the \$40,000,000 for extensions and improvements is insufficient and that the present bondholders would enter no such agreement. The refunding bonds, as proposed by Judge Harlan, would constitute only a secondary lien against the property after a prior lien sinking fund issue to raise money for the suggested betterments.

Sunday Passes on Three Adjoining Ohio Interurbans

Owing to the successful revenue and riding results obtained with the Sunday unlimited-ride pass since its installation on July 4, the Stark Electric

Railroad, Alliance, Ohio, has extended its use to include holidays as well. The first of these holidays will be Labor Day, when the pass will be especially welcome because of an unusually important Labor Day celebration at Alliance. The pass sells at 50 cents to adults and at 25 cents to children who are between six and thirteen years of age.

As of Sunday, Sept. 5, the Northern Ohio Power & Light Company and the Youngstown & Ohio River Railroad will add Sunday passes for trial use on all September Sundays and also on Labor Day. The Northern Ohio will issue adult and children's passes at 50 cents and 25 cents respectively, while the Youngstown & Ohio River Railroad will

issue just one price pass, viz., 50 cents.

The Northern Ohio pass will be good for unlimited rides by bearer on the interurban cars between Canton and Uhrichsville and also on the local or city cars in Canton and Massillon. The Youngstown & Ohio River Railroad's pass will be good between Salem and East Liverpool. As Canton and Salem are the terminals of the Stark Electric Railroad, the latter will afford a gateway for cheap and convenient travel between points on the adjoining systems. It will be possible for a person buying three 50-cent passes to ride from Uhrichsville to East Liverpool, the total cost of this and all other long rides being very much less than at existing rates of fare.

Arbitration Hearings End

Review of Summing Up of Counsel for Boston Company in Wage Case Which Now Goes Before Board for Its Decision— Many Telling Points Made

IMMEDIATELY after Labor Day the arbitration board which has heard the Eastern Massachusetts Street Railway wage dispute will meet for its first discussion of the evidence in the case. Then Judge John C. Leggat, the chairman and neutral member of the board, will write the decision.

In his argument in behalf of the railway, Arthur G. Wadleigh, who is a member of the board of trustees and its attorney in the arbitration proceedings, said at one point:

If there is any merit in the demands for increased wages and changed working conditions, you may be sure you have the advantage of everything that can be said in favor of it. Nothing has been skipped in this case. I don't remember that Mr. Vahey (counsel for the men) has read anything here from Justice Higgins of Australia, but if he hasn't I venture to say he has put it in the record. He covers not only this country, but the Antipodes in his search for something that will enable you or induce you to believe that these men haven't had a decent wage for the last twenty years and won't have a living wage for the next year unless you increase their wages.

Mr. Wadleigh said that really the important question was whether the men should have more wages—a question contingent and predicated upon whether they are now receiving a decent living wage. He said he had always contended, now contended and should continue to contend that the financial condition of an employer under some circumstances should be considered a factor in determining what he shall pay to his employees, but that he had never taken the position, and did not now take the position, that these gentlemen were not entitled to a decent living wage irrespective of the financial condition of the company. He did not for a moment take the position or assert that the company could not pay what the board of arbitration decided to be a decent living wage. Mr. Wadleigh said:

Our contention is that we are paying a decent living wage, and I believe that I would be justified in resting what I have to say with reference to that contention solely on the evidence that has been introduced here by Mr. Vahey himself. You do not suppose for a moment, Mr. Chairman, do you, that Mr. Vahey in culling the length and breadth of the Eastern Massachusetts Street Railway and bringing here

his human exhibits to show why they should have more wages, has picked out the best examples of comfortable living? He has probably done as well as he could, in picking out personnel, and in every instance where a witness has appeared here in answer to questions on either direct or cross-examination he has been obliged to admit that he has had a comfortable living ever since he went to work on this street railway, and that he has brought up his family, if he had one, in respectable surroundings and in a creditable manner. Not one of them has answered "No" to a question of that kind. Here is Powers. He has worked for this company since his former employer went into obsolescence. He has been a valued employee, and is today. He has brought up a creditable family in a creditable way. I put the question to him as to whether he thought he had a good job, and he was an honest enough man to say "Yes." He went on to point out some factors that made it a good job that I hadn't thought of and didn't know. He said it was a stepping stone to other jobs, and he said that the greater part of the traffic policemen on the streets of Lowell were recruited from the ranks of the Eastern Massachusetts employees.

Here is McGowan. He says it taxes his mental capacity to operate a one-man car. Yet he learned how to do it in two days, and he is the president of the general conference board. If his mental capacity was of such limited caliber that it taxes it to run a one-man car he wouldn't be president of that board; and so on, all through.

It is significant that the average age of the men employed on our road is 46 years, and that the average length of service is nineteen years. Do you suppose that men of the caliber of the witnesses who have appeared here would stay for nineteen years, and that is the average length of their stay, in an employment or occupation that did not afford them a decent living wage and a chance to bring their families up under decent American conditions?

Now let us see just for a moment what constitutes the yardstick of the cost of living as applied to them. The wages on this system between October, 1913, and June, 1926, have increased 117.9 per cent. During the same interval the cost of living has increased only 60.9 per cent.

Mr. Wadleigh then pointed to the fact that Judge Enright's award last year was based wholly on the cost of a decent living. Every other consideration, offered either by the men or by the company, was set aside and Judge Enright proceeded to give the men what he found to be a sufficient wage for a decent living. There has been no change in the cost of living since then. He then said:

It is true the company has asked you to cut the wages of the men. That is one of the articles of submission here. We haven't receded in any way from that request, but I am going to be exceedingly frank and

say I do not expect you will do it, but I see no reason whatever where your Honor can say Mr. Vahey has sustained his burden of proof on the question of whether these men shall have any more pay than they do now.

Mr. Wadleigh said that the proverbial last straw which breaks the camel's back might come into existence on the railway or on a part of it. Every increase in fare had a marked effect on the public, and the diminution in riding consequent upon an increase in fares was not to be measured wholly by what it costs the pocket book of the rider; it was to be measured somewhat by their outraged feelings. It was pretty easy for them to get a Ford.

According to Mr. Wadleigh the exhibits in this case showed that the Eastern Massachusetts Street Railway was paying its employees more than the average railway in this country. He also said that the average earnings on the Eastern Massachusetts Street Railway were in excess of the average weekly earnings of the employees in the textile and woolen mills and shoe factories and tanning industry, the main industries upon whose workers the railway must depend for its patronage. The Eastern Massachusetts is a one-man railway, 96 per cent of its mileage is one-man operation; 90 per cent of its personnel are one-man operatives. So Mr. Wadleigh said that when the arbitrators were fixing wages for one-man car operators they were fixing wages for the blue uniform men on the Eastern Massachusetts system. The basic rate to which he alluded was a rate in name only, as it applies to 10 per cent of the persons employed on the road.

The men on the Eastern Massachusetts system earned last year an average wage of \$1,825. That, of course, took into consideration all classes of men, including one-man car operators. That was an average wage of \$36.45 a week—remuneration much greater than the average wages of the working people in manufacturing and textile cities and towns served by the railway. The average weekly wage in June, 1926, of male boot and shoe workers was \$25.03. The male workers in the woolen and worsted goods averaged \$21.10; the workers in cotton mills \$21.71 as against \$36.45 a week average earnings on the Eastern Massachusetts. Mr. Wadleigh said frankly that in earning that average the men did probably work more than six days in the week on an average. They were entitled to consideration of that factor for what it was worth. In Fall River average payroll earnings in June were \$18.39, in Brockton \$23.09, Lawrence \$22.50, in Lowell \$19.37, in Taunton \$22.57. Counsel for the company also said very frankly:

Now an increase in wages, as far as anybody representing the Eastern Massachusetts is able to see, must inevitably result in an increase in fares. Whether an increase in fares will bring an increase in gross revenue is in the laps of the immortal gods; nobody knows. We don't know. In that connection your Honor has to consider whether it is fair play and decent usage to car riders, the majority of whom are receiving much less per week in wages than our men, to add to their cost of living by increasing the cost of a necessity in the life of these people riding on these cars, for it has been admitted here on all hands that the riding has all gone except the necessity riding.

Resumption of Service Promised Argentine, Kan.

According to William G. Woolfolk, president of the Kansas City Public Service Corporation, Kansas City, Mo., the proposed successor to the Kansas City Railways, street cars will again be operating over the Twelfth Street bridge into Argentine, Kan., as soon as the corporation gets possession of the railway, probably about Oct. 1. Mr. Woolfolk made his statement after Powell C. Groner, attorney for the reorganization committee of the railway, had offered to furnish Argentine with street car service providing Kansas City, Kan., would forego a \$12,000 annual rental on the viaduct. At the same time William Drennan, city attorney, had said he believed the viaduct rental could be abated legally.

New South Shore Service Started

Downtown Chicago and South Bend, Ind., were connected on Aug. 29 by high-speed electrically operated trains of the Chicago, South Shore & South Bend Railroad, operated under their own power to and from the Illinois Central Randolph Street suburban station.

Limited trains make the run from the Randolph Street station to Hammond in 37 minutes, to East Chicago in 42 minutes and to Gary in 57 minutes. Trains run from Chicago to Michigan City in one hour and 35 minutes and from Chicago to South Bend in two hours and 30 minutes.

Control of the South Shore Line was acquired a year ago by the Midland Utilities Company and since that time an extensive rehabilitation program has been carried on. The line has been completely re-electricified and now the electrification of the Illinois Central makes it possible for South Shore Line trains to run downtown under electric power from Kensington, from which point they have heretofore been towed in by Illinois Central steam engines.

The South Shore Line is the only railroad serving that part of the Indiana Dunes now owned by the state, and South Shore Line trains stop at Tremont, the main entrance to the Indiana Dunes State Park, which was formally opened on July 1.

More Praise for Grand Rapids Cars—More Patrons Carried

Emphasis is placed on the increased patronage on the lines running the new cars of the Grand Rapids Railway, Grand Rapids, Mich., in an article in the *Detroit News*. The account states that the cars have been operating for about a month, and in that time one line has increased its earnings 8.04 per cent over the similar period last year when the old cars were in service. Another line shows 7.95 per cent increase and a third 2.99 per cent. The new cars are concentrated on those three lines. The lines using the old cars, on the other hand, showed an increase in earnings of only 1.46 per cent over last year. The article in the *News* gives a brief account of the installation of the new cars and of the plans to arouse public interest and to

improve the service. It is illustrated with pictures of the inside and outside of one of the cars and also with a portrait of Mr. DeLamarter, vice-president and general manager of the company, who is largely responsible for their design and unusual features.

Organized Accident Prevention Work Promotes Safety

Not a single fatal accident among the 6,000 employees of the United Railways, St. Louis, Mo., since Jan. 1, 1926, and not one street car involved in a fatal accident since May 1 is the record set by the St. Louis street car system, according to a report made public by Girard C. Varnum, secretary-manager of the St. Louis Safety Council.

Nine accidental deaths involving street cars have been recorded this year, compared with fifteen deaths during the same period in 1925, fifteen during 1924 and twelve during 1923. Varnum attributed the good showing to the United Railways' organized effort to prevent accident. The company holds safety first meetings every month for the carmen and other employees, while keen competition among the various sheds for the best accident prevention record is encouraged. Prizes are awarded the sheds making the best showing each month. New employees are given a rigid course of instruction and must undergo a thorough test and examination before being permitted to work on the cars.

Boulevard Plan for St. Louis Approved

United States District Judge Faris on Aug. 25 authorized Receiver Rolla Wells of the United Railways, St. Louis, Mo., to accept the proposal of the Board of Public Service providing for the removal of its present tracks in Olive Street between Twelfth Boulevard and Channing Avenue and placing them in a central parkway when Olive Street is widened from 60 ft. to 100 ft.

Opposition to the proposed plan has developed among property owners along Olive Street and some automobilists are also opposed to it. However, as more than 90 per cent of the users of Olive Street ride in the street cars, the Board of Public Service has decided that the parkway will speed up traffic along Olive Street and protect railway patrons from reckless automobile drivers.

The plan for the reconstruction and widening of Olive Street with a parkway in the center for the exclusive use of street cars has been approved by the Chamber of Commerce. The committee found that the neutral zone for street cars would speed up the cars, expedite all other traffic using the street and enhance the safety of pedestrians. The total cost of the widening and paving has been estimated at \$2,783,507, of which property lying east of Twelfth Boulevard and west of Channing Avenue and the city generally will pay about 60 per cent. Property actually facing on the improvement is to pay less than 40 per cent of the expense.

Tunnels Come High in New York —\$15,000,000 a Mile

Contractors have been invited to bid on construction of the municipal subway from Eighth Avenue, Manhattan, through 53d Street to and under the East River to Nott Avenue in Long Island City. The job will be let in three sections. On Oct. 1 bids will be opened on the two sections crossing Manhattan and on Oct. 15 bids are asked for the tube under the river.

The estimated cost of this branch to Nott Avenue is \$30,000,000. The length is a little more than 2 miles. Costs of station finish, cars, equipment and power supply will be added to construction, and for land damages there will be a liability not yet computed. Within conservative calculation the sinking fund requirements for this 2 miles of subway will be \$2,000,000 a year for 50 years.

The new tunnel will be eleven blocks north of the Interborough Rapid Transit Company's and seven blocks south of the Brooklyn-Manhattan Transit Company's. It will be a competitor of both lines. All three will connect in Long Island City with the terminal the Long Island Railroad is building to relieve the congestion at Pennsylvania Station.

Pay-as-You-Pass Plan in Milwaukee

To overcome objection in the Railroad Commission's recent city-wide report on railway service that the articulated trains were slow, delayed traffic and did not carry full loads, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has introduced a new method of operating these cars. Hereafter the front car will be run as a pay-as-you-leave. Passengers enter this car at the front without paying fares to the motorman. If they remain in the front car they pay their fares to the conductor at the center entrance when they leave. They can also pass through to the rear car, paying the conductor when they pass him. The rear car will be loaded as heretofore at the center, passengers paying as they enter but taking seats in the rear car only. With two entrances in use instead of one under the old plan, loading is greatly expedited. The only exit is at the center. Cars operated in this fashion carry a sign at the front reading "Double Car, Enter Front or Rear."

Franchise Renewal Asked by Ohio Line

The Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio, recently applied to the City Council for the renewal of its 25-year franchise. The matter was taken under advisement. Julius Lochsinger, chairman of the committee, said that changes in the transportation system of the city since the original franchise was granted have made it necessary to adapt the new privileges sought to the plans now existing. The company is already operating buses in conjunction with the service.

News Notes

One-Cent Raise for Mansfield Employees.—Employees of the Mansfield Public Service Company, Mansfield, Ohio, have signed an agreement for 1926, accepting the company's offer of an increase of 1 cent an hour in wages. This makes a flat rate on all lines of 57 cents an hour. A clause was included in the agreement which gives the men the right of signing on either buses or cars in accordance with seniority and at the car rate of pay.

Free Trip for Portland G. A. R. Members.—The Portland Electric Power Company, Portland, Ore., on Aug. 24 transported free members of the G. A. R. who attended the Sells Floto Circus as guests of the circus management.

Compensation Claims Dismissed.—Compensation claims of A. L. Shapleigh and Henry S. Priest against the United Railways, St. Louis, Mo., aggregating \$120,000 were dismissed in the federal court Aug. 11. Mr. Priest sought \$69,750 for services as general counsel for the corporation. Mr. Shapleigh asked \$30,737 as president over a four-year period and additional \$19,687 as president for two years and seven months.

Paving Question Point in Franchise Discussion.—The City Commission of Middletown and the Cincinnati & Dayton Traction Company, Hamilton, Ohio, are at a temporary deadlock over the question of renewing for twenty years the franchise of the company, which desires to be relieved of any future paving between tracks and 18 in. each side. The City Commission insists upon the company's assuming paving burdens.

One-Man Cars to Speed Up Service.—Fred Cooper, manager of transportation for the Portland Electric Power Company, Portland, Ore., has announced that one-man cars are to be run on the Richmond line, except during the peak hours of traffic, thus cutting the schedule from 12½ to ten minutes. Later, if patronage justifies, it is planned to add another car. Mr. Cooper states that this is part of a general movement which the company intends to sponsor to encourage the public to ride street cars. In order to accomplish this purpose the shortest possible intervals between cars must be provided. One-man cars, however, will be introduced only on lines where it seems feasible.

Rental Agreements Continue Between Ohio Lines.—Agreements between the Community Traction Company, Toledo, Ohio, and interurban lines entering the city over the local company's tracks have been extended at the old rental rate for the balance of the calendar year. The rate imposed by the agreements, which expired on Aug. 1, involved both car mileage and ton mileage as its basis. It averaged about 20 cents for the 18-ton cars and 36 cents a car-mile for the 40-ton type of car. Officials of the company had intended to ask for a revision upward, but put the matter over for a few months in order to avoid any issues during the settle-

ment of the amendments to the Milner service-at-cost ordinance.

More Arrests in East St. Louis Hold-Up.—I. Lochman and J. Giardano, St. Louis youths suspected of participation in the \$8,100 robbery of an East St. Louis & Suburban money car in East St. Louis, Ill., on July 19, last, have been held for the St. Clair County Grand Jury under bonds of \$30,000 and \$35,000 respectively. At a preliminary hearing before Justice of the Peace Grossman both youths were identified by Joseph T. Van Dusen, an assistant cashier of the railway, and A. B. Shiek, motorman of the pay car, as two of the bandits who staged the robbery. As

recorded in the *ELECTRIC RAILWAY JOURNAL* of Aug. 14, five other men and a woman are under arrest in connection with the robbery.

Increased Fare Asked by Ohio Company.—The Northern Ohio Power & Light Company, Akron, Ohio, is asking to increase its fare from Akron to Wadsworth from 20 cents to 25 cents. All that remains is for the Wadsworth Council to grant permission. The present franchise with Wadsworth has five years to run. The company asks the right to increase the fare between Wadsworth and Barberton from 10 cents to 12½ cents in tokens or 14 cents cash.

Foreign News

Ticket and Change Machine

Experiments are now being made with a new combination ticket-issuing and change-giving machine by the London underground railway companies. A passenger desiring a 2d. ticket inserts 6d. or a shilling in the slot and receives a ticket and 4d. or 10d. change instantaneously.

Statistics show that 65 per cent of the traveling public throughout the day ask for change and it is thought that the slot machine, which gives both ticket and change by the same operation, will prove very popular with the underground passengers.

Berlin Buses in 1925

The report of the Allgemeine Berliner-Omnibus A. G. (General Berlin Omnibus Company, Ltd.) for the year 1925 states that the suburban lines still failed to meet expenses. The increase in number of routes, which are now thirteen city and six suburban lines, was accompanied by an increase of passengers from 48,058,153 in 1924 to 77,163,551 in 1925 and a corresponding increase in bus-kilometers from 8,475,264 to 13,859,302 (5,254,664 car-miles to 8,592,767 car-miles). The passengers per bus-mile were respectively 9.2 and 8.9.

Revenue from transportation was 14,980,625 marks and operating expenses 11,505,121 marks. The latter sum approximates \$2,795,715, which leads to an operating cost of 33 cents per bus-mile for the mixture of double-deck and single-deck vehicles used. The total earnings were 14,993,122 marks. From this amount depreciation and other allowances totaling 2,435,357 marks were made as follows: structures, 636,893 marks; vehicles, 1,451,017 marks; machinery, 273,437 marks; inventory or supplies, 74,010 marks.

Of the net earnings of 1,052,644 marks remaining, 119,883 marks were assigned to reserves, 6 per cent (72,000 marks) was paid to preferred stock holders and 10 per cent (720,000 marks) to common stock holders. License fees amounted to only 43,200 marks. The remainder, 97,560 marks, was carried over as surplus to 1926.

The latest bus service to the suburbs was started by this company April 10, 1926, between Unter den Linden in Berlin and the fashionable suburb of Grunewald-Hundekehle. This route is 11 km. (6.8 miles) long with an over-all fare of 1 mark (24.3 cents) and a short-haul fare of half this amount. The run, which includes twelve stops, is made in 30 minutes. The vehicles are single-deck, 30-seat buses, run on fifteen-minute headways.

Liverpool's Prosperous Municipal Tramways.—"During the past year the Liverpool tramways carried 246,000,000 passengers," which meant carrying nearly the whole population of the city, each day, F. C. Wilson, chairman of tramways and electricity committee, stated after an inspection on March 8. The department paid £90,000 a year in rates and taxes, ran at the lowest fares in the United Kingdom, showed a profit, and contributed £50,000 in relief of local rates. There were 675 cars in service.

High-Speed Cars for Glasgow.—Two experimental cars are now under construction in Glasgow, one a single decker and the other a double. Ordinary cars in this city are four wheelers, but these two will be of double bogie type, having two 50-hp. motors each, geared for a maximum speed of 50 m.p.h. The development is one of the methods adopted by the Glasgow tramways for meeting bus competition.

Light Signals on Southern Railway.—Four-aspect color light signals have recently been installed by the Southern Railway of England. Each signal has four powerful electric lamps mounted on masts and arranged vertically. The lights, used all day and night, indicate as follows: Green—All right; proceed. Two yellows—be prepared to find next signal at caution. One yellow—be prepared to find next signal at danger. Red—Stop. The track circuit system of automatic signaling is also employed.

Passimeters in London and Berlin.—Berlin has decided to adopt the passimeter system now used at the London Underground railway stations. Eight new stations have also been added to the existing 27 now using it in London.

Recent Bus Developments

Final I. C. C. Bus Hearing Postponed

Announcement has been made by the Interstate Commerce Commission of an extension of time until the end of September for the railroads to answer questionnaires as to their bus operations, and of a postponement from Sept. 20 to Oct. 25 of the general hearing in Washington, which will conclude the investigation.

The time given the railroads to present full and complete data on their bus operations will permit a report from the B. & O. as to its new terminal coach system in New York.

A motor bus and truck bill will be brought up at the short session of Congress, but it is doubtful if any action can be had until the next long session, which does not meet until December, 1927. The Cummins-Parker bill, now pending before Congress, provides for divided regulation of buses and trucks by the federal commission and state railroad commissions. Hearings were held on this measure during the last session of Congress, but action was not taken. The I.C.C. hopes to have available for the coming session recommendations which will lead to drafting a measure that will have the approval of bus and truck operators as well as the railroads and shipping public.

Steam and Electric Roads Opposed Over Bus Rights

The Boston & Worcester Street Railway, Framingham, Mass., is seeking to obtain a license to operate a bus line between Framingham and Boston. Its plea is opposed by the Boston & Albany Railroad. The electric railway has a bus line now between Boston and Worcester and is operating trolleys over the proposed route between Boston and Framingham. The steam railroad objects on the ground that the buses would cut into the earnings on the train service between Boston and Worcester.

Equipment in Texas Sold for Scrap

Eight safety coaches once valued at \$10,000 each were sold at Dallas, Tex., on Aug. 20 for \$625 apiece under a court order. This equipment belonged to the Dallas-Fort Worth Safety Coach Company, organized two years ago to operate between Dallas and Fort Worth, a run of about 40 miles, in direct competition with lines of the Northern Texas Traction Company, winner of the Coffin prize two years ago and operator of the Crimson Limited trains.

Texas has no regulation and no public service commission. All the operator does is buy a bus and start to run. That is what the coach company did. It ran the eight coaches on varying schedules and at several different rates of fare. Innumerable jitneys, mostly nondescript

touring cars, followed in the wake of the coach service. Since the jitneys made the 40-mile run for 50 cents both the railway and the coach company suffered, but particularly the coach company.

The Fageol Company secured a judgment on May 19, 1926, for \$48,716 against the Safety Coach Company. The court ordered L. S. Gross, United States Marshal, to sell the coaches to satisfy the judgment. The Fageol Company alone bid for the coaches, and it bought them for a lump sum of \$5,000.

\$17,775,000 for Buses and Equipment in New Jersey

By the end of the current year the Public Service Corporation of New Jersey will have spent more than \$17,775,000 for buses, garages, shops and other equipment necessary to provide the best bus service. Since it entered the business Public Service has bought more than 700 new buses. These are among facts being stressed in newspaper advertising run by the company.

Interstate Bus Rights Asked

The Scioto Valley Railway & Power Company has asked the Ohio Public Utilities Commission for permission to operate eight twelve-passenger parlor car buses for interstate traffic between Chillicothe, Ohio, and Huntington, W. Va. The buses will run on an hourly schedule if the permit is granted. They will travel over a route which will include stops at Portsmouth, Ironton, Ashland and Huntington.

Coach Service from Chicago to Grand Rapids

New motor coach service between downtown Chicago and Benton Harbor and Grand Rapids, Mich., was started on Aug. 29 by the Shore Line Motor Coach Company, owned in part by the Chicago, South Shore & South Bend Railroad.

Exclusive features of this new motor coach service are the reservation of seats and the option of riding between Chicago and Michigan City, in either direction, on the fast limited electrically operated trains of the South Shore Line, thus saving an hour in time. Motor coach tickets carry a coupon on which passengers are assigned specific seats, the same as in railroad parlor cars. Tickets and seat reservations may also be made in advance.

The Chicago terminal of the Shore Line Company's Michigan service is at the passenger station of the Chicago, North Shore & Milwaukee Railroad at Adams Street and Wabash Avenue. Stops will be made at the Auditorium Hotel, Chicago Beach and Windermere Hotels, and 63d Street and Stoney Island Avenue on the south side of Chicago.

Motor coaches are run from Chicago

to Benton Harbor every two hours from 7 a.m. to 7 p.m., central standard time. One coach will run each way daily between Chicago and Grand Rapids. It will leave Chicago for Grand Rapids at 9 a.m., central standard time.

Bus Rights Sought at Lancaster

Application was filed at Harrisburg, Pa., on Aug. 27 with the Public Service Commission by the Conestoga Traction Company, Lancaster, Pa., operating in Lancaster and Chester Counties, for permission to extend its charter rights to include that of operating buses for freight and passengers on all its lines. Under a charter issued in 1922 the company now operates buses between Lancaster and Long's Park, Manheim Township, Lancaster County. The Cumberland Valley Transit Company, now operating between Chambersburg and Shippensburg, in an application filed with the commission, seeks permission to operate along certain streets in the two boroughs.

Bus Service Considered for Memphis Suburbs

A system of buses under the management of the Memphis Street Railway, Memphis, Tenn., operated through the principal suburbs of the city, is one of the possibilities of the city in the near future. Realization of the plan is said to be probable after the completion of the Poplar Avenue viaduct at Aulon.

The project hinges on extensions of Madison and Union Avenues to a point from East Parkway to Poplar Avenue, near Aulon.

The buses, if definitely decided upon, will operate through Highland Heights, east on Poplar, Southern Avenue, Lamar Avenue, and probably south of the city, it is said. Connections with cars on the Raleigh, Normal, Poplar Avenue and Lamar Avenue and Forest Hill lines may be made if the proposition is carried out. This will give suburbanites regular service at minimum cost. It will be dependable, and the buses will run on schedule time.

Plans for the Poplar Avenue viaduct are being whipped into shape. It probably will be completed late in 1927. The city will pay its portion of the cost, and the four railroads crossing Poplar at Aulon will pay their part. Officials of the railroads promise one of the best and most attractive viaducts of its kind in the South.

Latitude Asked in Twin City Operation

The Twin City Rapid Transit Company, Minneapolis, Minn., told the Minnesota Railroad and Warehouse Commission that in its supplementary bus operations it proposes to provide adequate and modern transportation service on the most economical basis and that if this new service does not command sufficient patronage the company does not propose to be bound rigidly to carry it on.

In two ways the company's attitude has been placed before the commission: The Minneapolis City Council street car

committee has been told that bus operation is experimental and that unless the buses are patronized to the extent of four cash passengers per mile or eight combination cash and transfer passengers the company would go before the state commission with application for permission to discontinue the service and such an application would not be opposed by the City Council.

The company has applied for more flexible schedules on its intercity and interurban bus lines, with a view to operating buses to meet the patronage and, while with minimum and maximum service clauses adequate service is to be provided at all times, the company would not be forced to operate uneconomically; the present requirements are more rigid.

The railway is now before the commission to obtain certificates of convenience and necessity under the state law for operation of five bus lines in Minneapolis.

Bus Service Extended in Kansas City

With the completion of the new paving on South Troost Avenue in Kansas City, Mo., the South Troost Bus Line of the Kansas City Railways has been extended from 61st Street south to the city limits at 79th Street. The northern terminus of the line is at 55th Street, at which it connects with the Troost Avenue car line.

The bus franchise originally provided that the buses should operate from 55th Street to 79th Street, but up until Aug. 22 the condition of the pavement south of 61st Street has been such as to prevent buses from operating over it.

Texas to Regulate the Bus

An amendment to the law placing bus and truck transportation under the jurisdiction of the Texas Railroad Commission will be required before regulation in the Lone Star State can be effectively enforced, according to C. V. Terrell, member of the Railroad Commission. For this reason rates and regulations will not be promulgated until after the next regular session of the Legislature in January, when it is expected the existing law will be amended so as to cure the defects that now prevent the Railroad Commission from exercising control.

More Independent Bus Lines Withdrawn in Cincinnati

Abandonment on Sept. 1 of the Elberon Avenue route of the Cincinnati Motor Bus Company is announced by Edwin Becker, secretary of the company, in a letter to E. D. Gilman, Director of Utilities. It was announced the company was losing money on the operation, and that the receipts for July were approximately \$2,500 less than the cost of maintaining the service.

This is the second route to be discontinued within the last 30 days, the East End-Red Bank operation of the company being discontinued a few weeks ago.

Mr. Gilman said:

Buses cannot operate successfully on their present rate of fare, and the people of Cincinnati who wish to ride in buses must come to a realization of the fact that they must pay a higher fare or expect discontinuance of service.

It is stated not a bus line in Cincinnati is able to hold its own, but that

all are losing money at the existing rate of fare. In this connection attention has been directed to the report for July recently submitted by Walter A. Draper of the Cincinnati Street Railway, which indicates that railway operation for the month recorded a surplus of approximately \$6,000, but that this was offset by a deficit of \$15,000 incurred by the operation of its motor coach service.

Substitution of Buses Again Asked in Huntington

The Huntington Traction Company, Huntington, N. Y., is about to apply to the Town Board of Huntington for consent to substitute buses for trolleys over the entire 7½-mile route of the company's present railroad. The company would expect to have the buses in operation within 30 days after the order of the Public Service Commission authorizing the substitution was made, and also within 30 days after the commencement of operation of the buses would begin work on removing its tracks, poles and overhead equipment and of restoring the highway. The company made a similar application last May. Its president, E. T. Dempsey, states that with the co-operation of the Town Board and the Public Service Commission the operation of a motor system can be effected without delay.

A committee of the Huntington Chamber of Commerce, after considerable work, appeared before the Town Board several months ago with a request that the trolley line be abandoned and bus service substituted. Both the Huntington Traction Company and the Northport Transportation Company, which now maintains a bus service over a number of the town highways and between the village and Manhattan, applied for bus franchises. The Town Board awarded a permit to the Northport Transportation Company and refused the plea of Mr. Dempsey for a franchise.

Bus Service Discontinued.—The daily bus service of the Ottawa Electric Railway, Ottawa, Ont., to the Ottawa Hunt and Golf Club, via Mooney's Bay, has been discontinued because the revenue from passengers fell far below the cost of operation. In future this bus line will be operated only on Saturday afternoons, Sundays and public holidays.

Crosstown Line for Hartford.—Plans are being discussed by officials of the Connecticut Company with a view to establishing a crosstown bus line at Hartford, Conn. It is likely the line would be routed to accommodate the industrial area at Capital Avenue and would be extended thence to Farmington and Albany Avenues, probably via Sigourney Street.

Operation of Interstate Line Attached.—The Worcester Consolidated Street Railway, Worcester, Mass., has filed an equity suit against the Interstate Buses Corporation, Springfield, Mass., in the federal court at Boston. The railway asks an injunction to pre-

vent the bus company from doing an interstate business between Worcester and Rhode Island. It also asks for damages. The bus company is alleged to be operating its buses without necessary licenses as demanded by the state laws.

Bus Service Extended in Tacoma.—The Tacoma Railway & Power Company, Tacoma, Wash., has started bus extension service on Pacific Avenue to the city limits, on Sixth Avenue and North Stevens Street to North Twenty-sixth and Proctor Streets and on Ruston Way from Old Tacoma to Ruston, on part schedule, which will be brought up to full operation early in September.

Nashville Railway Studies Efficiency of Buses.—J. P. W. Brown, vice-president and general manager of the Nashville Railway & Light Company, Nashville, Tenn., stated recently that bus experts and engineers have concluded a survey to determine the practicability of using buses as adjuncts of the railway system. The company's plans, however, are still indefinite.

Bus Service Increases Madison Street Car Earnings.—The operation of auxiliary motor bus service by the Madison Railways, Madison, Wis., continued to bring the earnings of the company in June above the revenues earned by the street cars alone in the past. Gross revenues from street car and bus patrons during June were \$32,418, compared with \$32,179 for June, 1925. In June of this year street car revenues were \$29,863, a slight decrease from the income of \$30,167 for June, 1925. Street car and bus passengers carried totaled 473,357 for June, 1926, compared with 459,097 for June, 1925. Passengers who used the street car last month totaled 439,554. This is a decided drop over a four-year average of 485,489 for that month.

Increased Rates Approved in Utica.—The Public Service Commission has approved an increase in the rates of the Utica Railway Co-ordinated Bus Line, Inc., Utica, N. Y., on the Parkway and Oneida Street lines within the city of Utica from 7 to 10 cents per capita. A strip of ten tickets will cost 75 cents.

New Transfers for Indianapolis Buses.—A new type of transfer slip has been adopted by the Indianapolis Street Railway, Indianapolis, Ind., for use on its buses. When the transfers are removed from the pads in which they are bound, they are so cut as to indicate the time of day they are issued. Lines to which the transfers are issued are indicated by directions instead of specific names. By using this transfer the company has reduced the number of punch marks from five to three and has made it possible for the conductor to issue transfers without making more than one punch mark at the time of issuance.

More Buses Used in Oregon.—T. L. Billingsley, superintendent of the railway lines of the Southern Pacific in Eugene, Ore., has announced that the company will substitute buses for the street car service between Eugene and Springfield. The Public Service Commission has authorized the railway to make the change.

Financial and Corporate

Abandonment Principles Laid Down in Mount Vernon Case

The Public Service Commission has approved a declaration of abandonment by the Westchester Electric Railroad of two portions of its line in Mount Vernon, as follows:

1. South Fulton Avenue line between East Sixth Street and the Hutchinson River, a distance of 0.536 mile of double track.
2. East Sixth Street from South Fifth Avenue to South Fulton Avenue, a distance of 0.369 mile of double track.

The abandonment is approved by the commission on condition that the railroad remove all its rails and structures and level and fill the part of the streets now operated by the company, under the supervision and direction of the city engineer.

The city of Mount Vernon opposed the application. Commissioner Van Namee, in a memorandum approved by the commission, says the questions before the commission are: Is operation of the routes proposed to be abandoned necessary for successful operation of the road and is operation of the routes necessary for the convenience of the public?

Paving of the two streets is planned by the city. The railroad submitted evidence showing that its estimated share of the cost of repaving South Fulton Street and reconstruction of track was \$74,250 and East Sixth Street \$41,020. The city claimed these estimates were too high, but did not present any evidence thereon. No passenger service has been in operation in South Fulton Street. The track has not been used since 1908 except to bring cars to and from the company's carhouse between the Hutchinson River and South Columbus Avenue. A new carhouse is now

being built in East Sixth Street. There was opposition to abandonment by residents.

The city of Mount Vernon objected to removal of the tracks from portion of the streets in question unless the company removed all of its tracks from all the streets in Mount Vernon upon which it operated and abandoned its franchise.

Commissioner Van Namee in his memorandum says:

This is a condition which has never been imposed by the commission in allowing an abandonment of portions of a street railroad line. It is, at least, doubtful whether the commission could force a street railroad to abandon its franchise. The company however, could abandon all of its lines in the city and abandon its franchise without the permission of the commission. What is necessary for the commission to determine is whether the abandonment proposed seriously affects the successful operation of the balance of the route and the convenience of the public.

Evidence submitted by the company showed net losses from 1921 to 1925 inclusive.

Earnings Off \$1,000,000 During Interborough Strike

The net result recorded by the Interborough Rapid Transit Company, New York, for July was a deficit of \$1,663,538, compared with a surplus of \$252,855 last year, a decrease of \$1,916,394. Of this decrease \$770,000 is due to the receipt of that amount in July of last year as a cash payment on account of the new advertising contract, there being no similar payment this year. The difference is largely attributable to the strike on the company's subway lines during July of this year.

The statement of earnings and ex-

penses for July was presented to the board of directors on Aug. 31. It showed total revenue from all sources of \$4,016,301, a decrease of \$1,242,910 compared with the corresponding month of last year. Expenditures for operating and maintaining the property increased \$622,436. Taxes payable to city, state and the United States increased \$33,684. Rentals increased \$3,298. Income deductions increased \$14,065.

\$980,609 Transferred to Profit and Loss in Baltimore

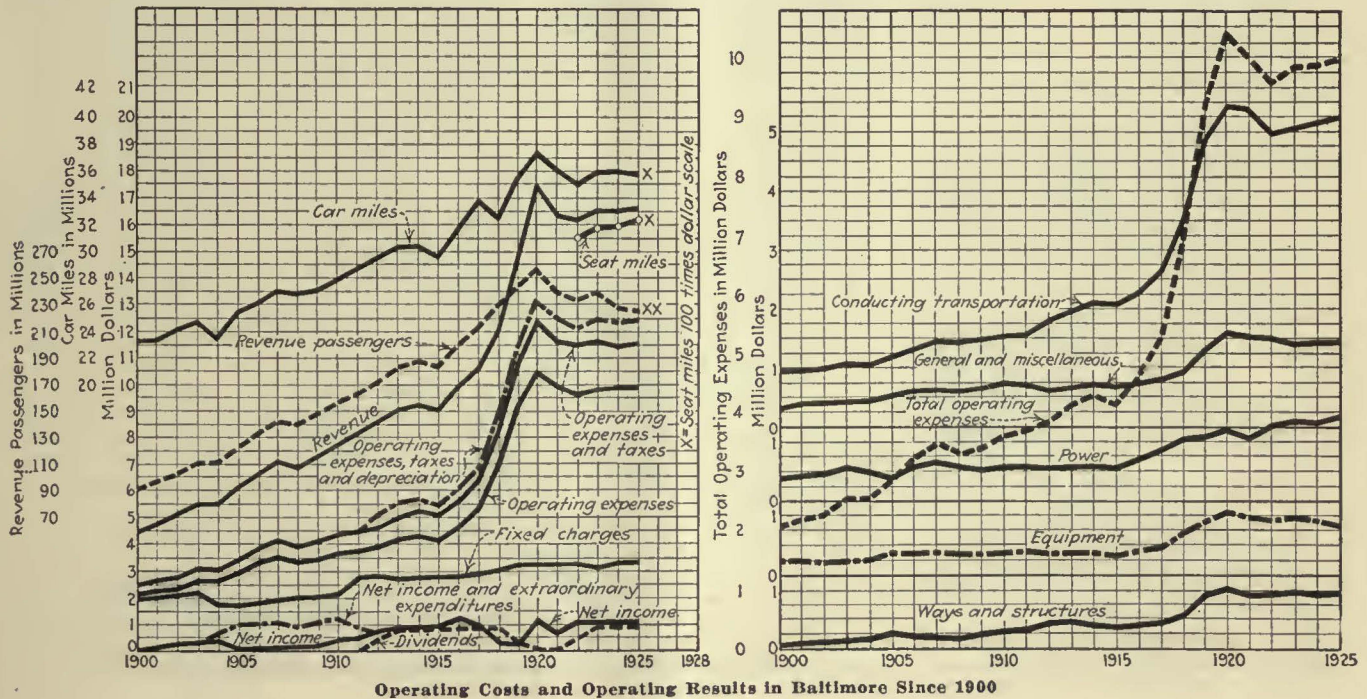
After paying all operating expenses and fixed charges, including interest on income bonds, the balance realized by the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1925, is \$1,811,671. From this was deducted \$818,448 for dividends and \$831,061 for depreciation, the balance going to surplus. This statement was made in the twenty-seventh annual report to the stockholders of the company.

Since 1906 the company has set up depreciation reserves aggregating \$14,315,000, out of which more than \$13,000,000 has been put back into the property for reconstruction and improvements and for property retired, leaving a balance in the reserve account of \$1,303,799. During the past five years the company spent for the items of maintenance and depreciation alone \$13,686,551 and for capital improvements more than \$5,300,000. During 1925 nearly \$3,000,000 was put back into the property for upkeep and improvements.

The report goes into detail on the valuation proceedings and findings.

The total amount of taxes paid by the company during 1925 was \$1,632,386. The total amount paid to the city of Baltimore in park taxes since the consolidation of street railway lines in 1899 now aggregates \$17,229,980.

The report refers to the acquisition of all the buses, property, rights, privileges and franchises of the East Fay-



COMPARATIVE STATEMENT OF EARNINGS
AND EXPENSES OF THE UNITED RAILWAYS
& ELECTRIC COMPANY, BALTIMORE

	1925	1924
Operating income:		
Revenue from transportation.....	\$16,481,077	\$16,294,580
Revenue from other railway operations...	140,142	158,674
Total operating income.....	\$16,621,220	\$16,453,254
Operating Expenses:		
Maintenance of way and structures.....	\$966,995	\$909,911
Maintenance of equipment.....	869,908	949,614
Maintenance of power..	46,054	48,067
Total maintenance...	\$1,882,959	\$1,907,593
Depreciation.....	831,061	822,662
Power service.....	\$2,714,020	\$2,730,256
Conducting transportation.....	1,351,755	1,280,550
Traffic.....	5,270,167	5,189,681
General and miscellaneous.....	*4,145	*12,558
Transportation for investment—		
Credit.....	1,464,987	1,469,082
Total operating expenses.....	\$10,776,811	\$10,637,925
Taxes and licenses.....	1,632,386	1,656,073
Total operating expenses, taxes.....	\$12,409,197	\$12,293,999
Net operating income....	\$4,212,022	\$4,159,255
Non-operating income....	120,814	143,975
Gross income.....	\$4,332,837	\$4,303,230
Interest on funded debt	2,093,415	2,093,415
Remainder.....	\$2,239,422	\$2,209,815
Other deductions from gross income:		
Rents.....	\$558,809	\$546,343
Interest on unfunded debt.....	33,560	30,500
Interest on income bonds.....	559,080	559,080
Amortization of discount on funded debt	59,388	59,267
Miscellaneous.....	47,974	46,655
Total.....	\$1,258,813	\$1,241,847
Net income (transferred to profit and loss)....	\$980,609	\$967,968
Seat-miles.....	1,627,061,900	1,601,907,976
Car-miles.....	35,717,666	35,973,691
Revenue passengers....	224,235,527	228,423,774
Transfer passengers....	92,893,828	91,879,977
Revenue passengers per car-mile.....	6.2852	6.3524
Maintenance cost per car-mile.....	.0527	.0530
Depreciation per car-mile.....	.0233	.0229
Ratio to total operating income:		
Maintenance and depreciation.....	16.33	16.59
Operating expenses and depreciation.....	64.84	64.66
Taxes.....	9.82	10.06
Operating expenses, depreciation and taxes	74.66	74.72

* Credit.

ette Street Bus Company by the Baltimore Transit Company, one of the United Railways & Electric Company subsidiaries. The Baltimore Transit Company operates bus service on various streets as well as trackless trolley service from Gwynn Oak Junction to Randallstown.

During the year the company reconstructed 15.3 miles of track and built nineteen additional articulated cars, similar to the sample car developed in 1924. In addition it increased its service during the year 25,153,924 seat-miles.

The company, in conjunction with the United Railways Association of Baltimore, an organization of employees, during the year expended for free medical and nursing attendance \$88,281 and for pension and insurance payments \$81,359.

Safety educational work among employees was continued during the year. The total car accidents in 1925 were

31 per cent lower than in 1919, when the safety department was organized and traffic conditions were much less acute. Personal injuries during 1925 showed a decrease of 34 per cent compared with 1919. The company transported 63,817 passengers for each one injured in 1919, and in 1925 106,210 passengers were transported for each one injured.

Part of Lebanon-Thorntown
Equipment Sold

Disposition was made on Aug. 27 of part of the property of the Lebanon-Thorntown Traction Company, Lebanon, Ind. Retel-Hyman-Michaels bought the rails, trolley and feeder wire; the Big Four Railroad bought the right-of-way, and the Evans Electric Company bought the poles. The cars have not yet been sold. As recorded in the JOURNAL of Aug. 14, the railway had operated interurban service for 21 years between the center of the town of Lebanon and the center of the town of Thorntown, a distance of about 10 miles. The road has been operating at a loss for some time.

One Month's Accomplishment of
Boston Elevated

On the 630,054 trips operated by the Boston Elevated Railway, Boston, Mass., during the month of July, 1926, 27,160,300 revenue passengers were carried and a total of 4,809,609 miles were operated. A statement from the office of the general manager of the company in which this year's accomplishments during July are compared with last year's is as follows:

JULY OPERATION AT BOSTON		
General Financial Data	1926	1925
Cost of service exceeded revenue.....	\$393,028.41	\$249,477.93
Operating revenue per car-hour (A. E. R. A. std.)...	5.23	5.49
Operating revenue per car-mile operated, cents....	54.24	56.77
Average fare per revenue passenger, cents.....	9.284	9.279
Ratio operating expense to operating revenue, per cent	83.95	79.23
Passengers Carried		
Revenue passengers.....	27,160,300	27,119,429
Per cent 5-cent and 6 cent passengers.....	17.39	17.25
Revenue passengers per car-mile operated.....	5.647	5.995
Operating Facts		
Trips operated.....	530,054	594,131
Car-miles operated:		
Rapid-transit lines.....	1,186,783	1,193,204
Surface, two-man.....	1,965,154	1,983,587
Surface, one-man.....	1,238,162	1,112,084
Express, newspaper and sprinkler cars.....	2,345	9,821
Motor bus.....	417,165	224,646
Total miles operated...	4,809,609	4,523,342

\$34,561 July Deficit of
Toledo Company

Facing higher operating costs and less income from interurban track rentals the Community Traction Company, Toledo, Ohio, had a deficit in July of \$34,561, according to the report of Commissioner E. L. Graumlich to the street railway board of control. The company carried 3,779,835 revenue passengers during the month, compared with 3,590,487 in the similar month last year. Accumulated deficits now amount to \$747,092. Against this amount is

the sinking fund, which has retired \$1,261,000 of bonds and in which there is a cash balance of \$79,451.

The commissioner reported that the first few days' operation of the new Front Street bus line had shown good income, but that higher fares might be necessary to keep from turning in a deficit from the bus operation.

Petition for Abandonment at
Vancouver, Wash.

The Clark County Development Company, which holds the franchise and operates the railway in Vancouver, Wash., has petitioned the County Commissioners and the City Council for the cancellation of all franchises. A heavy loss, caused by the constantly decreasing number of passengers, is given as the reason for withdrawal. Earl S. Nelson, president, says the stockholders have had no return on their investment of \$500,000 since the tracks were laid in 1917. During the years 1917-21 inclusive the revenue was such that operation could be continued, but for the last four years the loss has totaled \$22,187. In 1925 the deficit was \$10,129. It is stated that if the city and county refuse to release the company from its franchise it will have to go into receivership. The petition calls attention to the fact that the equipment is out of date. The company agrees to put the streets in condition. The system consists of 14 miles of track.

Service Discontinued on New Hampshire Line.—The Public Service Commission of New Hampshire has authorized the Manchester & Derry Street Railway, Manchester, N. H., to discontinue service on its lines. These orders are the result of an agreement between the State Highway Department, the town of Andover, N. H., and the Boston & Maine Railroad.

Change to No-Par Value Stock.—The Eighth Avenue Railroad, New York City, has filed a certificate in the office of the Secretary of State changing the par value and increasing the number of shares of its capital stock from 10,000 shares \$100 par value to 50,000 shares no par value.

Branch Lines Abandoned in Ohio.—The Cleveland Southwestern Railway & Light Company, Cleveland, Ohio, has abandoned its branch lines from Elyria to Grafton, and from Penfield Junction to Amherst. Bus service between Elyria and Grafton has been started by the company and bus service connecting Amherst, South Amherst and Lorain has been increased.

Orders Traction Funds Invested in Municipal Bonds.—Investment of \$5,374,000 from the funds of the Chicago City Railway, Chicago, Ill., in municipal bonds for current public improvements was approved July 22 in an ordinance adopted by the City Council. The plan was sponsored by Mayor Dever in the belief that it would bring larger returns than keeping the cash on deposit in banks. All but \$9,000,000 of the total of \$45,000,000 now held in the traction fund is already invested in corporation tax warrants, city bonds and Liberty bonds.

Legal Notes

FEDERAL CIRCUIT COURT—*Injunction Stopping Alleged Confiscation of Railway Property after Bond Is Given Held Proper.*

A franchise specified certain rates of fare, but in one section indicated that its purpose was to grant the company the right to obtain a reasonable profit on its investment. The court held that it had a right to grant an injunction preventing the continuance of the unprofitable fares and so increasing the rates until a decision could be had on the merits of the case. [City of Council Bluffs vs. Omaha & C. B. Street Railway, Ninth Federal (Second) Rep., 246.]

KENTUCKY—*Injury to Pedestrian Hurlled on Track by Automobile*

Where a pedestrian, struck by an automobile, was hurled onto an electric railway track, the railway company was liable for injuries to him by its car only if the motorman failed to use ordinary care to prevent injury after discovering the peril. He is not required to maintain a lookout for such occurrences. [Ohio Valley Elec. Ry. vs. Payne, 481 Southwest. Rep., 523.]

MAINE—*Passenger Hit by Automobile After Alighting*

A passenger, who has alighted from a street car, is not required to look and listen before walking to the sidewalk, though if he does not do so in a street with much automobile traffic it may be strong evidence of negligence. An automobilist approaching a street car on the side opposite the car gates, which has stopped to receive or discharge passengers, must anticipate that some passengers may pass behind the car to the other side of the street. Hence, he must use increased care in passing. [Day vs. Cunningham, 133 Atlantic Rep., 855.]

MASSACHUSETTS—*Fire Apparatus Returning from Fire.*

A state law provides that members and apparatus of the fire department have the right of way in a street when "going to a fire or responding to an alarm." This right does not apply when the fire apparatus is returning from a fire. [Hoye vs. Boston Elevated Ry., 152 Northeast Rep., 738.]

MICHIGAN—*Construction of Terms of Public Utilities Act.*

The State Public Utilities Act declares it "shall not apply to carriers operating exclusively within cities or villages." An auto bus company, whose route lay entirely within the limits of two contiguous cities, viz: Detroit and Springwells, claimed to come under this exception. It was not sustained by the Supreme Court, which held the exception applied only when the carrier operated exclusively in a single city or a single village. [Red Star Motor Drivers' Association, et al. vs. Michigan Public Utilities Commission, 209 Northwest. Rep., 146.]

MINNESOTA—*Statute Giving Commission Power Over Rates with Appeal to Court, Affirmed.*

A section of an act of the legislature authorizes the Railroad and Warehouse Commission, in certain circumstances, to fix the rate of fare on street railways, but gives right of appeal to the Court. The constitutionality of this act was attacked by the City of Duluth on the ground that the establishment of a public utility rate is a legislative function and this power is ultimately invested in the courts. The Minnesota Supreme Court held, however, that under the act the courts were authorized only to set a fair value on the property and determine a fair return on such value, and that the act was therefore constitutional. [City of Duluth vs. Railroad & Warehouse Commission, 209 Northwest. Rep., 11.]

MISSISSIPPI—*Property Owner Sues for Damages Because of Discontinuance of Railway*

A city authorized a street railway company temporarily to discontinue operation on a certain line because of work being done on the street, but after the completion of that work, the city did not order a resumption of service. An abutting property owner on the route declared the market value of his property was reduced to approximately one-half because of the discontinuance of the service and sued the company for damages. The court held that a careful study of the franchise, which was not in evidence, would be necessary to determine the rights of the respective parties, but as the discontinuance presumably was temporary, it was an error in the trial court to assume that the measure of damages, if justified, was the difference between the value of the property with car service and its value with the service permanently discontinued. [Mississippi P. & L. Co. v. Maulding, 108 Southern Rep., 901.]

MISSOURI—*Thought Car Would Stop for Passengers. Excess Speed of Car Not Evidence of Negligence in Certain Circumstances.*

A truck driver about to cross a railway track noticed several persons standing on a corner between him and an approaching car as if they were waiting to board it. If he did not rely upon the belief that the car would stop for them, he cannot avail himself of an ordinance which requires the car to do so, and if he did rely upon the ordinance, he should not do so to the extent of failing to make use of his own senses for his own protection. Evidence of possible excess speed of the trolley over that permitted by an ordinance was also immaterial where the plaintiff was not acquainted with the ordinance and did not know or estimate the speed of the trolley car. He was therefore held contributorily negligent when injured. [Epstein vs. Wells, 284 Southwest. Rep., 845.]

NEW JERSEY—*Club Bus Held to Be a "Jitney"*

The New Jersey law permits every municipality to license and regulate auto buses "commonly called jitneys," fix their fees, etc., whenever the routes are wholly or partly within the limits of such municipalities. The borough of Edgewater passed an ordinance specifying the conditions under which such motor buses could be used, and under it stopped the operation of two buses operated by the "Workers' Club" in West Fort Lee, an adjoining borough. Membership in this club could be obtained for 10 cents a month dues, plus a tax of 90 cents a week, for which twelve rides could be taken. The club claimed that the buses did not come under the law, but the Court of Errors and Appeals of New Jersey held that they did. [Fort Lee Transportation Co. vs. Edgewater, 133 Atlantic Rep., 424.]

NEW YORK—*Unlawful Bus a Public Nuisance.*

A motor bus, not authorized by the Public Service Commission, the Transportation Corporation Law, or the Greater New York Charter, is a "public nuisance" even if it is operating under a permit from the Department of Plant & Structures. As such, the owner cannot collect damages from a street railway company whose car collided with the bus, in the absence of wilful, wanton or reckless conduct on the part of the motorman causing the collision. [Klinkenstein vs. Third Avenue Railway, 214 N. Y. Supp., 725.]

OHIO—*Company Not Liable to Intending Passenger Struck by Broken Pane of Glass in Car.*

Where an intending passenger, while standing in a safety zone preparatory to boarding a car, was injured when the approaching car stopped suddenly, and glass falling from a broken window cut her face, the law will not assume negligence by the company. The glass might have been broken by the act of a third person or caused by some other event with which the company had nothing to do. [Cleveland Railway vs. Sutherland, 162 Northeast. Rep., 726.]

UTAH—*Power of State Over Highways*

An order of the Public Utilities Commission, acting for the state, in forbidding a motor bus carrier to increase his service is within the power of the commission, especially if it believes such increase will seriously affect the ability of another utility, serving partly the same territory, to render service. [Gilmer v. Public Utility Commission of Utah, et al., 247 Pacific Rep., 284.]

VIRGINIA—*Paving Obligation Construed*

Where a franchise said in paving or repaving the track area, the city should furnish the material for paving and the railway should pay for the labor, the company was held liable for the cost of both material and labor for the concrete base under the rails and ties, such base being not properly a part of the paving because it was necessary to give a proper support to the rails and ties. [Virginia R. & P. Co. v. City of Norfolk; 133 Southeast. Rep., 565.]

Personal Items

Illinois Power & Light Personnel Changes

Changes are announced by the Illinois Power & Light Corporation, Chicago, in its executive staff.

W. A. Baehr, vice-president and general manager, has retired and is succeeded by L. E. Fischer, who has long been associated with the corporation and its predecessors, and more recently has become connected with the North American Light & Power Company, an affiliated company.

Scott Brown has retired as secretary and is succeeded by Dwight Holmes, and P. C. Dings has retired as treasurer and is succeeded by P. L. Smith.

Clement Studebaker, Jr., continues as president. No changes of personnel in the operating staff or management of local properties are contemplated by the Illinois Power & Light Corporation or by any of its numerous subsidiary and allied operating companies.

The changes in personnel are coincident with the reorganization of the North American Light & Power Company, of which the Illinois Power & Light Corporation is an important subsidiary. This reorganization was announced last June, but is just now completed and made effective.

In this reorganization the Middle West Utilities Company and the North American Company acquire a majority of the common stock of the North American Light & Power Company. Clement Studebaker, Jr., continues as president in active direction of the company and, with his associates, retains a substantial interest in the common stock.

J. J. McNally in Public Relations Post in Washington

James J. McNally, who has been engaged in advertising agency work in Washington for more than two years, has joined the Washington Railway & Electric Company, Washington, D. C., as assistant to C. Melvin Sharpe, who is in direct charge of public relations for the company as executive assistant to William F. Ham, the president.

The appointment of Mr. McNally in this division of the company's activities adds another advertising man to the rapidly increasing number of men in that profession who have in recent years chosen to specialize in public utilities work. His retention is not only in keeping with the tendency of nearly all public utilities to pay more and more attention to public relations, but is in line with work in which Mr. Ham takes an unusual interest, as is indicated by his own recent appointment to the committee on public relations of the National Electric Light Association.

Mr. McNally is a native of Chicago. At one time he was assistant advertising manager for the Hydro-United Tire Company, Chicago, Ill., and Pottstown, Pa. He is a graduate of the Technical

High School, Techny, Ill., and an alumnus of Campion College, Prairie du Chien, Wis. For the past five years he has resided in the national capital—"by choice, not chance," he avers.

So it will be seen that he is schooled in mass psychology and the problem of trying to strike a responsive chord in the public mind, one of the major problems of a street railway, namely, to please the public and, in pleasing them, profit. Aside from the technical knowledge of advertising practice and pro-

cedure which they bring to public utilities, men like Mr. McNally are qualified to apply principles of propounding advertising to arrive at ways and means of gaining the co-operation of car riders.

Messrs. Coen and Moore with Cleveland Electric Company

F. W. Coen, formerly general manager of the Lake Shore Electric Railway, Cleveland, Ohio, is now assistant to the president of the Cleveland Electric Illuminating Company.

George Moore, Fremont, also formerly associated with the Lake Shore Electric Railway, now is connected with the Cleveland Electric Illuminating Company.

Messrs. Phillips and Rossell Advanced

Well-Known Manager of Pittsburgh Railways Made Vice-President of
Duquesne Light Company—Former General Superintendent
of Railway Advanced to Managership

ANNOUNCEMENT was made on Sept. 2 of the election of Frank R. Phillips as vice-president of the Duquesne Light Company, Pittsburgh, Pa., and of the appointment of William T. Rossell to succeed Mr. Phillips as general manager of the Pittsburgh Railways. Mr. Phillips has been general manager of the Pittsburgh Railways since March, 1925, having served as

followed a year later by another similar car. Both of these proved less costly in construction and more economical in operation than the types which had preceded them.

He also extended the shops of the company so that every type of repair could be made by the company's own employees with a minimum of time lost from operation by the car. In



F. R. Phillips



W. T. Rossell

mechanical and electrical engineer of the company prior to that time. He is one of the best posted as well as one of the best known figures in the electric railway industry. After completing his education in Cleveland in 1894 he became master mechanic of the Cleveland Railway, a position he held until he went to Pittsburgh in the fall of 1909 to assist in the development of the street cars in that city.

Prior to Mr. Phillips' advent at Pittsburgh, the cars of the Pittsburgh Railways were of wood. His problem was to develop a car which would be lighter in construction and yet maintain the same strength and speed of the heavier car. His first achievement was the low-floor steel car operated with pony trucks and so-called baby motors. This type went into service in 1910, but was

1910 Mr. Phillips was made superintendent of equipment, a position he filled until July, 1923, when he was made acting general manager for the receivers following the death of P. N. Jones. Upon the lifting of the receivership on Feb. 1, 1924, Mr. Phillips was made mechanical and electrical engineer and was also appointed the representative of the company to the Traction Conference Board.

Mr. Phillips was active in the work of designing the first efficient double-deck electric car in the country, placed in service in Pittsburgh in 1917, and in 1917 he designed a low-floor, high-speed, all-steel interurban car of a type which has since been made standard on the Pittsburgh Railways' lines. He was also active in the construction of the new cars which have recently

been placed in service in Pittsburgh, including the one-man cars and those used in multiple operation.

Mr. Phillips has become nationally known through his activities in the American Electric Railway Association, in which he served on many important committees. He has recently been re-elected president of the Pennsylvania Street Railway Association, and is past-president of the American Electric Railway Engineering Association.

WILLIAM T. ROSSELL

Mr. Rossell was born in Memphis, Tenn., and was educated at Staten Island Academy, Staten Island, N. Y., from which he was graduated in 1904. Later he entered the United States Military Academy at West Point. In August, 1908, he became assistant engineer of track and structures for the Cincinnati Traction Company and the following year was connected with the York Manufacturing Company, York, Pa.

In October, 1909, he returned to the Cincinnati Traction Company, where he remained until 1916, when he became superintendent of tracks and structures for the Cincinnati, Newport & Covington Railway, operating out of Covington, Ky.

Following his discharge from the army in June, 1919, as a captain of engineers, Mr. Rossell returned to the Cincinnati, Newport & Covington Railway as superintendent of way and structures, in which capacity he continued until his appointment as superintendent of way of the Pittsburgh Railways in July, 1924. In March, 1925, Mr. Rossell was made general superintendent in charge of maintenance for the Pittsburgh Railways and served in that position until the present time.

Mr. Rossell is a member of the Pittsburgh Chamber of Commerce, Veterans of Foreign Wars and the American Electric Railway Association.

J. W. Knecht Superintendent at Grand Rapids

John W. Knecht has been appointed by L. J. DeLamar, vice-president and general manager of the Grand Rapids Railway, Grand Rapids, Mich., to succeed J. C. Madigan as superintendent. The appointment is effective beginning Sept. 1. Mr. Knecht has been chief engineer of the railway since his return from service as engineer in the Navy Department during the World War. He first entered the service of the company in 1911 as draftsman. Mr. Knecht is a graduate of the engineering department of Michigan State College and during his summers while at college he worked for the railway.

H. E. Ross, formerly auditor of the City Railway, Dayton, Ohio, has recently severed his connection with that company.

H. F. Farnham, superintendent of construction of the Vermont Hydro-Electric Corporation and electrical superintendent of the affiliated Rutland Railway, Light & Power Company, Rutland, Vt., has resigned to become super-

intendent of the Pennsylvania Edison Company with headquarters at Easton, Pa.

Harry E. Cawood has recently been appointed superintendent of the Edmondson Avenue and Ellicott City lines of the United Railways & Electric Company, Baltimore, Md. He entered the service of the company in 1909 as a carman. Four years later he was made a dispatcher and held that position for three years. After that he served as street man for the line until his present appointment.

Walter F. Helmreich, for many years chief mechanical and electrical engineer with the Missouri Public Service Commission, has resigned to become manager of the Capital City Water Company, Jefferson City. Mr. Helmreich was born in Cooper County, Missouri. He graduated from the Missouri State University with a master's degree in both mechanical and electrical engineering, taught in the David Rankin, Jr., School of Mechanical Trades, St. Louis, for six years and was assistant mechanical and electrical engineer to the Arkansas Public Service Commission for one year prior to his connection with the Missouri Public Service Commission.

Stewart W. Dube, formerly assistant engineer of the Grand Rapids Railway, Grand Rapids, Mich., has been promoted to engineer of way and structures, effective Sept. 1.

Hurley M. Taylor, Decatur, Ill., has been appointed to succeed Charles H. Robinson, whose resignation as master mechanic in charge of railway equipment for the Bloomington & Normal Division of the Illinois Power & Light Corporation was noted in the ELECTRIC RAILWAY JOURNAL of July 17. Mr. Taylor has been connected with the Illinois Traction System for the past fifteen years and had been located at St. Louis, Granite City and Peoria for various periods before going to Decatur in 1923. For a number of years he was employed by the Pacific Electric Railway at Los Angeles, Cal.

W. E. Bann, purchasing agent and auditor of the Southwestern Gas & Electric Company, Texarkana, Ark., has been named general manager of the company's Texarkana Division, to succeed W. L. Wood, Jr. Mr. Bann's whole business life has been spent in the service of this company, of which he is now manager. He began his work there on Nov. 1, 1904, as a messenger and collector. Later he became a clerk and stenographer and gradually worked his way up through the various stages until he was appointed purchasing agent and auditor eight years ago. When Mr. Bann started with the company he was one of less than fifteen employees; now there are 165.

Edward A. Evans has been retained as consulting engineer of the Quebec Railway, Light, Heat & Power Company, Quebec, Que.

G. R. Davidson, for six years connected with the publicity department of the British Columbia Electric Railway Company, Ltd., Vancouver, recently resigned to enter the financial field. He has been succeeded by Walter S. Hudson.

Obituary

P. F. Sullivan

Patrick F. Sullivan, long identified with electric railway interests in Massachusetts, died suddenly, on Aug. 29, at Sunapee, N. H.

Mr. Sullivan was not only an exceptional street railway officer and developer; he was a financier, a generous citizen, kind and sympathetic, and a speaker of extraordinary ability. He knew the railway business from the carhouse to the president's chair, for he had been in all the positions along the line. A remarkable thing about him was his memory. Dealing with railway financing before the legislative bodies, or public authorities, or in the New England Street Railway Club, he could speak entertainingly for hours, if need be, and accurately handle an abundance of figures without ever referring to a written note. Few other men in New England enjoyed a popularity so widespread among operators of electric lines as did Mr. Sullivan, and certainly no one can claim a more intimate part in the organization and development of electric railways there.

Patrick Sullivan was not cast in the common mold. In some respects he was the personification of Old Man Graham, made famous by George Horace Lorimer in his "Letters of a Self-Made Merchant to His Son." He had the knack of turning a phrase that was trenchant but never vitriolic. He was also able to recognize similar ability in others. He adhered strictly to his own motto: "Do a little bit more than you are expected to do." Mr. Sullivan's personality made him a good public relations man without any external help, but it is well to recall that he was one of the first executives to go in for better public relations on business lines. To this end he retained Thomas Dreier, a man unusually well qualified to encourage friendships already made and to foster new ones. Dreier had the title of assistant to the president and did the work, but Sullivan was the driving force. It is only eight years since Dreier perpetrated his famous screed "The Asininity of Trying to Get Blood Out of a Turnip," likewise his "When the Mark Twains Become Buffalo Bills," but these and other things done on the Bay State under the régime of Mr. Sullivan now appear startling in their daring and originality.

It was while engaged in newspaper activities in the early days after his arrival in the United States that Mr. Sullivan became interested in city transportation questions. With several prominent Lowell citizens he organized a railway in Lowell in competition with the old company already installed there. This new company soon won the confidence of the people and later, in 1891, absorbed the older company, Mr. Sullivan becoming paymaster and an important member of the board of directors.

His relations with the force employed won him a strong place in their confidence and affection and soon obtained for him the post of general manager of the consolidated company. In 1899 the

consolidation of the state lines into what is known as the Massachusetts Electric Companies took place and Mr. Sullivan became general manager in charge of 650 miles of tracks, carrying 70,000,000 passengers annually and employing 7,000 men. His activities increased measurably after that.

Born in Cork, Ireland, on March 16, 1856, he came to America with his parents in 1873. Soon thereafter he entered upon the career already partially reviewed, which included a wide and valuable experience in all the departments of railway operation from carhouse duties in the horse-car days to participation in electric railway mergers.

Mr. Sullivan was an ex-president of the old Bay State Railway, ex-president of the Newport & Fall River Street Railway, director of the Old Colony Trust Company, Boston; director of the Nashua Street Railway, Nashua, N. H.; ex-president of the Boston & Northern Street Railway, active in banking and insurance fields and interested in the advancing of civic and public welfare interests in his home city of Lowell.

Claude F. Chard, for several years district sales manager at Cleveland of the Austin Company, engineers and builders, that city, was killed in an automobile accident on Aug. 13. Before his connection with the Austin Company in 1918 Mr. Chard was with Westinghouse, Church, Kerr & Company, New York. He was graduated from Purdue University in 1910. He was a member of the Triangle Fraternity and of the Cincinnati Club of Cincinnati.

William H. Elliot, head of the Elliot Frog & Switch Works, East St. Louis, Ill., died in Green Bay, Wis., on Aug. 15, after several days illness. Mr. Elliot had been connected with the Elliot Frog & Switch Company since May, 1882, when he graduated from Kemper Military Academy at Boonville, Mo. Until two years ago he was president of the company, which in December, 1924, was taken over by the Ramapo Ajax Corporation. He was elected a director and vice-president of that corporation and placed in charge of the East St. Louis plant. Mr. Elliott was 62 years old.

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

Waugh Takes Over Rico

The Waugh Equipment Company, Chicago, announces that it has acquired all of the outstanding capital stock of the Railway Improvement Company, New York. It will amalgamate the two companies at once and operate the combined companies under the name of the Waugh Equipment Company, maintaining its offices in the Peoples Gas Building, Chicago, and Pershing Square Building, New York. With the acquisition of the Railway Improvement Company, the Waugh Equipment Company acquires all of the well-known Rico products, used extensively throughout the country on practically all electric street railways and steam railroad electrifications.

R. J. O'Brien, formerly general manager of the Waugh Equipment Company, has been elected vice-president. H. N. Ransom, W. M. Roche, O. L. Downs, Henry Wiegand and G. F. Ferguson of the Rico sales department have been added to the Waugh company sales forces and Col. L. M. Clark of the Railway Improvement Company has been attached to the Waugh company engineering department.

Electric Heat Applied to Thermit Welding

Electric heat has now been applied in connection with thermit welding. The Metal & Thermit Corporation, Jersey City, N. J., has introduced General Electric heating units on its track welding equipments for the purpose of assisting the vaporization of the kerosene oil, which is used for preheating the work.

The oil is passed through the heating unit and is then mixed with compressed air at a pressure of approximately 1 lb. Thence it passes through a rubber hose to the torch used in applying the heat to the rails.

The heating unit also acts as a resistor. The equipment is electrically operated from the standard 550/600-volt trolley circuit, and the group of two heating units is connected in series and placed in series with the 230-volt, direct-current motor which drives the compressor. With this arrangement a snap switch can be used to start the motor, for the heating units have sufficient reactance to hold back the inrush of current until the motor comes up to speed.

Refrigerator Service on the North Shore

Delivery of perishables and cold storage products by electric refrigerator cars was started on Aug. 23 by the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—connecting Chicago, Waukegan, Racine, Kenosha and Milwaukee.

The cars being used in this type of merchandise despatch service were especially built for the North Shore Line. They are equipped with ammonia compressor, ammonia condenser and water cooling apparatus, all of which is operated by electricity. Thermostatic control apparatus maintains an even temperature at all times, while the air-cooling method of refrigeration insures cleanliness and preservation of shipments in first-class condition during transit.

Each of the five cars in the initial service is equipped with control and air brake apparatus and control cabins at each end. They are finished in the style of the regulation North Shore Line passenger coaches, the absence of windows and passenger entrances being the only deviation in exterior appearance. The cars are being operated in conjunction with the regular merchandise despatch service of the North Shore Line.

That the cars would be placed in



These Units Will Make Possible a Highly Effective Express Refrigerator Service Between Chicago and Milwaukee

service soon was noted in the **ELECTRIC RAILWAY JOURNAL** for Aug. 21, page 328. The equipment was built by the Phoenix Ice Machine Company, Cleveland, Ohio.

Welding Exposition to Be Held in November

An international welding exposition will be held in connection with the annual fall meeting of the American Welding Society in Buffalo, N. Y., Nov. 17-19. A feature of the exposition, the purpose of which is to display new developments in welding apparatus and supplies, will be an exhibit of a large variety of welded products.

Plans for the annual meeting include technical discussions and inspection trips, notably an excursion to Niagara Falls. The list of exhibitors includes, among others, the following companies: John A. Roebling's Sons Company, Metal & Thermit Corporation, General Electric Company, Una Welding & Bonding Company, American Brass Company, Westinghouse Electric & Manufacturing Company.

Westinghouse Electric Makes Unprecedented Sales

Indication that the current fiscal year may establish a record in the sales of the Westinghouse Electric & Manufacturing Company is found in the company's recent report of billings of \$61,186,127 for the period from March 31 to July 31, 1926. This is an increase of \$10,135,114 over billings in the corresponding period of 1925.

In these four months the company earned a net income of \$5,567,022, which amounts to \$2.34 per share of its outstanding stock. Since the trend of sales is usually upward during the fall and winter, it is predicted by competent observers that the yearly income will run around \$7 a share, which is a substantial increase over the high figure of \$5.96 a share which the company earned last year.

Kuhlman Company Builds Wheeling Cars

The fifteen new cars now being received by the Wheeling Public Service Company, Wheeling, W. Va., were supplied to that company by the G. C. Kuhlman Car Company, Collinswood, Ohio, so **ELECTRIC RAILWAY JOURNAL** is advised, and not by the St. Louis Car Company, as was inadvertently stated in the issue for Aug. 28. The incorrect statement was based on news sources which had hitherto proved reliable.

Details of Milwaukee Track Reconstruction

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started work extending its double track on First Avenue one mile from Oklahoma Avenue to Euclid Avenue, thence south to Morgan Avenue, at a cost of \$40,000. The Holton-Mitchell line will be extended on Forest Home Avenue from 26th Avenue to 29th Avenue at a cost of \$25,000. Double tracks will re-

place the single track line on 35th Street between Clybourn and State Streets. This reconstruction work will cost \$59,000. Ready-made tracks in 60-ft. lengths with rails and ties securely spiked together will be used on the 35th Street track laying job. These rails are delivered on flat cars and placed in position by electric derricks. To carry the method a step further, a new track building machine is being constructed at the company's shops. Extension of the Center Street line from 51st Street to Lisbon Avenue has been completed at a cost of \$45,000.

North Shore Line Has New Freight Handling System

An elaborate system for handling freight by means of electric trailers will be installed by the Chicago, North Shore & Milwaukee Railroad in both its Chicago and Milwaukee terminals. Twenty-two 8-ton capacity Interlocking semi-trailers, with 7-ft.x17-ft. metal container bodies, together with twenty-six 8-ton Interlocking chassis to convert a like number of the company's present trailers into the Interlocking type, have been purchased from the Trailmobile Company, Cincinnati, Ohio. The trailers will collect the freight at one terminal, will be run over special inclined runways onto flatcars equipped with holding-down apparatus especially de-

signed for this purpose, and will then be transported to the other terminal of the railroad. The advantages of this trailer system are expected to be a greater convenience in handling less-than-carload shipments of freight, and a considerable saving in time and money by eliminating reloading at the terminals.

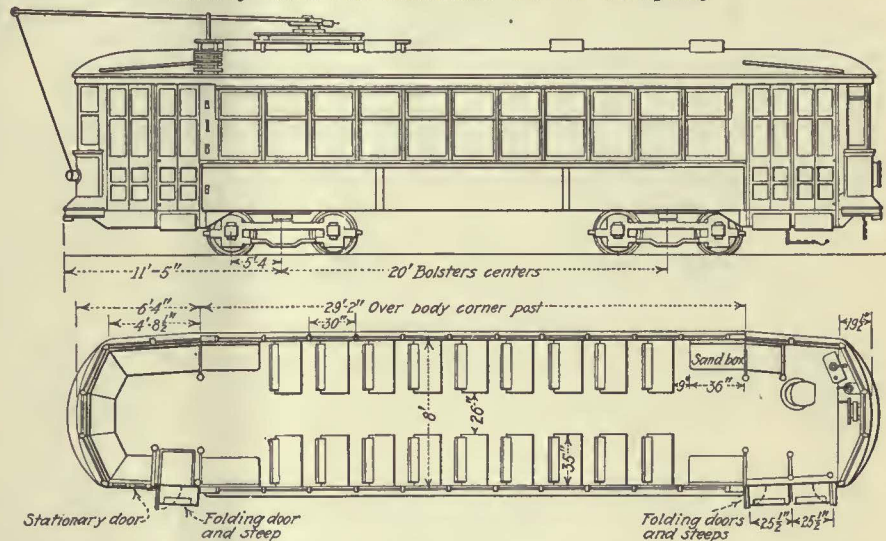
White Motors Opens Seventeen New Stations

The service department of the White Motor Company this year has seen the greatest expansion in its history, with seventeen completely equipped service stations newly established in various parts of the country. Several more are to be opened before the end of the year. There now are more than 80 company service stations in the United States and Canada, exclusive of those operated by about 500 dealers. Each station is equipped and its employees are trained to build a complete new White bus or truck if necessary.

Union Switch & Signal Gets Interborough Order

The Interborough Rapid Transit Company, New York, has ordered electric pneumatic interlocking devices with 75 levers, including 21 automatic train stops and 72 signals from the Union Switch & Signal Company.

Safety Cars for Alabama Power Company



On July 15 the Alabama Power Company of Birmingham, Ala., placed an order with the Perley A. Thomas Car Works, High Point, N. C., for three double-truck, single-end safety cars. These cars are to have a seating capacity of 53 and will weigh 32,000 lb. each. Delivery is expected in eleven weeks from the date when the order was placed. Principal specifications follow:

- Length over bumpers 42 ft. 10 in.
- Length of body 29 ft. 2 in.
- Width over all 8 ft. 4 1/2 in.
- Height, rail to trolley base 11 ft. 3 in.
- Body All steel
- Interior trim Cherry
- Roof Arch
- Alr brakes Westinghouse
- Axles Taylor steel, best quality
- Bumpers Steel channel
- Buzzers Electric Service Supplies
- Car trimmings Polished bronze and aluminum
- Control Westinghouse K-35-KK

- Curtain fixtures.....Curtin Supply No. 88 ring fixtures
- Curtain materialPantasote
- Destination signsHunter
- Door operating mechanism.....National Pneumatic
- FendersH-B life guards
- FlnshDuco
- Gears.....Taylor Electric Truck, sold
- Hand brakesPeacock Staffless
- HeatersConsolidated Car Heating, cross-seat type
- HeadlightsCrouse-Hinds, type WDF
- HeadliningAgasote
- Journal boxesMCB, 3 1/2 in. x 7 in.
- Lightning arresters.....Westinghouse type K
- MotorsFour Westinghouse 510-E, 35 hp.
- RegistersOhmer
- Safety devicesSafety Car Devices
- SandersOhlo Brass
- Sash fixtures.....Curtain Supply (metal sash)
- Seats ..Hale & Kilburn, No. 103 stationary
- Seating material.....Genuine leather
- Slack adjusters.....American type E
- Step treadsKass
- Trolley baseOhlo Brass
- Trucks.....Taylor Electric Truck
- Ventilators.....Railway Utility
- WheelsRolled steel

Metal, Coal and Material Prices

Metals—New York		Aug. 31, 1926
Copper, electrolytic, cents per lb.	14.40	
Copper wire, cents per lb.	16.25	
Lead, cents per lb.	8.90	
Zinc, cents per lb.	7.75	
Tin, Straits, cents per lb.	65.875	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$5.425	
Somerset mine run, Boston, net tons	1.975	
Pittsburg mine run, Pittsburgh, net tons	2.00	
Franklin, Ill., screenings, Chicago, net tons	1.625	
Central, Ill., screenings, Chicago, net tons	1.50	
Kansas screenings, Kansas City, net tons	2.35	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$6.25	
Weatherproof wire base, N. Y., cents per lb.	18.00	
Cement, Chicago net prices, without bags	2.10	
Linsed oil (5-bbl. lots), N. Y., cents per lb.	11.90	
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25	
Turpentine (bbl. lots), N. Y., per gal.	\$0.94	

Rolling Stock

British Columbia Electric Railway, Vancouver, B. C., received eight new street cars in July and was informed that its four new two-car trains would arrive shortly. The new cars, which will be placed on the Dunbar-Hastings East service, are of unusually large capacity, and have exceptionally powerful motors.

Los Angeles Railway, Los Angeles, Cal., has ordered three double-deck Fageol buses equipped with air brakes. These units will be used in city operation.

Eugene Street Railway, Eugene, Ore., has purchased three 29-passenger, city type Mack buses for operation between Eugene and Springfield, a distance of 3.6 miles, at a 15-cent fare, 25 cents a round trip. These are the first buses purchased by this company. Eighteen daily trips per bus will be made. Buses will replace street cars formerly operated between these two points.

Pittsburgh Railways, Pittsburgh, Pa., anticipates delivery of its 50 new cars beginning in October. The units are of the one-man, two-man type and will be used in city service in Pittsburgh. They are being built by the Standard Steel Car Company. Each car will seat 52 passengers. Some of the principal specifications follow:

Weight	38,000 lb.
Length over all	45 ft.
Width over all	8 ft. 11 in.
Height, rail to trolley base	10 ft. 10 1/2 in.
Body	All steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Monitor
Air brakes	Westinghouse
Axles	4 in.
Bumpers	Hedley anti-climbers
Car signal system	Faraday
Car trimmings	Statuary bronze
Conduits and junction boxes	Crouse-Hinds
Control	K-43-G
Couplers	Van Dorn
Curtain fixtures	Curtain Supply Co.
Curtain material	Fabrikoid
Destination signs	Illuminated
Door operating mechanism	National Pneumatic
Fare boxes	Cleveland No. 5
Finish	Cellulose lacquer
Wheelguards	Root life-guard
Gears and pinions	Helical
Hand brakes	Peacock
Heater equipment	Consolidated Car Heating
Headlights	U. S.
Journal boxes	Symington 3 1/2 in. x 7 in.
Lighting arresters	Westinghouse K-3
Motors	Four Westinghouse 514-P
Registers	International
Sanders	Nicholas-Intern air

Sash fixtures	Dayton Mfg. Co.
Seats	Transverse and longitudinal
Seating material	Rattan
Slack adjuster	Pin type
Springs	Elliptical
Step treads	Feralun
Trolley catchers	Ideal
Trolley base	Nuttall
Trucks	Arch bar
Ventilators	Peerless and Perry
Wheels	26-in. forged steel
Special devices	Rico hand straps, porcelain enameled stanchions

Track and Line

Louisville Railway, Louisville, Ky., is adding some trackage to its old power house, connecting switches at Campbell and Finzer Streets, west to Shelby, which will enable Broadway cars to operate a little over 1/2 mile east of Second Street, to a loop running around four sides of a block, and back into Broadway. This arrangement should relieve congestion at Second Street materially.

Lincoln Traction Company, Lincoln, Neb., has ordered nine main line automatic box signals to expedite the single-track operation of its suburban lines. The equipment was obtained from the Nachod & United States Signal Company of Louisville, Ky., at a cost of \$8,000. It is expected that the new signals will speed up traffic and also furnish a maximum of safety in time of storm and whenever visibility is poor.

San Diego Electric Railway, San Diego, Cal., began service on the new Woolman Avenue extension on July 20. The new line is about 1 mile long and cost more than \$88,000. In addition to the major extensions and reconstructions, the company has undertaken a great amount of maintenance work all over the system and officials have indicated that their maintenance forces are to be augmented so that even more of this work can be done in the future.

Power Houses, Shops and Buildings

Eastern Massachusetts Street Railway, Boston, Mass., has awarded contract to Robert A. Doyle, 32 Cauldwell Crescent, Lynn, Mass., to remodel its brick building at 53 Mason Street, Salem.

Asbury Park, N. J.—The Eastern New Jersey Power Company and its subsidiaries, the Coast Cities Railway, operating a shore traction system, and the Atlantic Coast Transportation Company, running single and double-deck buses, will occupy the basement and first three floors, including the mezzanine, of an eleven-story office building on Bangs Avenue and Emory Street. The building will be fireproof in every respect and will cost about \$850,000. It will be ready for occupancy April 1, 1927.

Pacific Northwest Traction Company, Seattle, Wash., subsidiary of the Puget Sound Power & Light Company, awaits only the passage of an ordinance by the City Council concerning trackage rights adjoining the site on the south side of Stewart Street, between Eighth and Ninth Avenues, to begin the construction of the proposed stage terminal depot. The building will be fireproof

reinforced concrete, 63 x 260 ft., two stories high, adjoining a roofed concourse 260 ft. long equipped with tracks for interurban trains and loading platforms capable of handling twelve stages at one time.

Trade Notes

Bridgeport Brass Company, Bridgeport, Conn., announces the removal of its New York office from the Pershing Square Building to the Farmers Loan & Trust Company Building, Suite 407, 475 Fifth Avenue.

Commercial Truck Company, Philadelphia, Pa., has purchased all assets, including machinery, equipment, trucks completely or partly completed, parts, drawings, dies, etc., and all patents of the Electruck Corporation, manufacturer of electric street trucks. The Commercial company is now able to supply any services that may be required on the products of the Electruck Corporation.

O. M. Edwards Company, Syracuse, N. Y., furnished the brass sash for the 50 cars now being built by the Canadian Car & Foundry Company for the Montreal Tramways. An article on these cars appeared on page 293 of the issue of this paper for Aug. 21, 1926.

Ross H. Rathbun has been appointed sales manager of the Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y. Mr. Rathbun has a wide experience in the electrical industry. He was formerly in charge of the central station department of the Westinghouse Electric & Manufacturing Company.

Morton Manufacturing Company, Chicago, Ill., manufacturer of the Acme line of railway appliances, has just announced the appointment of Robert P. Mosier as manager of foreign sales. Mr. Mosier has had considerable sales experience, following which and until recently he has been connected with the consular service of the United States. For these reasons his service will undoubtedly be valuable in strengthening the sales department of the Morton company. Production capacity of the company's Chicago plant has been greatly increased recently by the erection of a new addition, providing 50,000 sq. ft. more floor space into which machinery and other forms of equipment are now being moved.

New Advertising Literature

Ludlum Steel Company, Watervliet, N. Y., has just issued the second edition of the Tool Steel Handbook. It describes in detail carbon, alloy, rust and heat-resisting steel, their use and methods of treatment.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-424, entitled "Distribution and Small Power Transformers." In addition to complete information on small power transformers for industrial purposes there is included information on large power transformers and outdoor substations suitable for railway purposes.

The Modernization Doctrine Includes SAFETY!



Modernization in car design and operation leads to comfort, speed, dependability and SAFETY.

Insure your schedules against interruptions caused by accidents due to failures of hand brakes by calling for

Peacock Staffless Brakes

in the specifications of
your modern equipment



The
Peacock
Staffless

They occupy minimum floor space. Their power is at least three times as great as any ordinary type of hand brake. They have a demonstrated capacity for winding in 144 inches of chain—so that neither slack chain nor worn brake shoes can prevent effective braking. It is such qualifications that make Peacock Staffless Brakes especially adapted for the modern car.

*Send for additional information
or estimates.*

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

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

Byllesby
Engineering & Management
Corporation
 231 S. La Salle Street, Chicago
 New York San Francisco

ALBERT S. RICHEY
 ELECTRIC RAILWAY ENGINEER
 WORCESTER, MASSACHUSETTS
 REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

ENGELHARDT W. HOLST
 Consulting Engineer
 Appraisals Reports Rates Service Investigation
 Studies on Financial and Physical Rehabilitation
 Reorganization Operation Management
 683 Atlantic Ave., BOSTON, MASS.

Transmission Line and Special Crossing
Structures, Catenary Bridges
 WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
 Engineers and Contractors SYRACUSE, N. Y.

DAY & ZIMMERMANN, INC.
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ENGINEERS AND CONSTRUCTORS
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 Reorganization Management Operation Construction
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 Operating Problems Rates Traffic Surveys
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 VALUATION AND FINANCIAL REPORTS
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 CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
 230 South Clark Street, Chicago, Ill.

MCCLELLAN & JUNKERSFELD
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 68 Trinity Place, New York
 CHICAGO ST. LOUIS

C. B. BUCHANAN President
W. H. PRICE, JR. Sec'y-Treas.
JOHN F. LAYNG Vice-President

BUCHANAN & LAYNG CORPORATION
*Engineering and Management, Construction,
 Financial Reports, Traffic Surveys
 and Equipment Maintenance*

BALTIMORE Phone: **NEW YORK**
 1904 Citizens National Bank Bldg. Hanover: 2142 49 Wall Street


THE P. EDWARD WISH SERVICE
 50 Church St. Street Railway Inspection 131 State St.
 NEW YORK DETECTIVES BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Coin Counting and Sorting Machines
FARE BOXES
 Lever-Operated and Slip Change Carriers
The Cleveland Fare Box Co.
 Cleveland, Ohio
 Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

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

Cameron Electrical Mfg. Co., Ansonia, Connecticut




Gets Every Fare
PEREY TURNSTILES
 or **PASSIMETERS**
 Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
 101 Park Avenue, New York City

UNA RAIL BONDS-RAIL JOINTS
 DYNAMOTORS
 WELDING ROD
UNA Welding & Bonding Co.
 Cleveland, Ohio.


BRAZED **Rail Bonds** **ARC WELD**
ERIC Portable Arc Welding Outfits
The Electric Railway Improvement Co.
 Cleveland, Ohio

Adapted to all Types of rails and paving.



GODWIN
Steel Paving Guards
 Proven by service to economically prevent seepage and disintegration of street railway paving.

Writes for Illustrated Catalog No. 20
W. S. GODWIN CO., Inc.
 Race and McComas St., Baltimore, Md.




Just Figure It Out for Yourself

Approximately, 60% to 80% of the cost of Magnet Wire represents **MATERIAL**. The remainder includes all other items: labor, overhead, inspection, packing, selling.

Concessions in price, to be attractive, must come out of the **MATERIAL** — and this cannot help but result in insulation that is not safe, either because of insufficient amount or inferior quality.

Buyers should consider safety first and price second. The consequences of doubtful insulation sooner or later come home to roost on the desk of the man who sacrifices safety for price.

Buy with **FORESIGHT**. Pay a few cents more if necessary. The good word of a satisfied customer remains after the price is forgotten.

Acme Magnet Wire measures up to the rigid tests of the various electrical societies and, for years, has been living up to these standards in innumerable electrical installations in the country. May we send you Bulletin 3J, telling the story in detail?

Acme Wire Products
 The Acme Wire Co., New Haven, Conn.
 Branches at
 New York, 52 Vanderbilt Ave.
 Boston, 80 Federal St.
 Chicago, 427 West Erie St.
 Cleveland, Guardian Bldg.

WINDOWS DO MAKE A DIFFERENCE



Fageol Safety Coach for Capitol District Transportation Co., Albany, N. Y., using Edwards Metal Sash.

Built for Passenger Comfort

Comfort expressed in terms of ample vision, of windows that open easily and close safely, of air-tight protection from wind, rain, and cold. Comfort in the complete lack of nerve-racking window rattles!

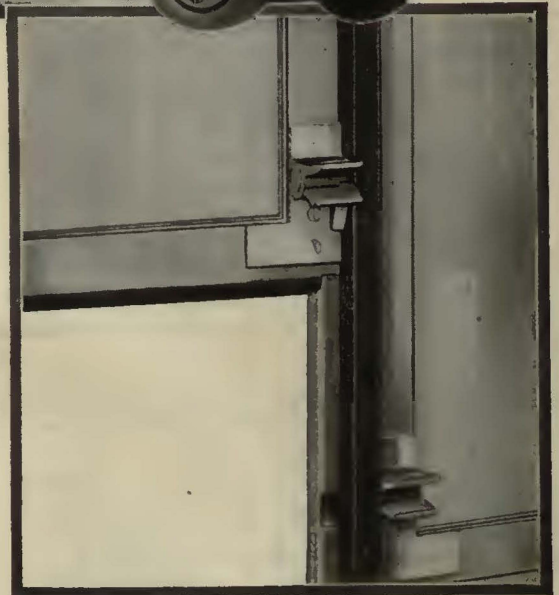
This is the comfort which Edwards Metal Sash brings to bus passengers.

To the bus operator, Edwards Metal Sash brings ease of maintenance through effortless window cleaning, and economy through durability and long life under the most difficult operating conditions.

Bus operators will be interested in our catalog, and the list of prominent body builders who use Edwards Metal Sash. Both will be sent on request.

O. M. EDWARDS CO. SYRACUSE, N. Y.

Canadian Representatives:
Lyman Tube & Supply Co., Ltd., Montreal and Toronto



EDWARDS
TRADE
PAOWNYC
MARK

EDWARDS Metal Sash

Mack

Bus

26 years of experience
stand behind the Mack 6

Mack Trucks Inc.

International Motor Company
25 Broadway New York City





Goodyear-equipped motor coach of the Red Star Transportation Company, Lexington, Kentucky

GOODYEAR

“We recommend them for Lower Cost Per Mile”

The Red Star Transportation Company, of Lexington, Kentucky, operates through the Blue Grass country for a radius of 90 to 105 miles around Lexington.

Its buses travel south to Harrodsburg, Danville, Somerset, Richmond, Berea, Mt. Vernon and Corbin, and north as far as Cincinnati—on Goodyear Pneumatic Bus Tires.

“We have just recently removed some Goodyear 32x6 Bus Tires, from our No. 50 Studebaker bus, that have delivered over 35,000 miles,” writes Mr. Roger H. Swope, Vice President and General Manager.

“We have had two of these tires retreaded, which ought to give us a great many thousand miles more.

“We have been receiving exceptionally good mileage on Goodyear Bus Tires—so much so that we are standardizing with Goodyears on all our fleet of 45 Studebaker buses. We feel justified in recommending Goodyear Bus Tires to any operator who wants to lower his cost per mile tire expense.”

* * *

Goodyear Tires, made with that extra-durable, extra-elastic fabric developed by Goodyear for Goodyear Pneumatic Tires—SUPERTWIST—provide the last word in active, tractive, secure and long-wearing service at low tire cost per mile.

Only Goodyear Tires are made with SUPERTWIST—yet they cost you no more.

*More people ride on Goodyear Tires than
on any other kind*

BUS TIRES

Made with SUPERTWIST

Light on the Bus Braking Question

The A B C's of Bus Brakes and Braking Systems

Braking Power

The previous articles have all pointed definitely to the need of a braking power other than muscle.

No driver has sufficient muscle power to take advantage of the traction of all wheels. If his strength be multiplied by levers to the point where it is effective on all wheels, the travel in the mechanism at the point of application is so reduced that almost daily adjustments are necessary. Also a sufficient amount of "self-energization" to augment his strength is uncontrollable and gives erratic braking.

For self-equalization, too, power brakes are essential. No muscle power brake with its levers, pullrods, and cams can stay equalized. To attain this, power must be used; power that can be applied INSIDE the brake drum itself, and not transmitted through a system of levers and rods.

Fatigue is an important element that operators are coming to appreciate more and more, as vehicles increase in weight, speeds increase, and dense traffic necessitates more frequent stops. Repeatedly stopping a heavy vehicle all day long saps the energy of a driver and decreases his alertness. It requires too much of his

strength. Stopping should require no more strength than accelerating. Power Brakes is the only answer.

Compressed Air is the universal power-braking agent. The power obtainable with it is adequate for any braking job; it is sure and positive in operation, it is flexible, and it is economical. Properly controlled and applied, nothing else has ever been found to equal it for all-around braking efficiency (witness its universal use on steam and electric railways).

Compromises will not satisfy the requirements. Real Power Brakes are needed, and the bus industry—manufacturers and operators as well—are rapidly coming to them. Safety, reduction of driver fatigue, strain upon the chassis and body, tire wear, and brake maintenance cost make power brakes not only necessary but profitable to the operator.

This is the sixth of an informative series on Bus Brakes. The series consists of:

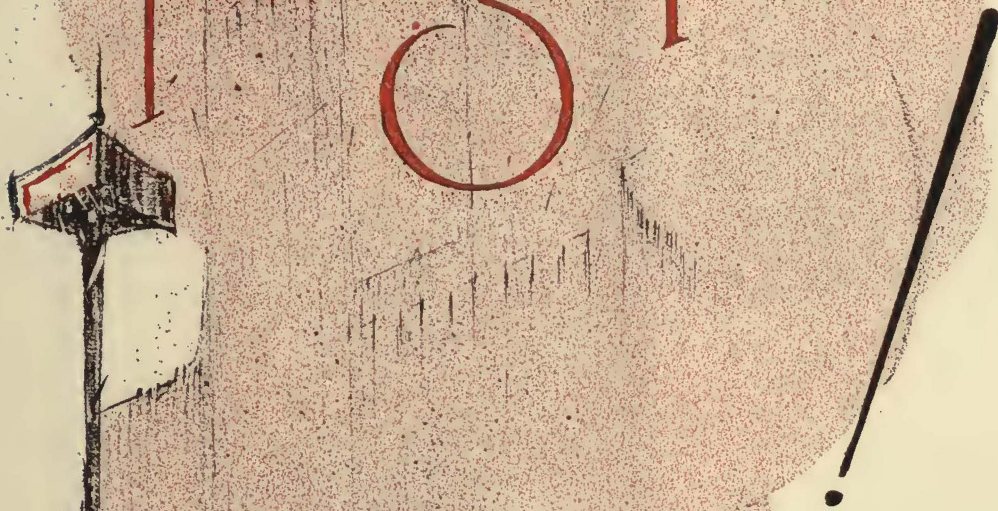
- A—What Brakes Must Do.
- B—How many wheels should brakes go on?
- C—Self-equalization and brake adjustments.
- D—Curing the skid.
- E—Metal to metal or molded linings—which?
- F—Braking Power.
- G—Compressor Mountings and Drives.
- H—Compressor Cooling.
- I—The Control Valve.
- J—Maintenance on Different Types.

The above topics will appear in the above order. Address any comments, suggestions, or requests for advance information to:

The Christensen Air Brake Company
6513 Cedar Avenue, Cleveland, Ohio

Christensen

Let us fight competition
on a basis of
passenger preference-



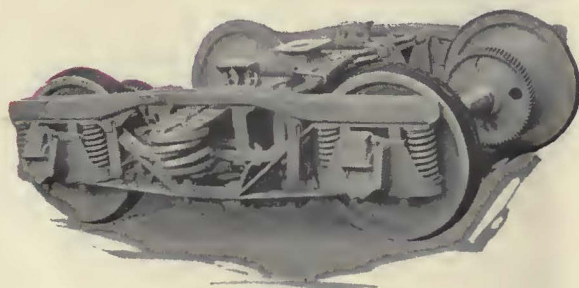
—using **New** cars, built to - - - - with a



Attractive Cars Attract Riders



*The Interior Design is Balanced
to Fit Character of Service*



*City or Suburban Truck, Balanced for
Easy Riding and Low Maintenance*

THERE was a time,—it seems long ago now,—when the electric railway company's sales problem was merely a question of "taking orders." Public transportation was a monopoly. A majority of the average railway's patrons were "have-to" riders. Hence passenger preference and passenger comfort found small place in the operating scheme.

Things have changed,—very decidedly. There is competition these days, and competition so effective that it has become serious.

What are we doing to turn the tables? How are we going to get the business back?

Cincinnati engineers have already given a logical and decisive answer.

By pooling the results of 10 years' consistent effort in modernization, by boldly breaking with precedent in design and construction, they have produced a series of NEW cars so striking in appearance, so comfortable, so easy riding and so thoroughly practical as to have been unfailingly successful on every one of the many installations made to date.

These Cincinnati NEW Cars have PROVED that the electric railways can "come back" stronger than ever, provided they meet present day transportation demand. And under the Cincinnati Principle of "balanced design" these results can be duplicated with equal or greater success on *your* property.

meet **New** conditions **New** measure of success

A step ahead
of the modern trend

- in *earning power*
- in *low cost of operation*
- in *passenger preference*

Cincinnati New Cars are "balanced." They are balanced in their structural details, to assure light weight with low maintenance; "balanced" in their appointments and appearance to attract riders in a given class of service. And when mounted on Cincinnati-built trucks they form "balanced" transportation sales units designed in every detail to furnish transportation of maximum attractiveness at minimum cost.

The Cincinnati principle of "balanced" light weight car construction is particularly interesting because of the remarkable *certainty* of results which has characterized its application.

Cincinnati Cars are now in service on an impressive number of properties.

Their many practical advantages and strikingly attractive lines have already won comment—and patronage,—from one end of the country to the other.

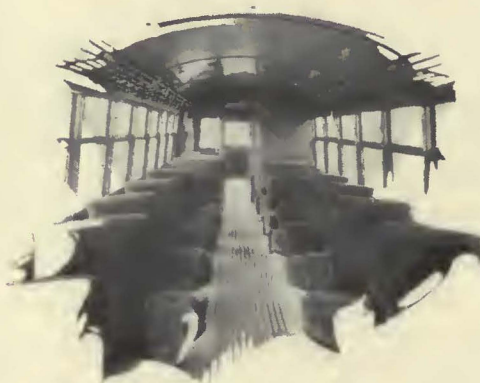
Their light weight; their efficient NEW trucks and modern equipment have already shown savings up to 30% in operating cost.

And the roads which operate them have without exception reported that New cars,—Cincinnati New Light-weight Cars, *do* pay and pay well.

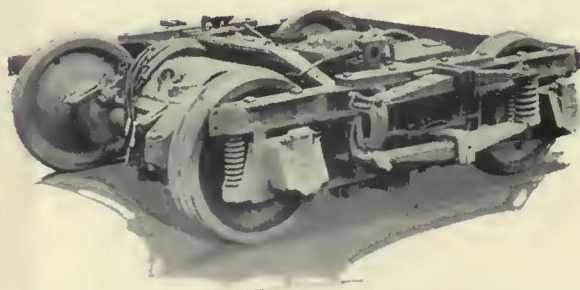
Let us send you blueprints and further details. Cincinnati New Cars are available to meet your service conditions with but little need for special designing.



*High Speed with Light Weight—
the Result of Perfect Balance*



*Parlor Observation Arrangement
Offers Luxury and Comfort*



*"Quartered" Equalization Inaugurates New Era
of Light Car Stability at High Speed*

CINCINNATI *New* CARS

A step ahead of the
modern trend

and **PROVED**

By the operating statistics of
many Cincinnati, **New** Car
operators—

All of these roads are “old timers” in the industry. And all of them have been operating Cincinnati NEW Cars long enough to have compiled authentic and practical operating data. In every case the results have proved beyond doubt that it pays and pays well, to modernize with light weight *NEW* cars, of *Balanced* design and built by *Cincinnati*.

All data is available to interested executives on request.

The Cincinnati Car Company

Cincinnati, Ohio

CINCINNATI
NEW
CARS

Gas Cars Invariably Timken-Equipped

Timken Bearings grew up with self-propelled transportation. Now the gas rail car, latest form of the self-propelled vehicle, is growing up on Timken Bearings. There is hardly a single make which is not thoroughly Timken-equipped.

The M. A. C. Rail Coach, built by the Skagit Steel and Iron Works, of Sedro-Woolley, Washington, employs Timkens in the clutch, transmission, wheels, and final drive. Under heaviest thrust, shock, speed and torque Timkens get more of the engine

power onto the rails—smoothly, economically and consistently.

The utmost endurance is assured by Timken *POSITIVELY ALIGNED ROLLS*, Timken tapered design, and Timken rolling motion entirely on Timken-made steel. The usual effects of bearing wear—and most lubrication items—are eliminated from schedules and cost sheets. Every manufacturer and operator of gas cars can guide himself by Timken records in hundreds of thousands of miles of service, in every type of car.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

Technical information regarding bearing sizes and their mountings can be secured from the Timken Roller Bearing Service & Sales Company's Branches located in the following cities: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, Richmond, St. Louis, San Francisco, Seattle, Toronto, Winnipeg

TIMKEN *Tapered* Roller BEARINGS





Dragged from one location to another, it still stands the gaff.

Two years use— without a bit of trouble

DURING the last two years considerable construction work has been done in this great middle west oil refinery. Addition has followed addition. And Super Service has played its part in this work.

The foreman in charge writes—"In the two years I have used Super Service Cords and Cables on Electric machinery in construction work, we have never had a single shut-down due in any way to their use."

A clean record made possible by the special process under which Super Service is built. Every foot is vul-

canized in steel molds under tons of pressure—a special process used in the manufacture of no other wire.

A process that compresses the outer jacket of rubber into a tough, dense, yet flexible covering that protects the conductors from wear and abrasions and gives it many times the life of ordinary cables. It is absolutely waterproof and highly resistant to the action of oils and acids.

If you would like detailed information about these portable cords and cables with the long life, we will be glad to send you a catalog and price list.

ROME WIRE COMPANY

Mills and Executive Offices: Rome, N. Y.

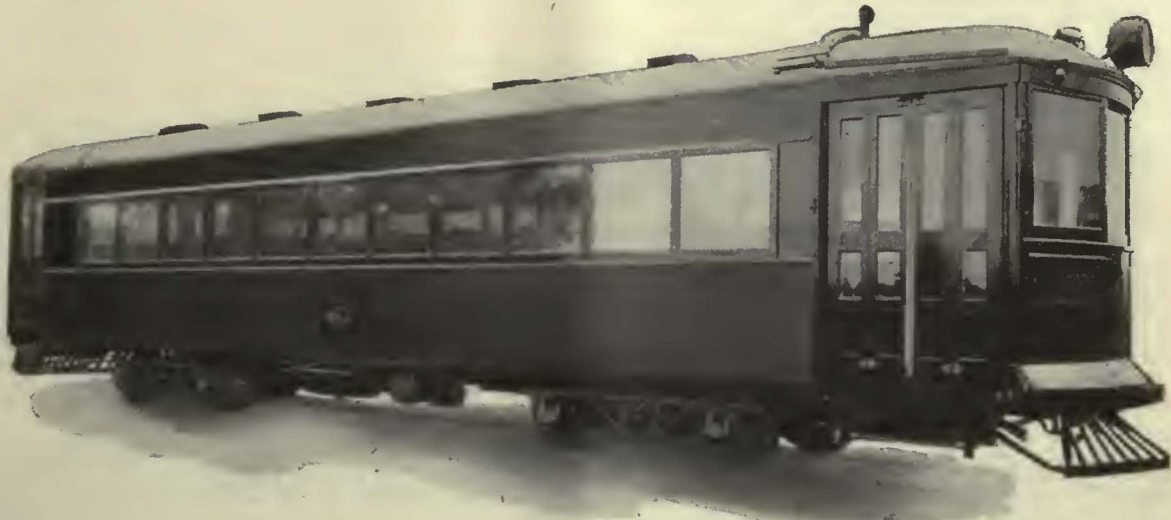
Diamond Branch: Buffalo, N. Y.

SUPER SERVICE CORDS and CABLES

A ROME WIRE PRODUCT

New York
50 Church Street
Boston
Little Building
Detroit
25 Parsons Street
Cleveland
1200 West 9th Street

Chicago
14 East Jackson Blvd.
Los Angeles
J. G. Pomeroy, Inc.
336 Azusa Street
San Francisco
J. G. Pomeroy, Inc.
960 Folsom St.



MODERN LIGHT WEIGHT CARS

*for replacing heavy type
on city or interurban service*

Typical of the trend toward light weights and more attractive designs, is the car illustrated, one of a number recently put in service in a midwestern city. Seating 46 passengers, and equipped with four 35 h.p. motors, and mounted on Cummings No. 62 trucks, the total weight of the car is 37,000 pounds.

These cars are arranged for double end, one-man or two-man operation. They are building up increased patronage by reason of their attractive appearance and comfort and their reduction in weight is making a saving in operating expenses. They replace two-man equipment.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire-Cummings Mfg. Co.

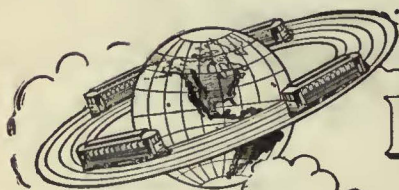
111 West Monroe Street
Chicago

Gas-Electric Motor Coaches

Snow Sweepers and Plows

Light Weight City and Interurban Cars

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



Barron G. Collier

INCORPORATED

CANDLER BLDG. NEW YORK



FROM the smallest to the largest, many of the Chicago, North Shore and Milwaukee Railroad cars run on "STANDARD" Rolled Steel Wheels.



Rolled Steel Wheels
 Quenched and Tempered
 Carbon Steel Axles
 Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
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SAN FRANCISCO
 ST. PAUL, MINN.
 PITTSBURGH, PA.

WORKS: BURNHAM, PA.



In Cincinnati—

a permanent foundation this time

The Cincinnati Street Railway Company this summer replaced the wood ties on Madison Road with Carnegie Steel Cross Ties, spaced 3 ft. center to center, and laid on the old concrete base.

The former track was laid in 1915—only eleven years of service. The new foundation is permanent—put down to stay. Temperature variations, water or decay will not affect it.

The initial cost of such construction has, in some cases, been less than that for wood ties.

Booklet, "Steel Cross Ties,"
will be sent at your request.

CARNEGIE STEEL COMPANY

General Offices - Carnegie Building - 434 Fifth Avenue

PITTSBURGH · PENNSYLVANIA



HASKELITE

The cars shown below are typical of the hundreds in use on the Chicago Surface Lines with HASKELITE roofs, headers and interior linings.

Time Proven Claims



When the use of HASKELITE in car roofs was first suggested, it was easy to prove the saving in weight. A pair of scales would do that. It was comparatively easy to prove its increased strength. Test pieces would demonstrate that. But time alone could prove the permanence and all around satisfaction of these modern roofs.

Time has passed. Hundreds of cars with HASKELITE roofs have gone in service and year by year have left their record. These records are the surest proof anyone could ask of the supremacy of HASKELITE roofs. Company after company has tried HASKELITE roofs and based on

experience has ordered this material for more and more cars. The Chicago Surface Lines, for example, has 100 more cars under order with HASKELITE roofs, headers and corner panels. This is the third big order from this company in the last five years. A score of other early users are regular buyers today. The urgent demand for modernized equipment is speeding the day when the HASKELITE roofs will be the standard on electric railway cars and buses.

May we give you details of the experience of others with HASKELITE roofs, PLYMETL side panels, etc.?

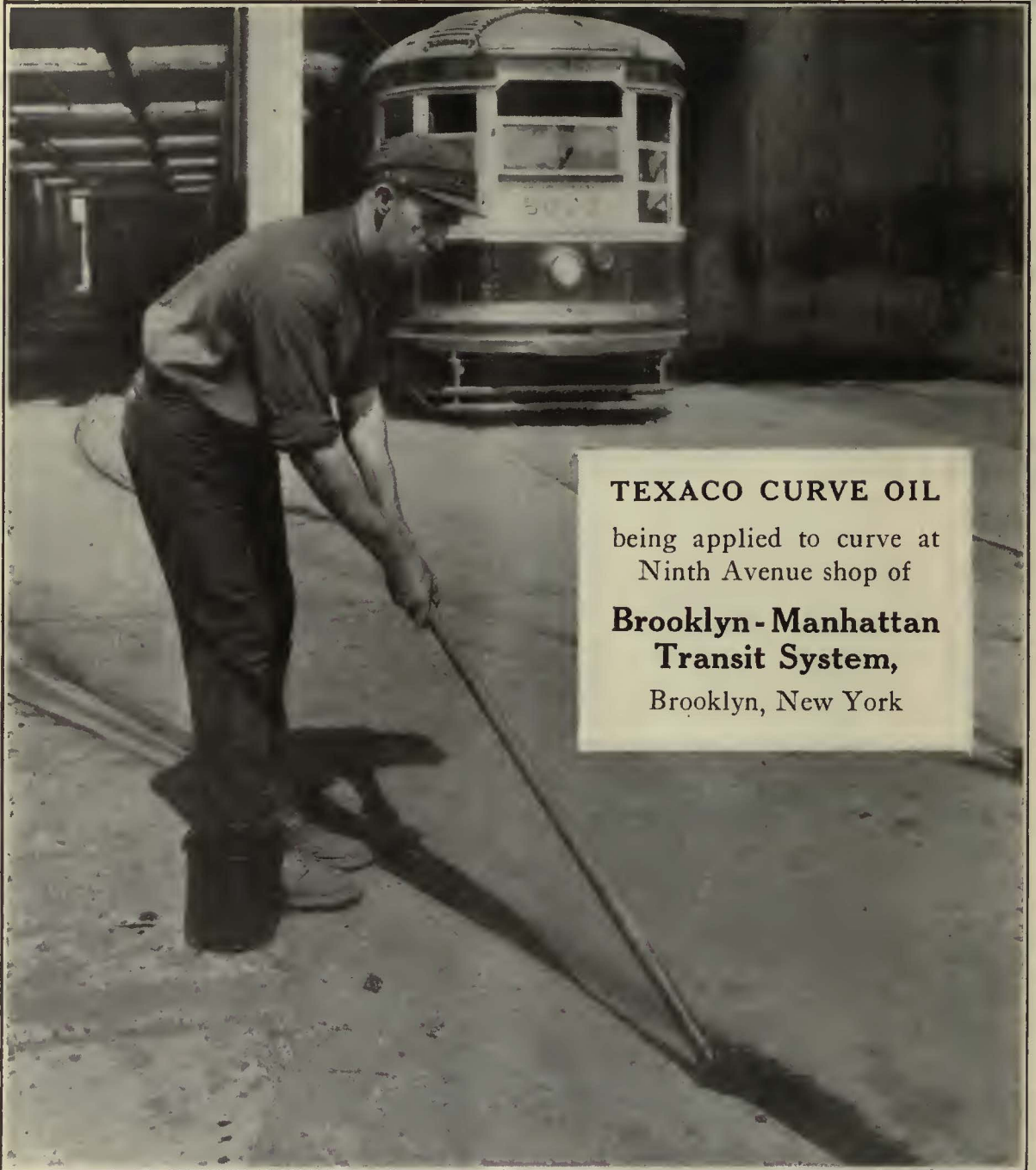
HASKELITE MANUFACTURING COMPANY

133 W. Washington St., CHICAGO

Canadian Representatives: Railway and Power Engineering Corp., Toronto, Montreal and Winnipeg

PLYMETL, the armored HASKELITE, has proven its claim to supremacy for side panels. Resists indentation, reduces weight, takes fine finish, makes a quiet, well-insulated car.

PLYMETL



TEXACO CURVE OIL
being applied to curve at
Ninth Avenue shop of
**Brooklyn - Manhattan
Transit System,**
Brooklyn, New York

TEXACO

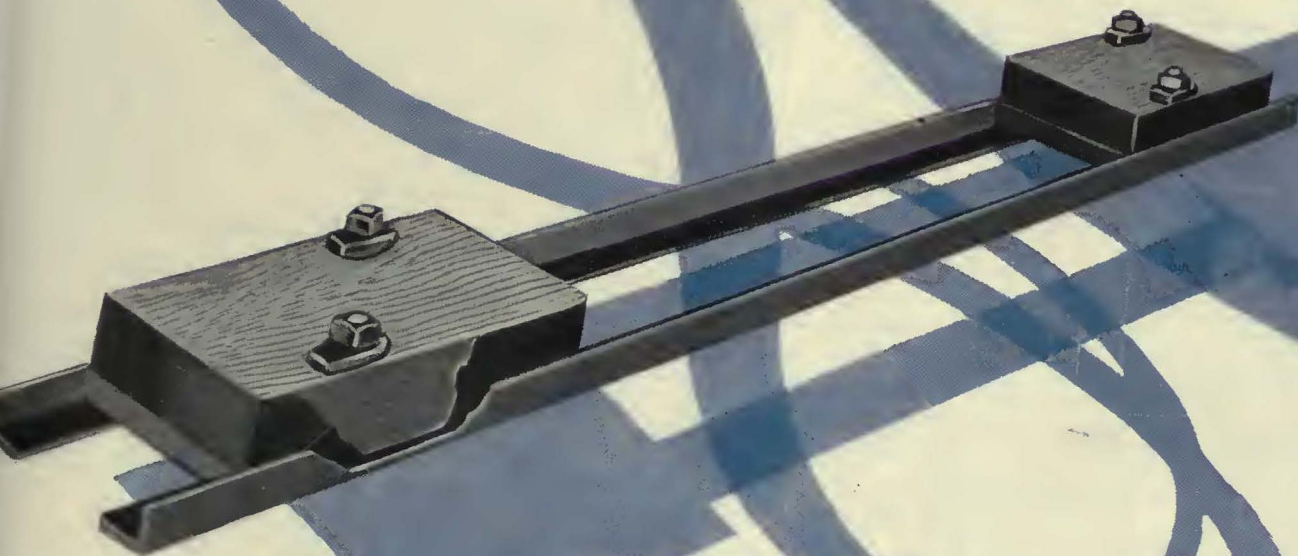


The Chosen Lubricant
of **ELECTRIC RAILWAYS**

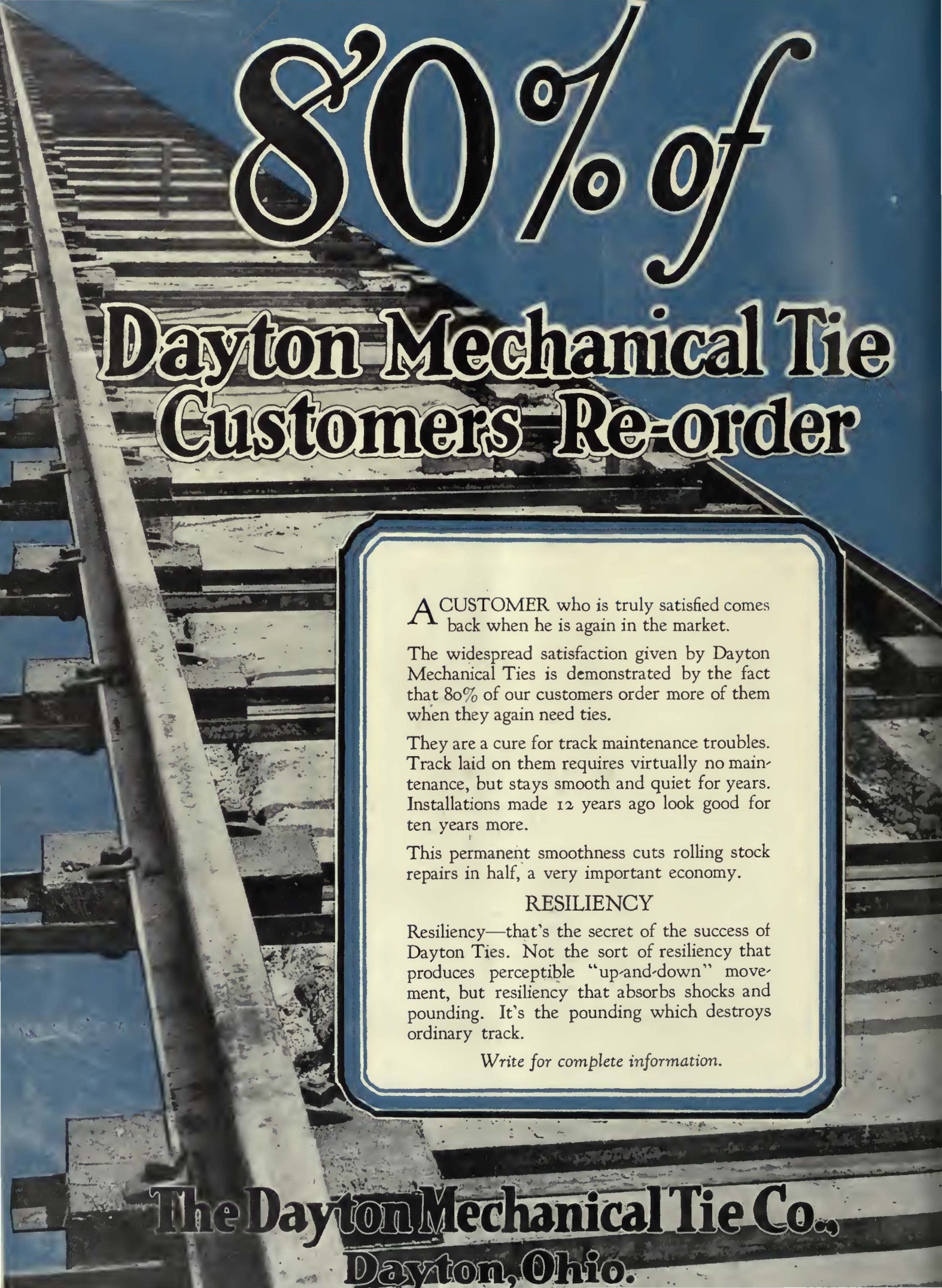


The Texas Company, U. S. A., 17 Battery Place, New York City
OFFICES IN PRINCIPAL CITIES

80%



80% Of Dayton Tie
Customers Re-Order
Because Dayton
Ties Prove More
Than Satisfactory



80% of

Dayton Mechanical Tie Customers Re-order

A CUSTOMER who is truly satisfied comes back when he is again in the market.

The widespread satisfaction given by Dayton Mechanical Ties is demonstrated by the fact that 80% of our customers order more of them when they again need ties.

They are a cure for track maintenance troubles. Track laid on them requires virtually no maintenance, but stays smooth and quiet for years. Installations made 12 years ago look good for ten years more.

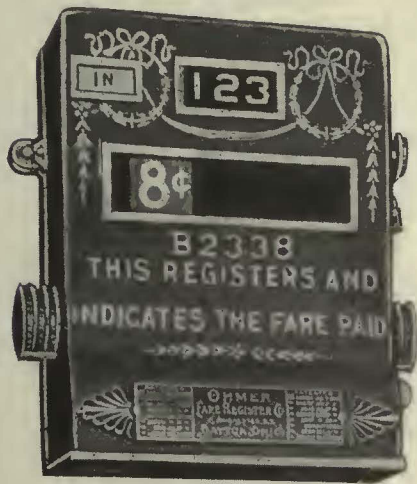
This permanent smoothness cuts rolling stock repairs in half, a very important economy.

RESILIENCY

Resiliency—that's the secret of the success of Dayton Ties. Not the sort of resiliency that produces perceptible "up-and-down" movement, but resiliency that absorbs shocks and pounding. It's the pounding which destroys ordinary track.

Write for complete information.

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



What OHMER

REG. U.S. PAT. OFFICE
FARE REGISTERS

*will keep a
check on for you*

ALL types of Ohmer Fare Registers indicate and record the exact amount and class of each fare paid.

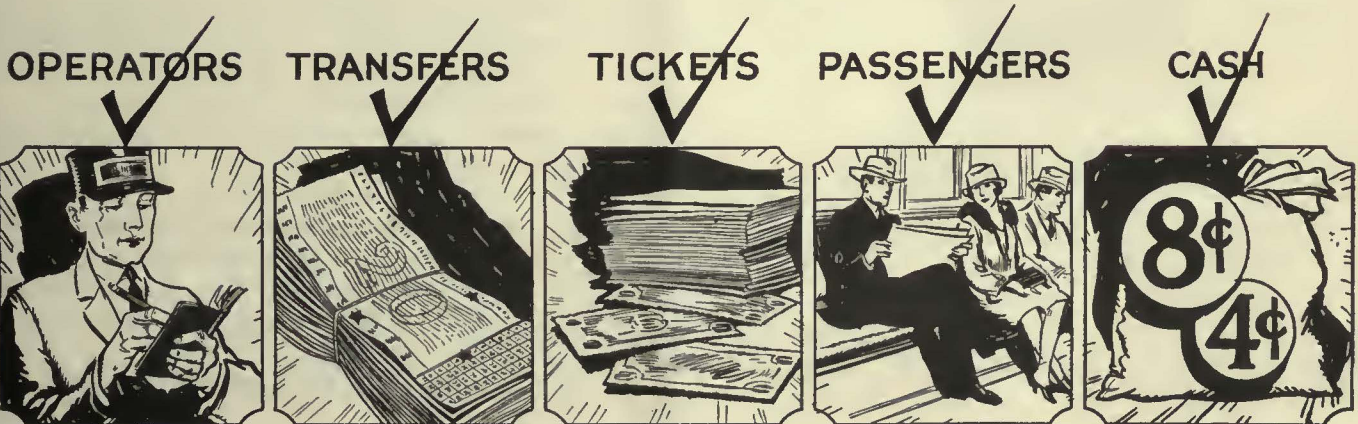
The visible indication throws protective publicity about each transaction and the printed report gives such detailed and complete information as to each fare collected that a complete check is kept on operators, on passengers and on each business transaction which takes place between them.

Ohmer Fare Registers offer the most complete and most businesslike method of auditing the income.

We manufacture Fare Registers, Ticket Printing Machines, Fare Boxes, Ohmer Taximeters, Atco Taximeters, Recordographs, Odometers, Hubodometers, Truck Auditors, and Commercial Counters.

Ohmer Fare Register Company

Dayton, Ohio, U. S. A.





Convention Exhibits

Cleveland, Ohio

October 4 to 8, 1926

Present indications are that this year's Convention, which will be held in Cleveland from October 4 to October 8 will be one of the greatest, if not the greatest, in the history of the American Electric Railway Association.

More exhibit space has been sold than in any previous Convention.

Arrangements have been made for larger and more diversified exhibits than at any previous Convention.

All indications point to the greatest gathering of transportation men and the greatest car and equipment exhibit in history.

Interest in new design and new developments has never been keener. Railway men have learned that modern equipment pays. They are alive to the possibilities and to the need of replacing existing obsolete equipment, and are seeking information on parts and equipment that will make possible more modern operation.

Every manufacturer has the four opportunities outlined here to turn this interest into sales.



Convention Number

Electric Railway Journal

September 25, 1926

The Annual Convention Number of *Electric Railway Journal* has been the backbone of the successful Convention sales program since the beginning of Convention exhibits.

Reaching the entire industry one full week before the Convention opens, it annually paves the way for the Convention itself by a comprehensive discussion of the most important subjects before the industry.

This year's issue will be devoted to an authoritative analysis and array of actual experience on the most important question now confronting the industry. Do modern cars and modern methods really pay?

The far-reaching influence of the editorial pages has made the advertising pages of the Convention Number the most valuable part of Convention selling. Before—during—and after the Convention its pages are used as the authentic guide to the industry's important operators and manufacturers.

The manufacturer who uses it adequately and intelligently has assured for his products maximum attention throughout the industry as well as at the Convention.

There will be a thousand extra circulation at the Convention.

The closing date is September 15, 1926.



THE AMERICAN
ELECTRIC RAILWAY
ASSOCIATION
CONVENTION

Oct. 4-8

AERA

Convention Dailies
Electric Railway Journal
(3 Issues)
October 5, 6, 7, 1926

The full benefit of Convention attendance comes with knowledge of daily happenings.

The three Convention Dailies are edited on the "spot" at Cleveland and will appear on Tuesday, Wednesday and Thursday at the Convention. These three "Dailies" give the delegates the only news of the daily Convention happenings and activities. The issues summarize as well, the events of the preceding day and present the program for the current day.

The intimate manner of treating personalities has made "The Daily" a popular and expected feature of the Convention.

Over 6,000 copies of the Daily are distributed during Convention week. All registered railway men will receive a copy at their hotel at breakfast. Additional copies will be distributed at the Auditorium and meeting rooms.

Use them to stimulate active and immediate interest in your exhibit.

Advertising copy and plates intended for insertion in the three issues of the Daily should be sent to our New York office not later than September 15, 1926.

**Convention
Report
Number**

*Electric Railway
Journal,*
October 9, 1926

The Convention Report Number of *Electric Railway Journal* is mailed 24 hours after the close of Convention.

Carrying the first Complete reports of the Convention, it brings to the returning delegates and to those who were unable to attend, a permanent record of the best thinking and the important developments of the Convention.

The Report Number preserves the worth-while happenings for reference and study. Because it is kept and referred to for months the advertising pages provide "a better than ordinary" opportunity for lasting sales messages.

Competition for the railway man's time is extremely keen. Stimulate and maintain his interest by taking adequate advantage of these four proved sales opportunities.





DIXON'S SILICA-GRAPHITE PAINT

Pioneer Of All Graphite Paints

Lowers paint costs per year of service by providing efficient protection for a surprising period of time.

It is a natural combination of silica and flake graphite for the pigment. The vehicle is pure boiled linseed oil. This pigment is inert, aids in preserving the original elasticity of the vehicle, increases the thickness of the paint film, and has long life.

Dixon's Paint will not peel, crack or flake off and is not affected by rust-producing agents, such as fumes, acids, dampness, etc.

Write for Booklet 91-B

Joseph Dixon Crucible Co.

Jersey City, N. J.



Established 1827



**Nearly $\frac{3}{4}$ of a
Million Miles
and apparently good
for a million**

ONE of the first Nuttall Heat Treated Helical Gears ever installed is still running, and is apparently good for an indefinite life.

DO YOU get that sort of service from the gears you buy?

Nuttall BP Helical Gears are saving most of their cost on many properties, just due to minimizing vibration.

Write for Bulletins giving full details

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.

HEAT TREATED— TROLLEY POLES



PRIOR to the last cold drawing operation every "NATIONAL-SHELBY" Seamless Steel Trolley Pole is given a special heat treatment. This is a very important part of the manufacture of a trolley pole. By this treatment the structure of the metal is left in the finest condition after having passed through the cold drawing operation. Thus every pole is ready to meet the severe conditions of service.

The elastic limit of these poles averages from 60,000 to 70,000 pounds per square inch. They are made in two regular designs—A and B. Design A for ordinary service conditions and where a light pole is practical and design B intended for heavier service.

Both types of poles are fully described in our booklet—The "SHELBY" Seamless Cold Drawn Steel Trolley Pole. A copy sent upon request.

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES

ELECTRICAL INSULATION

MICANITE and **EMPIRE**
INSULATOR
REG. U.S. PAT. OFF.

Micanite Sheets for all purposes
Micanite Commutator Segments
Micanite Commutator Rings
Micanite Tubes and Washers
Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)
Empire Oiled Cloths and Papers
(Yellow or Black)
Compounds Etc. Varnishes

Write for Catalogs and helpful booklet
on Commutator Insulation and Assembly

MICA INSULATOR COMPANY
New York: 68 Church St.
Chicago: 542 So. Dearborn St.
Works: Schenectady, N. Y.

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 Street
NEW YORK



You're having brush trouble

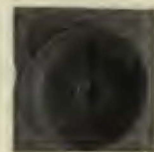
**CORRECT IT
USE LE CARBONE CARBON BRUSHES**

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

**No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication**

**Earll Catchers and Retrievers
C. I. EARLL, York, Pa.**

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.



R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

“SEARCHLIGHT”

Durable
Douglas Fir
AMERICA'S PERMANENT LUMBER SUPPLY
is railway wood...



A Douglas Fir transfer bridge for car floats of the Central Railroad of New Jersey.

DOUGLAS FIR is America's most useful softwood for every railway purpose. Every one of the A. R. E. A. structural grade combinations can be supplied in Douglas Fir—on short notice.

Light and Strong

The lightness of Douglas Fir makes handling easy—and when used for car construction, makes great savings in cost per ton mile of operation. The strength of Douglas Fir gives maximum load carrying capacity at low cost per board foot.

Stiff and Durable

The stiffness of Douglas Fir prevents excessive deflection under static or impact loading. The durability of Douglas Fir reduces maintenance charges. Other properties include resistance to mechanical wear, resistance to water penetration, nail-holding ability, excellent painting qualities, and unusual freedom from warping and checking.

Large Sizes Available

Special sizes of Douglas Fir, including timbers more than forty inches high by one hundred feet long, can be supplied readily on specified grade. No other commercial wood can be supplied in such large sizes. Douglas Fir will always be available from America's greatest forests. It has nation-wide distribution and can be obtained in every important lumber market.

Durable
Douglas Fir
AMERICA'S PERMANENT LUMBER SUPPLY

Send a postcard or mail the coupon for a free copy of the new booklet, "Durable Douglas Fir—America's Permanent Lumber Supply." Every railroad executive should have this handbook of information.

WEST COAST LUMBER BUREAU,
5562-T STUART BUILDING, SEATTLE, U. S. A.

R-71

Gentlemen: Please send me a copy of your free booklet, "Durable Douglas Fir—America's Permanent Lumber Supply."

Name _____
Street _____
Place _____

Important West Coast Woods

DOUGLAS FIR . WEST COAST HEMLOCK . WESTERN RED CEDAR . SITKA SPRUCE

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company



The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
 Birmingham San Francisco Los Angeles Seattle

Pellingell-Andrews Co., Boston, Mass.
 F. D. Lawrence Electric Co., Cincinnati, O.
 Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.
 Cuban Rep.: Victor G. Mendoza Co., Havana.


AIMco Electric Railway Automatic Signals

REG. U. S. PAT. OFF.

for Accessibility and Reliability

EST. 1855 AIMco INC. 1918

"American" INSULATING MACHINERY COMPANY

REG. U. S. PAT. OFF.

Philadelphia, New York, Paris, England

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

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

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.



We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
 Cleveland, Ohio


Chicago Representatives: Jameson-Ross Company,
 Straus Bldg.



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

ANCHOR WEBBING COMPANY.
 300 Brook Street, Pawtucket, Rhode Island

WHEEL TRUING BRAKE SHOE




U.S. TRADE MARK—WHEEL TRUING BRAKE SHOE

DON'T REMOVE WORN WHEELS

This shoe does the work while your car is in service.

SAVES TIME—SAVES LABOR—SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
 Detroit, Mich.



AMELECTRIC PRODUCTS

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

Reg. U. S. Pat. Office

AMERICAN ELECTRICAL WORKS
 PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 20-32 West Randolph Street;
 Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum .75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches \$4.50 an inch
4 to 7 inches 4.30 an inch
8 to 14 inches 4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

POSITIONS WANTED

ACTIVE young man, single, age 22, over three and one half years special training with large builder of street railway cars and trucks, desires change to mechanical department of operating company with opportunities for advancing. Can arrange for an interview with any interested party at Cleveland convention and solicit correspondence of others not attending. PW-927, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

AUDITOR, now treasurer of bus company in East, experienced accountant, desires change, preferably to Middle West. PW-928, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

OPERATING executive, superintendent transportation, motive power and equipment. Broad experience and a successful record on city, one-man safety, interurban and bus properties. Labor, industrial, public relations, traffic problems. Co-ordination of railway and bus service. Desires to re-enter operating field. University graduate. All references. PW-921 Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

SUPERINTENDENT of transportation: Qualified by a former successful record of twenty years on large city and interstate properties also co-ordination of rail and bus service recognized as an official of exceptional ability, successful in rehabilitation of properties, public relations, accident prevention, one man operation and handling of labor. Fully competent to take over any property and get results. High-grade references, correspondence invited. Will make appointments for interview at Cleveland convention or at convenience of interested parties. PW-926, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

SUPERINTENDENT with twenty years' experience in operation and maintenance of railway rolling stock and track; an outstanding success as a railway operator and as operator of co-ordinated railway and bus services desires for personal reason to make change. Fully capable of taking complete charge as manager or superintendent. PW-925, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

Wanted—

- 60 to 85 ton Electric Locomotive—railway voltage.
- 2—1000 kw. Railway Rotary Converters, 60 cy., 3 or 6 ph.

For Sale—Special Bargains

BIRNEY CARS
6—Standard Single Truck Double End

MOTORS

- 32—Westinghouse 306 SV Motors.

AIR COMPRESSORS

- 10—General Electric CP-27 Air Compressors.
- 8—Westinghouse DH-16 Air Compressors.

CONTROLLERS

- 12—K-35-G-2 Controllers.

IRVING S. VAN LOAN CORPORATION

1750 Broadway, New York City

SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS

**Economy—Service
Quality—Reliability**

**HYMAN-MICHAELS
H COMPANY**

Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

ROTARY CONVERTERS

- 2—Converter and Transformer units new in 1924.
Can be seen in operation at Warehouse Point, Conn.
Synchronous Converters
No. 4006698—4006699 G.E.
Type H.C.C. 6—500—1200.
Form P. Speed 1200 Direct Current.
Amperes 834 Nominal Volts 600 3 Phase, 1250 Amp. 2 hrs. 55 degrees C Rise.

TRANSFORMERS

- Type H.J.T.H.
Form D.D. Volts 13200 Y 445 Cycle 60 Capacity 500 K.V.A. Nominal.
750 K.V.A 2 hrs. 60 Degrees C Rise.
Reactance 12% approx.
G.E. Regular Coil H. Design.
Immediate delivery can be made.

THE PERRY BUXTON DOANE CO.

Boston, Mass.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built
Weat. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

ELECTRIC RAILWAY EQUIPMENT!

Railway Motors

- 25—Westinghouse 307'e G.E. 80's.

Tower Truck

- 1—2½-3 ton White. Three section. Fully equipped. New 1923.

Car Hoist

- 1—Universal Columbia Mch. Co. make. Motor and control equipment included.

Welding Machine

- 1—Railway Welding and Bonding Co. New 1923. Fully equipped.

Birney Cars

- 4—32 seating capacity Westinghouse 508A motors. Fully equipped. Splendid condition.

Southern Cars

- 6—Double truck, 42 passenger. One man operation.

Sweeper

- 1—Double truck Snow Sweeper. Fully equipped.

Track Grinder

- 1—Atlas Rail Grinder new 1923. Excellent condition.

When the operations of the
NEW YORK & LONG ISLAND TRACTION COMPANY

ceased,—all equipment was purchased by us for resale. This unusual opportunity was then created for railway companies to secure at unbelievable savings the little-used equipment shown here.

All is in excellent condition—and the low prices will surprise you. Write for complete information and prices on what you can use.

H. E. SALZBERG CO., Inc.
50 Church St., New York City

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Side
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Auto Body Co., The
Cummings Car & Coach Co.

Body Material, Haskelite and Plymex
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bolts and Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Yellow Truck & Coach Mfg. Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.

Cables, (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co. Inc.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. G.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Elec. Service Supplies Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Standard Steel Works
Wm. Wharton, Jr. & Co.

Catchers and Retrievers, Trolley
Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantastote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.
Cement
N. Amer. Cement Corp.
Cement Accelerator
N. Amer. Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Elec. Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & 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.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse Elec. & M. Co.

Colls, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Kicking
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 Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
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.

Conveying and Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Euda Co., The
Elec. Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals, (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
Morton Mfg. Co.
Pantastote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Hyman-Michaels Co.
Perry Baxton Doane Co.
H. E. Salzberg Co., Inc.

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Ears
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Track-work Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.
Rome Wire Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
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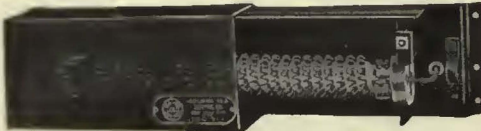
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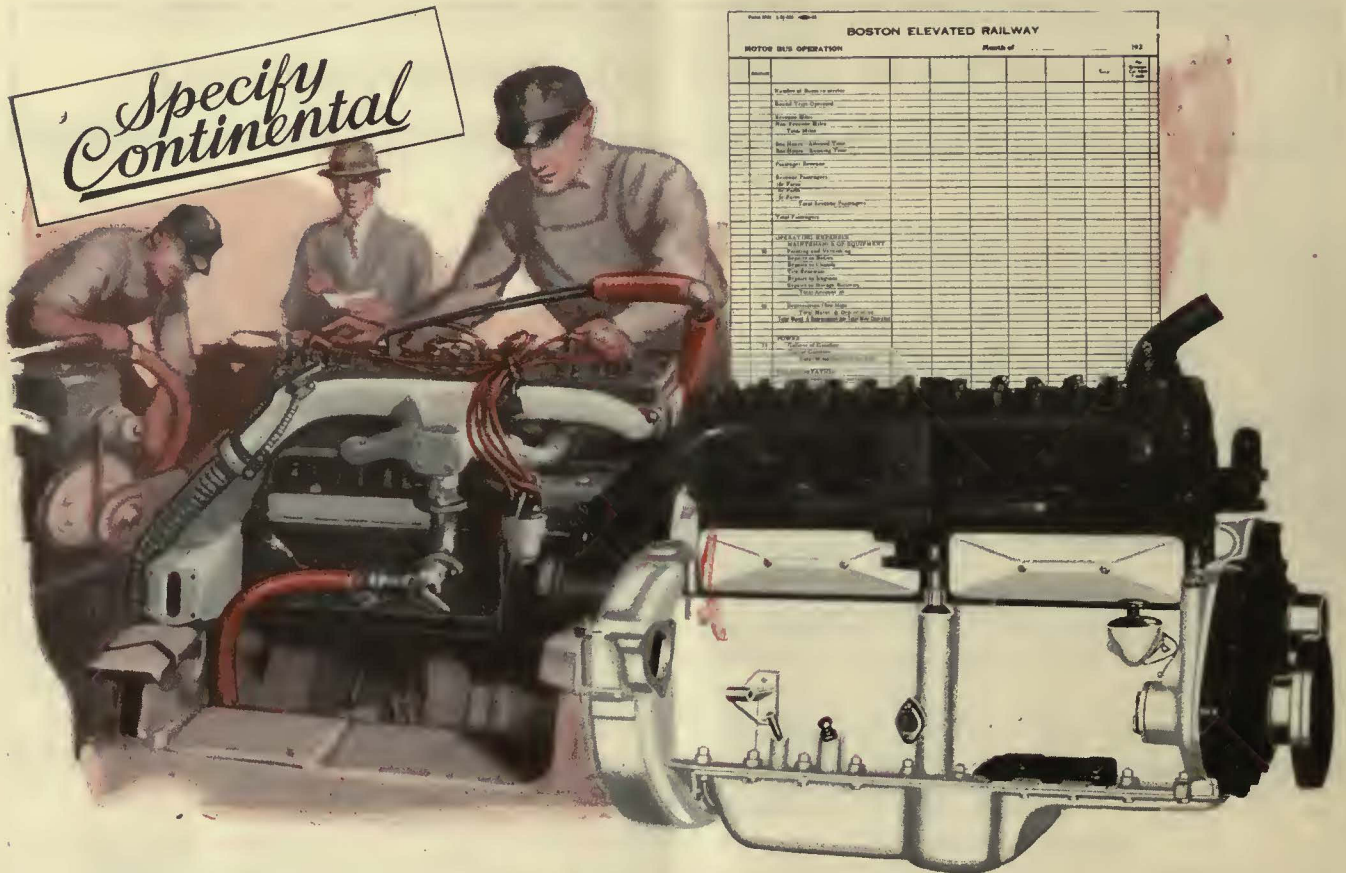
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Flexibility in cities where frequent stops and starts are necessary; smoothness of operation over long country routes where high speeds are maintained and passenger comfort is a factor; greater

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The Largest Exclusive Motor Manufacturer in the World



Continental Motors



Operating Costs OLD CARS 1923		Operating Costs NEW CARS 1925	
	Per Car Mile		Per Car Mile
Way and Structures..	4.67c.	Way and Structures..	4.59c.
Equipment	2.88	Equipment	2.55
Power	4.00	Power	3.44
Conducting Transp....	11.69	Conducting Transp....	9.47
Traffic	0.01	Traffic	0.15
General and Misc.....	8.10	General and Misc.....	7.70
Total	31.33	Total	27.60
		Savings.....	\$76,140.00
		* Approx. Investment	\$500,000.00
		Return on Investment	15.2%

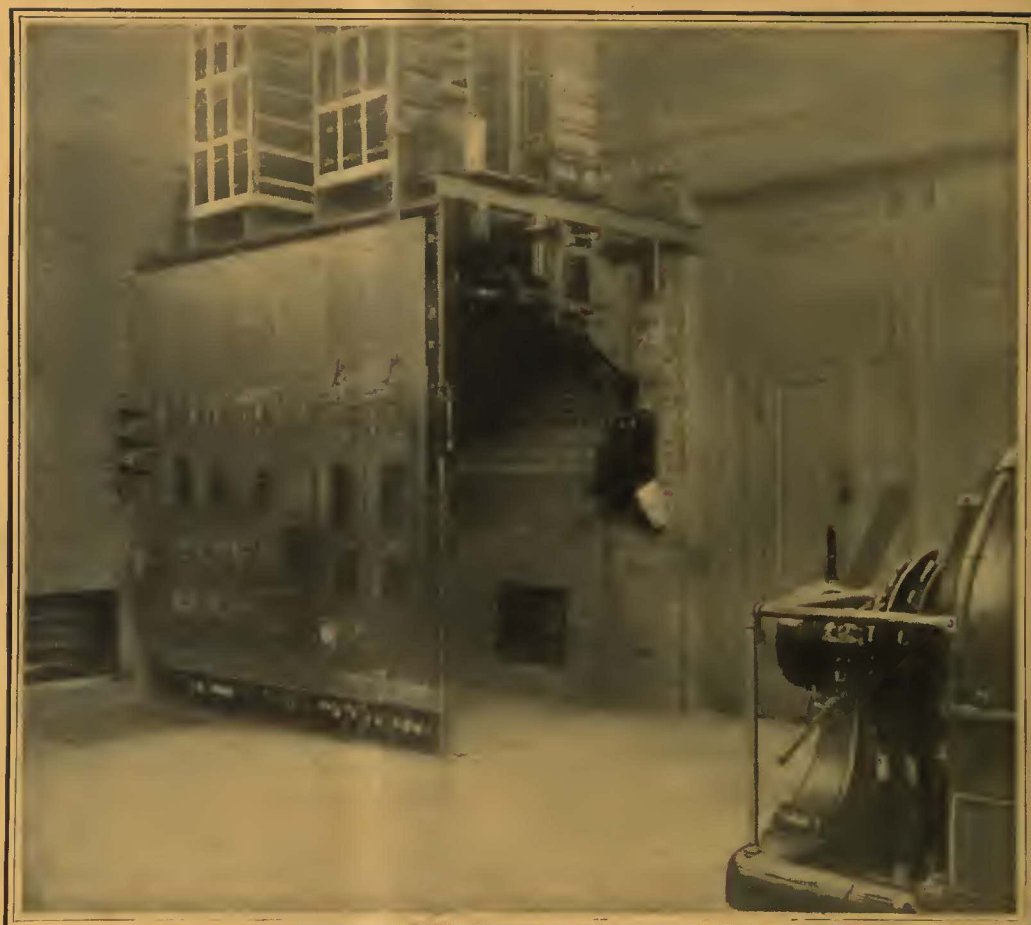
*The
Ohio Valley Railway
saves
15.2%
Return on Investment
with 40 New Cars

New Cars—Where Efficiency Begins

Late in 1923 the Ohio Valley Railway Co. displaced a lot of old rolling stock, weighing as heavy as 58,000 lb., with 40 new modern cars weighing 37,700 lb. each. This new equipment has effected such substantial operating econo-

mies that profitable operation has been the result.

Continued operation of heavy and obsolete equipment is economic waste. Efficiency begins with the introduction of new cars.



Lake Bluff Automatic Substation of the Chicago, North Shore & Milwaukee. In operation since February, 1919.

— built to endure

The unvarying good performance of the original automatic substations of the Chicago, North Shore & Milwaukee Railroad indicates that G-E Automatic Equipment is built to endure. The first was placed in operation in 1917 and its probable length of life is still for the future to determine.



Three years before the Chicago, North Shore & Milwaukee adopted automatic control, the first automatic substation (G-E) was put into operation. This station is one of the several G-E Automatics that have been in service 10 years or more.

The "North Shore's" growing list of automatic substations and its present program of installing automatic equipment in manual stations attest this company's confidence in G-E Automatics.

The G-E Automatic Equipments being built today are still further improved over those that are in regular operation after ten years of continuous service.

GENERAL ELECTRIC