

ELECTRIC RAILWAY JOURNAL



John R. McKay, Chief Engineer, Indiana Service Corporation, Fort Wayne. Mr. McKay is numbered among America's better known electric railway engineers. He is a member of the Standing Committee on Way and Structures of the A. E. R. E. A.

“We build for smoothness and easy riding”

WE have taken special pains in our track construction work to build for smoothness and easy riding, both for our own cars and for automobile traffic.” So says John R. McKay, Chief Engineer of the Indiana Service Corporation.

“Particular attention has been paid to arterial crossings, with the result that motorists can cross the tracks without feeling them at all.

“We have been greatly aided in our endeavor to get smoother, less noisy crossings, by the use of an asphaltic cushion next to the rails. This has the advantage of being easily applied, and in addition to deadening sound it gives us a tight construction that keeps out water.”

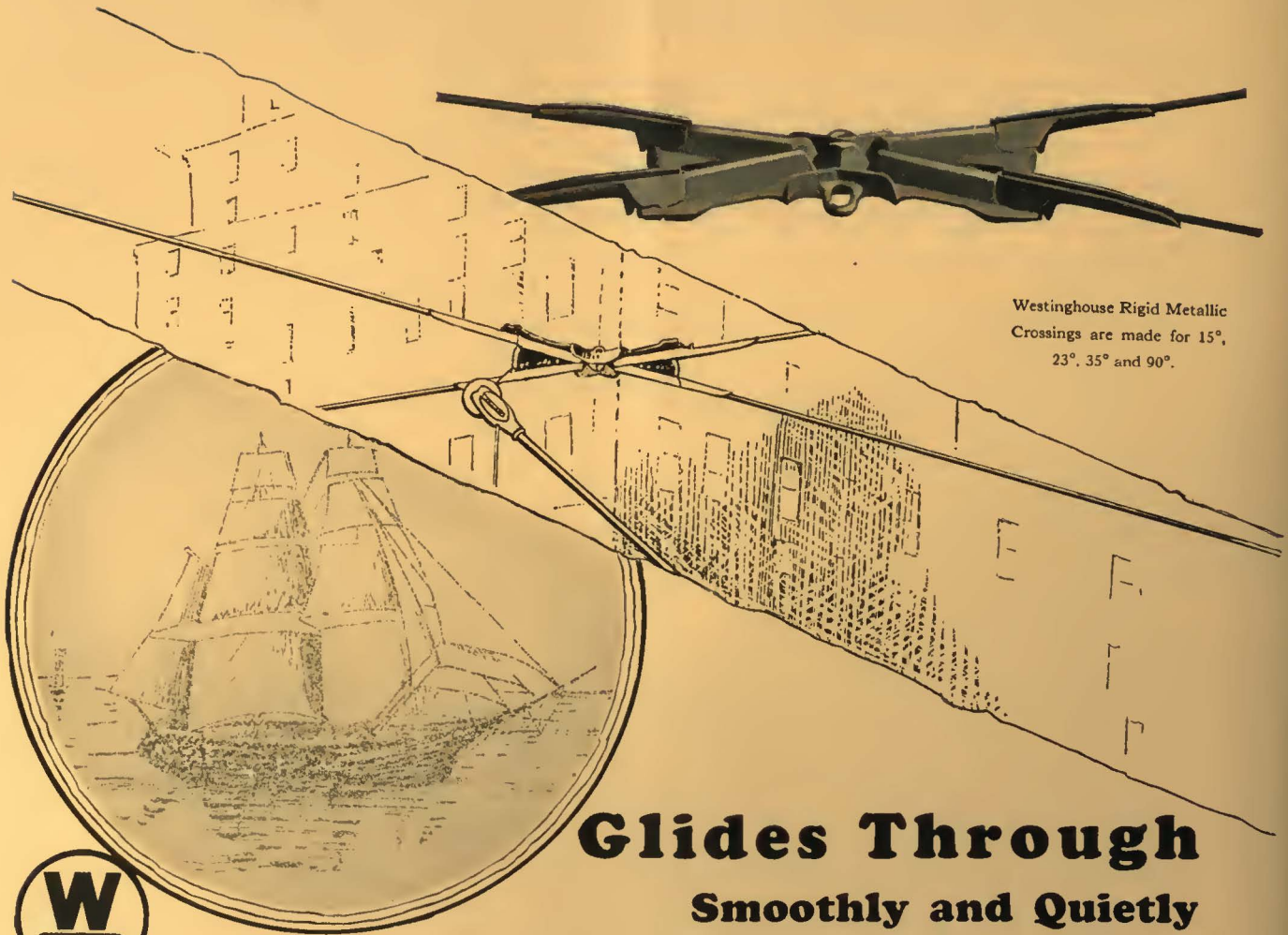
Fort Wayne electric railway tracks in process of construction—showing the slabs of Carey Elastite Rail Filler in place.



To improve track construction in Fort Wayne, the Indiana Service Corporation has made extensive use of the Carey Elastite System of Track Insulation—and with highly successful results. Complete information on request.

THE Carey Elastite System of Track Insulation consists of pre-cast slabs of a fibrous asphaltic compound, which form a resilient cushion between rails and pavement. A blow with a sledge sets the slabs in place. Unaffected by moisture or changes in temperature.

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TRADE MARK REG. U.S. PATENT OFFICE
SYSTEM OF TRACK INSULATION



Westinghouse Rigid Metallic
Crossings are made for 15°,
23°, 35° and 90°.



Glides Through Smoothly and Quietly

THE trolley wheel glides through the crossing as easily as over the plain wire.

Long flexible approaches lead the wheel onto the crossing without pounding or arcing.

The trolley wheel rides on the ridge clear through the crossing. The ridge is high and continuous except for two slots in which the flanges of a crossing trolley wheel may travel. As the wheel flanges never ride on the pan the pan receives no wear.

Smooth, quiet operation and long service are characteristic of Westinghouse crossings.

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Removing the Isolation of the Small City

A SINGLE thought from the remarks of G. O. Rushing, master mechanic of the Shreveport Railways of Louisiana, made at a recent railway meeting shows the value of the technical press.

"Our property," he said, "is way up in the state, and there we need ELECTRIC RAILWAY JOURNAL and we use it."

Shreveport is only one town that is a long way off the beaten track and away from the influence of large communities. But it is typical of many. To such properties, as well as those more centrally located, the JOURNAL carries its message weekly.

Mr. Rushing gets the news of the industry, the latest developments and data on the latest products as promptly and as completely as do executives in cities of a million population. His isolation, however, intensifies the value of this service.

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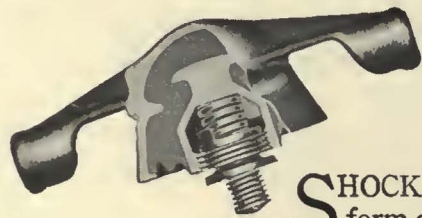
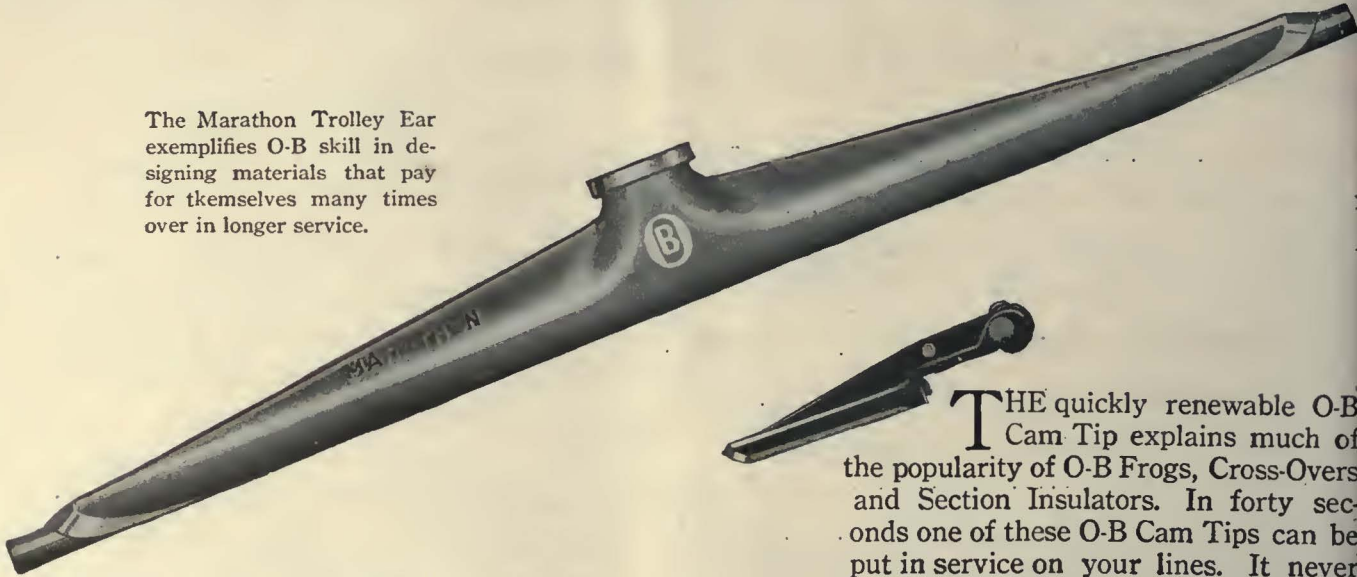
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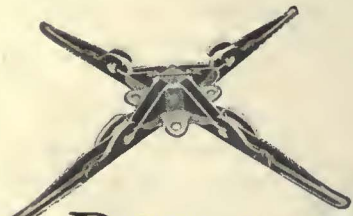
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Yes, Marathon Ears

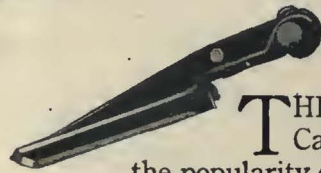
The Marathon Trolley Ear exemplifies O-B skill in designing materials that pay for themselves many times over in longer service.



SHOCK absorbers, in the form of O-B Spring Lock Hangers, play an important part in the scheme of economical railway operation. They take the hard spots out of the overhead by providing a cushion between ear and bracket arm or span. By softening the shock from the wheel as it passes under the suspension point, they materially reduce wear and depreciation. Made in barn or span type.



BUILT for long life in heavy traffic, the type ER Live Rigid Cross-Over is provided with a liberal metal thickness of pan and runner sections. This contributes also to its economical maintenance, making renewals few and far between. The cam tip approach simplifies installation and saves time, minimizing delays and lowering costs. Can be furnished for a large number of angles.



THE quickly renewable O-B Cam Tip explains much of the popularity of O-B Frogs, Cross-Overs and Section Insulators. In forty seconds one of these O-B Cam Tips can be put in service on your lines. It never becomes loose or troublesome on the wire. Provides a smooth approach for the trolley wheel, without arc or bump.



THE Type A-4 Section Insulator is sturdily built and so designed that the entire trolley tension is sustained by two wood strain insulators in the same plane as the trolley wire. There is no buckling strain. The renewable fibre runner piece cannot warp. Rocker clamps hold the trolley wire firmly without damage.



A FEATURE of the type E-1 Live Adjustable Cross-Over is its combination brace and pull-off ring. This prevents buckling and insures long, care-free service. It also permits attaching a pull-off wire to hold another trolley wire in alignment. Interlocking malleable iron pan and cross runner castings are held together securely without screws or bolts.

Have Made Unrivaled Records, but—

**so have other O-B Line Materials,
all of which help to increase profits**

ONE large city property saved \$5,000 on trolley ears alone, the first year Marathon Ears were used. Even larger yearly savings are expected as additional Marathons are placed in service.

Twenty-one months of actual service, at the rate of 20,000 car passes per month, or more than 420,000 total, is the record established thus far on this property by Marathons.

This is three times the life of other trolley ears which were matched against Marathons in competitive tests. Even after 420,000 car passes, 50 per cent of the Marathons were still in use, and have not yet been removed.

Trolley Ear replacements have been reduced on this road from 1470 to 50 per month, replacements becoming fewer as Marathons are put into wider service. Line Breaks have been reduced from 331 to 188 per year, since using Marathons.

How much profit could you show in a year if 420,000 car passes was the service received per trolley ear? How much would you save in the labor cost of replacing worn out ears?

O-B Type BC Trolley Frogs furnish other examples of profit earning line material. One property reports a Type BC Frog that survived 652,000 car passes before it was removed from service. Another reports 524,000 car passes; another, 504,000. The lowest figure reported by five properties was 365,000 car passes. The average for five properties is close to the half million mark.

There are other facts and figures available which will show you how O-B Line Materials can increase the net profits of your company.

Isn't this a good time to send for these facts—to begin making similar records for *your* property?

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

I03B

Ohio Brass Co.



PORCELAIN
INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING
MATERIALS
VALVES



Thirty buses of this type, operated by the Cleveland Railways, are equipped with Westinghouse Air Brakes

Modern buses should have WESTINGHOUSE AIR BRAKES

Westinghouse Air Brakes develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules—provide automatic equalization to minimize skidding and lengthen life of brake linings—relieve the driver of braking fatigue to increase safety and utility—and permit use of metal brake linings to provide still greater safety and economy.

Westinghouse Air Brakes provide the same element of control now safeguarding railway travel—are operating successfully on more than 2000 automotive vehicles under all conditions—receive Westinghouse service in all principal cities—are becoming increasingly popular with bus operators—and are being installed as standard factory equipment or on specification, by all leading automotive builders.

WESTINGHOUSE TRACTION BRAKE CO.
AUTOMOTIVE DIVISION

General Offices and Works, WILMERDING, PA.



Check steel tie construction

with these
essentials of
good paved
track—



BEARING—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track-foot at the lowest cost per unit of bearing—and, where it is most needed, 468 sq. in. of bearing under each joint.

PERMANENT MATERIALS—In Steel Twin Tie construction, the tie structure embedded in concrete is not affected by water, temperature variations or rot.

ECONOMY—Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life decreases the cost per track-foot per year.

For estimating get the 1926 prices at your delivery point.

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

International Creosoted Ties

"The wooden tie—with reasons why!"

Shock Absorbing Car Tracks—

IMPLY is the implacable foe of track and paving. It can never be entirely prevented, but it may be cushioned, and wooden ties best accomplish it. The resiliency of wooden ties makes a smooth, easy-riding track for which there is no equivalent substitute.

And you can obtain wooden ties with a life of several times the ordinary untreated kind. The preservative effect of properly treating sound timber ties is exemplified in the established long-life records of *International* Creosoted Ties.

*We are prepared to make immediate shipment
to all points in the United States*

ORDER YOURS NOW!

International Creosoting & Construction Co.

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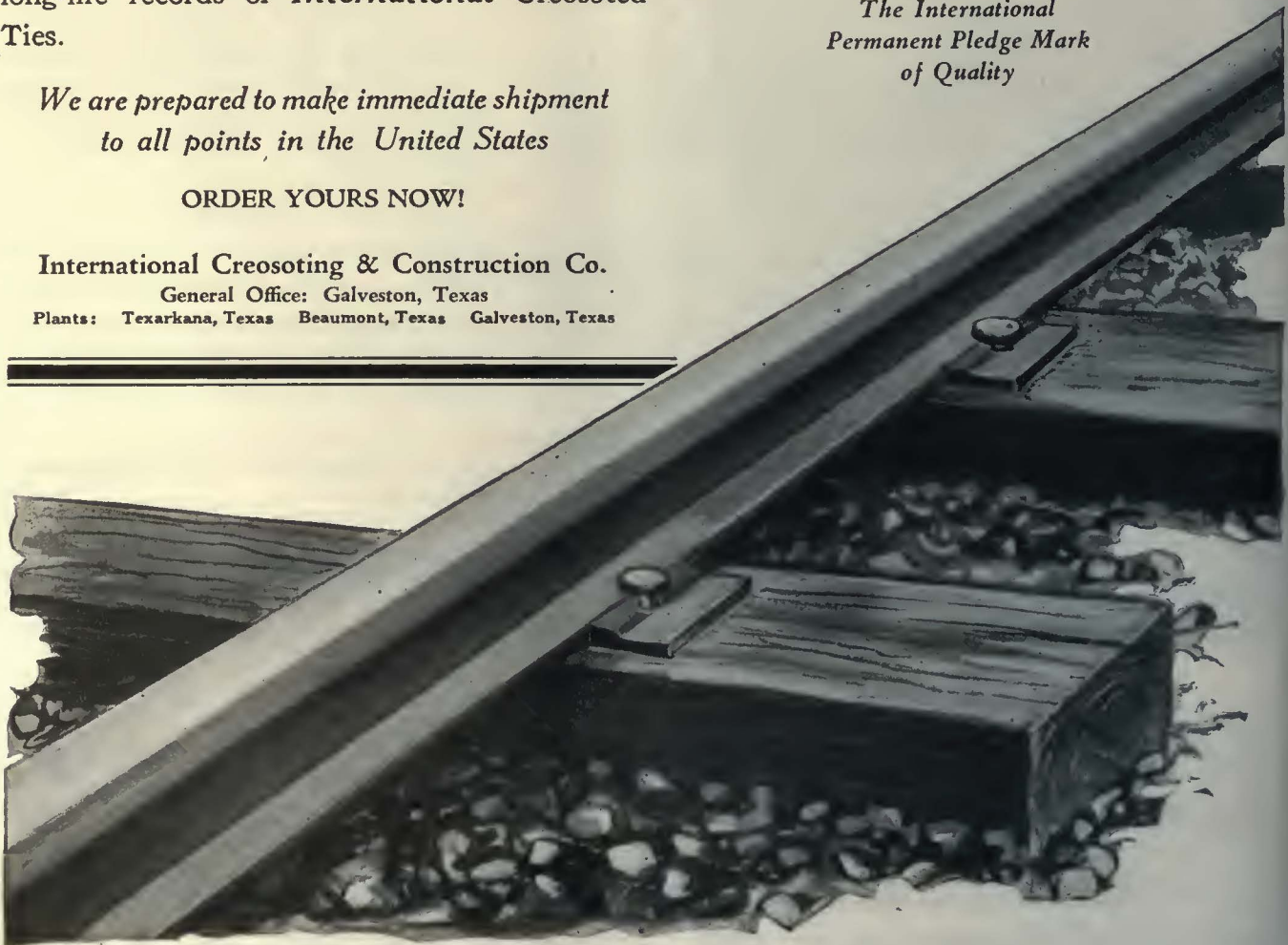
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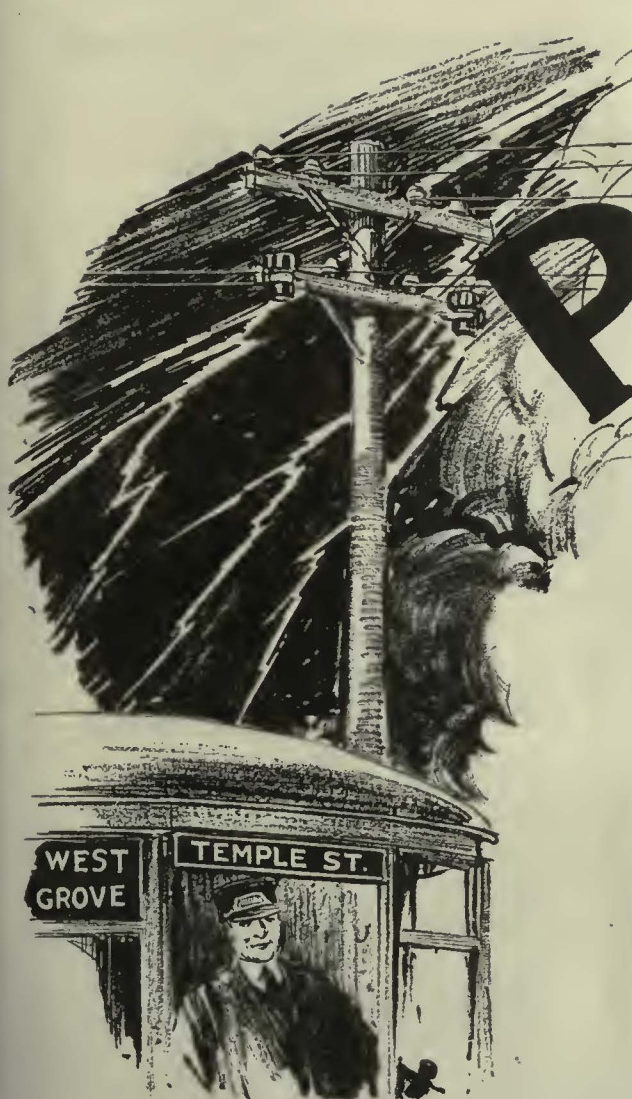


Resiliency



*The International
Permanent Pledge Mark
of Quality*





Protect those new cars!

To protect the twenty-eight thousand new cars that will replace the obsolete ones now in service—install Keystone Type I C Lightning Arresters on cars and feeder lines.

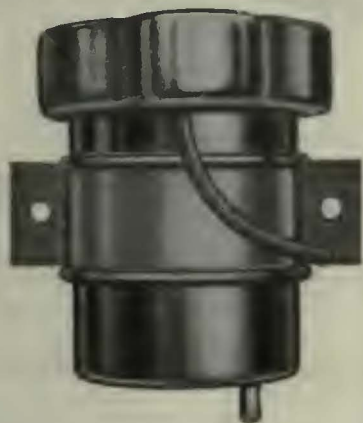
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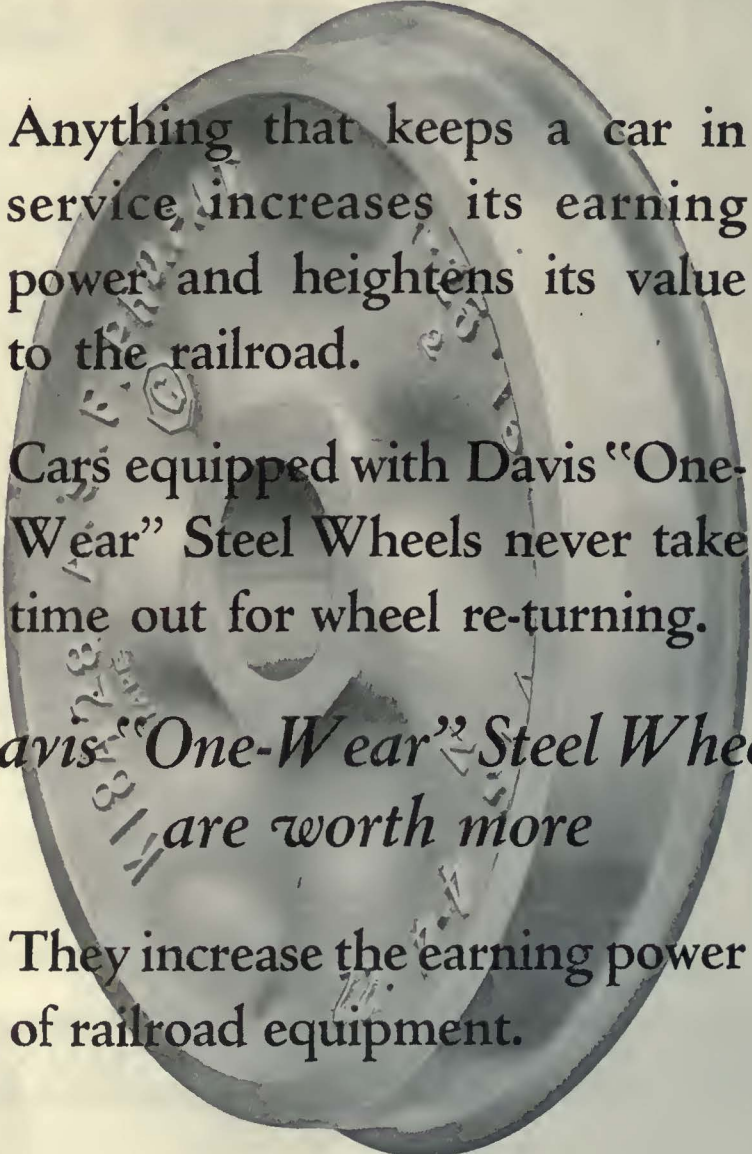
KEYSTONE LIGHTNING ARRESTERS



Type I C Arrester

- Self-contained.
- Easily installed.
- Small size makes them practical on crowded poles and in cars.
- No inspection required.
- Minimum depreciation.
- Remarkably efficient.

MORE CAR HOURS



Anything that keeps a car in service increases its earning power and heightens its value to the railroad.

Cars equipped with Davis "One-Wear" Steel Wheels never take time out for wheel re-turning.

*Davis "One-Wear" Steel Wheels
are worth more*

They increase the earning power of railroad equipment.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



*The Banks of America
stand behind Yellow Coach
transportation developments,*





Consider the judgment of your Bankers —

Bankers do not give long term trust equipment notes on Yellow Coaches without reason.

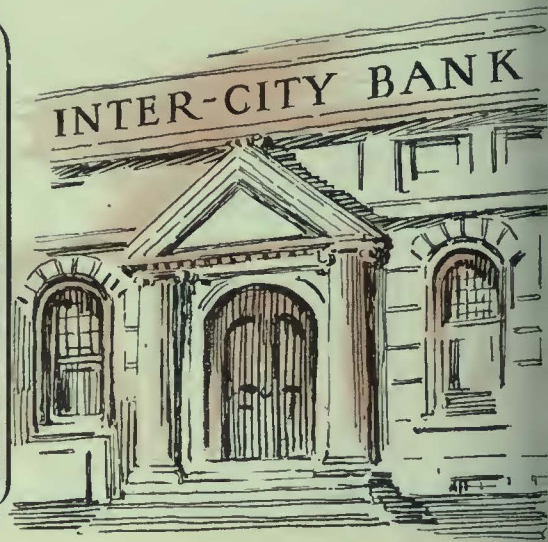
It is not sufficient that they realize the stability of the motor coach as a means of transportation, strong as this assurance may be. They must, and *do*, go further by investigating the financial status of the manufacturing organization. They



weigh the protective value of personnel. They gauge moral responsibility toward the field. They measure experience in terms of service. They look ahead for years as a protection against "orphan equipment."

Two recent issues of long term trust equipment notes, amounting to millions of dollars, testify that banks are willing and genuinely interested in furthering Yellow Coach transportation developments.

Yellow Coach and General Motors, by combining their vast technical and manufacturing resources, experience and financial strength, have earned this tribute



paid them by the bankers of America. Such an alliance places *financial stability* behind the coaches you operate and wins the approval and co-operation of the most conservative bankers in extending the scope of Yellow Coach operations.

Your bankers know Yellow Coach and General Motors. They know the impregnable position held in the industry by these world leaders of automotive progress. And they know that present models are the result of twenty-five years of development work, carried on by men who pioneered the way.

Consider their judgment. Their viewpoint is an outstanding tribute to Yellow Coach.

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



STREET SCENE IN SAN DIEGO, CALIFORNIA.



Courtesy in California

The most even-tempered car man in the world cannot operate car doors and steps as courteously as the National Pneumatic Door and Step Controlling Mechanisms. Pneumatically operated doors cannot be banged or slammed. They *always* close or open with a gentle cushioned action which not only spares the temper of your passengers, but eliminates unnecessary wear and tear on your equipment. These facts are realized by the railway companies in San Diego and in many other modern cities where National Pneumatic Equipment is employed to insure constant courtesy in service.

NATIONAL PNEUMATIC COMPANY

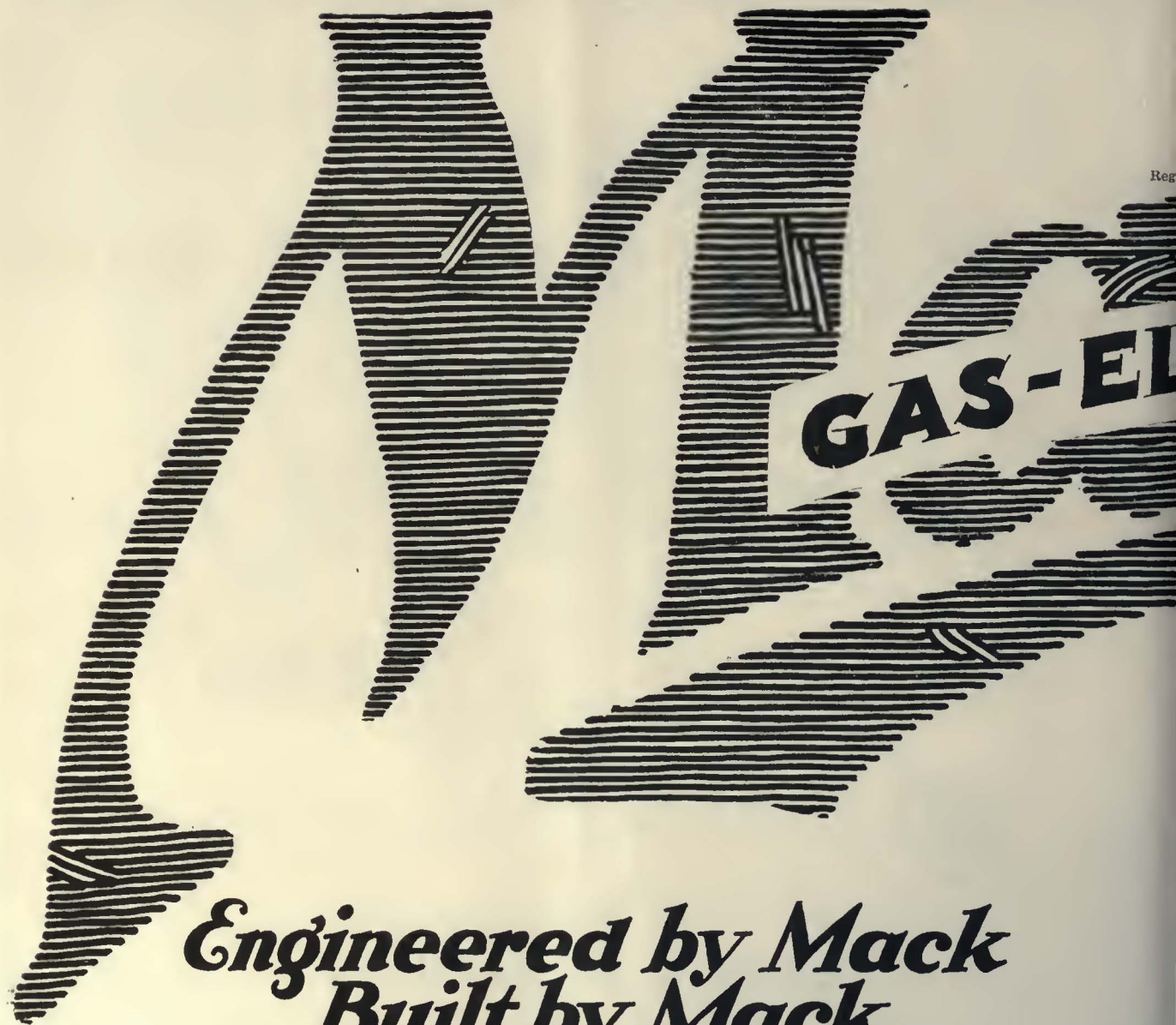
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Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Engineered by Mack Built by Mack Serviced by Mack-

Only after exhaustive tests, made under actual operating conditions, did Mack adopt one-motor drive as being the simplest and most economical in the long run, and on *your run*.

Retaining completely the many exclusive features and design of the standard Mack City-type Bus, the decision to stake the Mack reputation on one motor was based on the known advantages of one-motor drive to the operator.

One motor or two? Mack decided on one be-

cause *one motor does the job!* It insures the desired efficiency, at the same time reducing weight, care and maintenance charges. This being the case,—why two?

Mack uses a self-exciter generator and thereby eliminates the need of a separate exciter with its resultant added weight, care and service. Simplicity has always been the keynote of Mack engineering. Mack has always designed and built with the viewpoint of reducing maintenance charges to a minimum, dispensing with non-essential units and retaining only those which are necessary to the exceptional performance upon which Mack reputation rests.

That's why Mack uses one-motor drive. That's why one-motor drive is most logical and economical. Same standard Mack chassis features. Same liberal road clearance.



The first bus was a Mack
the first Mack was a bus



- one-motor drive

MACK STANDARD FEATURES THROUGHOUT PLUS PERFECTED ELECTRIC UNITS

The Mack Gas-Electric One-Motor Bus is in chassis construction essentially the same reliable Mack, identical and interchangeable.

Thus the Mack Gas-Electric uses the standard dual reduction rear axle and single propeller drive for strength, quietness.

Complete power plant of engine, generator and motor mounted on Mack Rubber Shock Insulators, reducing vibration and noise to a minimum and adding years of life.

Mack's generator hook-up with the engine is through a rubber torsion insulator—(an exclusive Mack feature).

All electric units are quickly and easily reached from trap doors in the floor of the body. No disturbance of adjacent parts in removing electric units from below.

Planned and built along rugged Mack lines, yet combining simplicity of design and great power and desired flexibility, Mack gives that simplicity of operation, acceleration and positive braking that traction men are accustomed to.

Get in touch with the Mack direct factory branch in your locality. Ride a Mack Gas-Electric One-Motor Bus. Put it to any test.

MACK TRUCKS, INC.

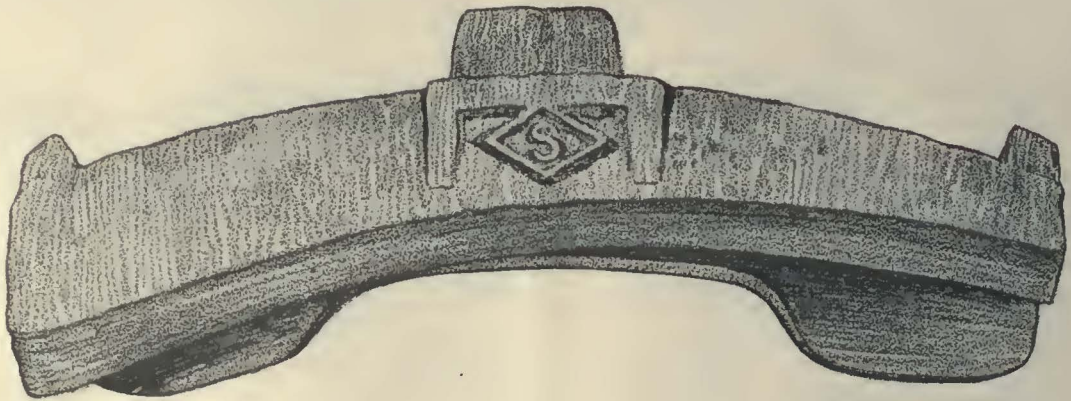
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One hundred and seven direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."



A Mack Gas-Electric Bus in service. Note the generous ground clearance—0½ inches.

The
Mack
Bus



Should Brake Shoes Be Reversed?

IMPROPER rigging causes brake shoes to wear unevenly. An unevenly worn shoe must be reversed to give full service. This is particularly advisable in the case of an American Brake Shoe from which long work can be expected. Reversing brake shoes, however, is a continual expense. It is both cheaper and wiser to correct the faulty rigging, thus obtaining the full wear from every shoe without the trouble and expense of shoe reversal. Money is saved by using the best shoes. Why throw it away by continuing the use of worn brake rigging?

"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

**30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO**



Timkens in Gas-Electric Efficiency

In the very latest forms of rail transportation Timken Tapered Roller Bearings are a basic element. Naturally the new Brill gas-electric car for the New York, Ontario & Western—among the very largest cars of its kind—runs on Timken Bearings.

They enter so vitally into the economy records of the gas-electric type by relieving the journals of excess friction. Power is saved under way, of course, but Timkens still more favorably affect the starting characteristics.

Anti-friction advantages are available in such

heavy service because highest capacity for thrust, shock and radial load is assured by Timken Tapered design, Timken-made electric steel, and Timken positively aligned rolls.

Even aside from saving of fuel, speeding up of schedules, and multiplied endurance, Timken Bearings are a major railroad economy because they require lubrication only a few times yearly!

On the rails the use of Timkens grows almost directly in proportion to the number of self-propelled cars, so widely have leading builders adopted Timken Tapered Roller Bearings.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS

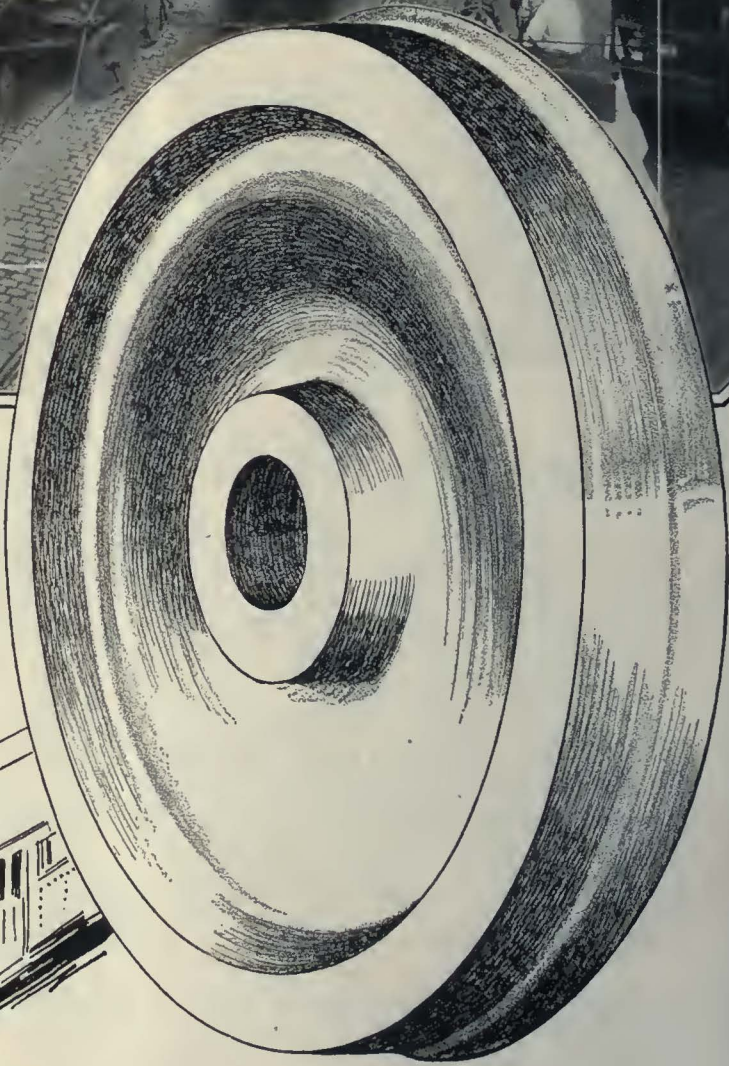


Modern traffic demands the best there is in equipment. Gary Wrought Steel Wheels meet these demands by reason of their *safety, dependability and economical mileage cost.*

Illinois Steel Company

General Offices, 208 South LaSalle St.
Chicago, Illinois

G A R Y
W R O U G H T S T E E L W H E E L S





Build New Business *with New Cars*

IT IS a fact, demonstrated by the experience of numerous city railways, that a decided increase in patronage as well as a reduction in operating and maintenance costs invariably follows the adoption of new, attractive cars. This will be the experience of your property also.

Our engineering department will cooperate with you in working out designs and submitting proposals, or we will gladly quote on your plans and specifications.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.

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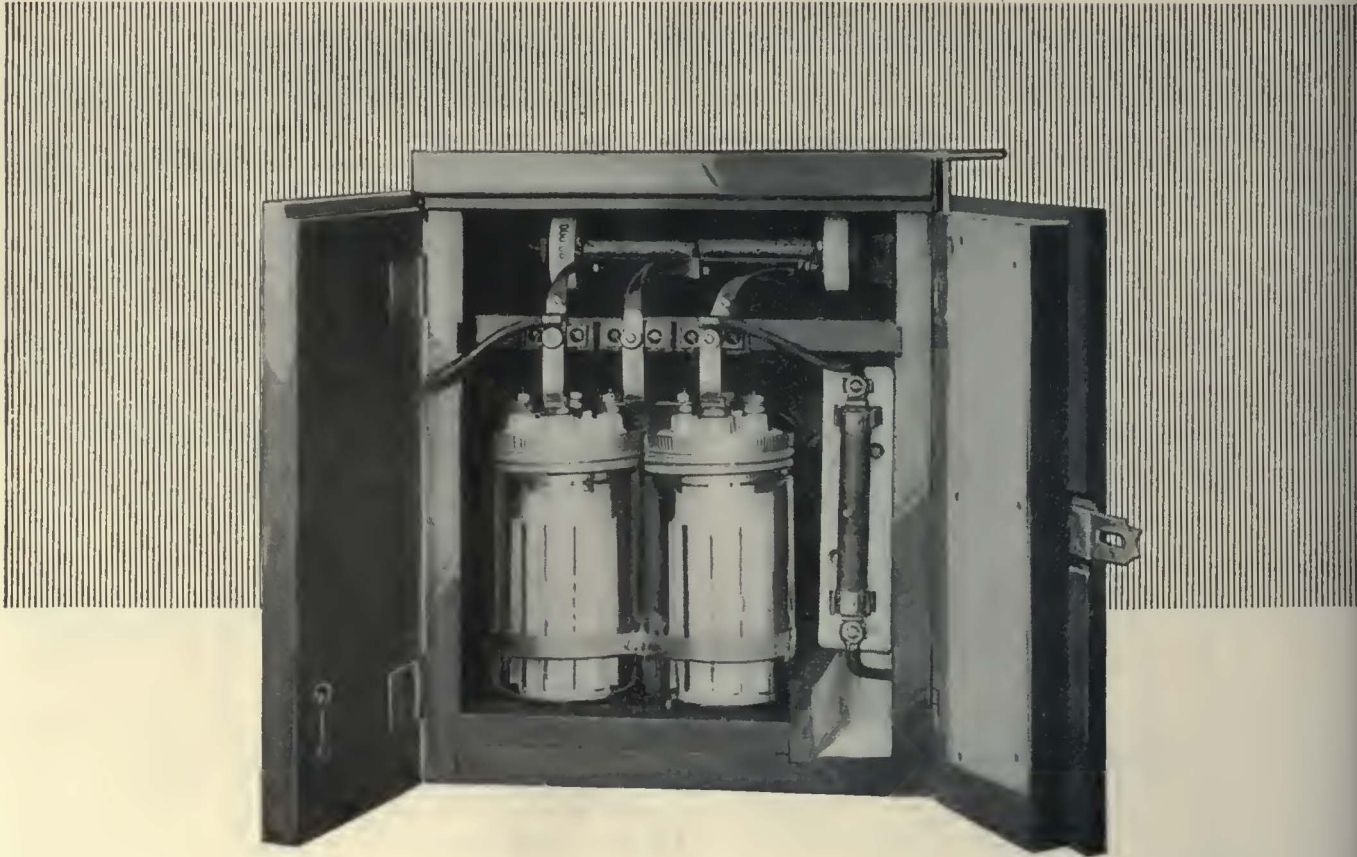


MC62 Low Car Body Truck

Light-Weight City and Interurban Cars

Lightweight Single and Double Trucks

Cummings Gas-Electric Motor Coach



Worthy of modern cars

The installation of D-C. Aluminum Arresters is right in line with the adoption of modern cars to reduce operating costs, because the record of this railway arrester in furnishing lightning protection is a record of cars kept out of the shop.

It is significant that south of the Mason-Dixon Line, where lightning storms are the most numerous, practically every electric railway has its equipment protected with arresters of this type.

The absolute protection afforded by the D-C. Aluminum Arrester is attested by roads where, with hundreds installed, not a single armature failure caused by lightning is experienced for years at a time.

No wonder that the confidence in this arrester is so enduring!



The D-C. Aluminum Arrester built by General Electric has the advantage of the most advanced facilities for research in lightning phenomena. It has the advantage of G-E experience with arresters for all other classes of service. It is the superlative arrester for the protection of car equipment.

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 67

New York, Saturday, June 12, 1926

Number 24

Mr. Nash Finds the Foundation Solid

DESPITE the growth of motor vehicle registration in the United States to approximately twenty million, and in the face of the unusual combination of difficulties produced by high operating costs on the one hand and limited income on the other, L. R. Nash, vice-president of the operating division of Stone & Webster, Inc., Boston, in an article in last week's issue of *ELECTRIC RAILWAY JOURNAL* declares that the \$6,000,000,000 invested in the electric railway industry is in no danger of being wiped out. In fact, Mr. Nash maintains that the industry is just entering upon a new era of broadened activity and usefulness.

These views are based not on mere surface indications. They come from a man who is conservative in his viewpoint and a keen student and analyst of the fundamentals of utility operation.

Improvements in regulatory legislation and administration; development of fairer and sounder public thinking regarding the purposes and mechanism of local transportation franchises; a growing public appreciation of the unfairness of taxing car riders for the maintenance of paving to the profit of property owners; rapid crumbling of the barrier to progress represented by the fixed fare; a growing enlightenment regarding the proper basis for bringing about co-ordination of transportation service—these are among the more important underlying factors in the electric railway situation to which he calls attention. Although expressed in conservative language, Mr. Nash's summary of the situation is most encouraging. His facts are weighed with the careful precision of the scientist rather than played up for effect with the skill of the advocate. Mr. Nash dug down to fundamentals—and there he found the foundation solid.

Three-Phase Electrification Gives a Good Account of Itself

DISCUSSION of electrification in this country has sometimes indicated a tendency by some of those interested to become so absorbed in American conditions as to forget that progress has been made in other countries along lines quite similar to those here. While trainloads are considerably lighter in Europe, the use of the track is otherwise quite as intense as in America.

Last week an article appeared in this paper on the extension of the Austrian State Railways' electrified system in the Alps. This week an article is published giving the results of 25 years of electrification in Italy, a portion of which is just across the boundary from Austria. These are not minor installations. The Italian State Railways now operates or has under construction more than 1,000 miles of electrified trunk line railroad,

and has in use or being built 686 electric locomotives totaling more than a million and a half horsepower.

Not a few Americans will be surprised to learn that the entire Italian electrification, save for a few experimental lines, has been carried out with the three-phase system. In this country three-phase operation has been counted out of consideration for many years. The Italian electrification has a mileage much greater than the longest American system. Continuous extension of the system indicates that it has given satisfaction under the conditions which are encountered in that country.

It is not to be inferred from the success of the three-phase system in Italy that it is suitable for use everywhere. It has its drawbacks, which the proponents of direct-current and single-phase operation are not slow to point out. But it cannot be gainsaid that in the situations where it has been employed it has given an account of itself which merits the attention of engineers whenever railroad electrification is discussed.

Wanted—A Railway at Its Best

BUSINESS grows through improvement of the product. Demand is built on desire. Saturation of the market for any product is overcome by tempting the customer through more attractive appearance, greater comfort and luxury, or, in the case of many products, improvement of the package in which the goods are sold. The automobile offers one of the most convincing illustrations of how effective is improvement of the product in stimulating buying demand.

The electric railway industry has been faced during recent years with what in some respects may be considered as a saturated market. Particularly in the smaller cities there has been experienced a serious recession in the demand for the product—street car rides. But at the same time the total demand for rides—for transportation—has increased at an astounding rate, largely due to the influence of the automobile. Under this same influence, also, the cost of transportation has been put on a new basis. Former standards have been entirely changed. There has come a widely expanded demand for quality in transportation. It remains for electric railways to improve their quality if they are to profit from the new market.

How can electric railway service be improved to meet the new conditions? The answer lies in the future. Attractive equipment, improved roadbed, speed, comfort, attention to the passenger—these are all factors in making a railway ride more marketable. Once the bounds of precedent are broken and the industry starts out seriously to exhaust the possibilities of improving service, then and only then will the limitations of the electric railway and the proper field for buses and other

forms of vehicles become clear. Curbstone transportation experts have been predicting the end of street cars and interurbans. They have judged electric railways as they found them, but they have judged not an industry which was functioning to the limit of its possibilities. Their conclusions have been based on performance after a long period of strangulation and starvation, caused by restrictive political bickering on the one hand and arbitrarily limited revenue on the other.

In the removal of franchise restrictions and in the growth of a more liberal attitude toward fares, underlying obstacles toward progress are being removed. This throws on railway management the responsibility for determining the limit of the improvements which can be made in equipment and performance. Under present conditions there are few examples which could be construed as electric railway service at its best.

The Action of King Canute Was No More Futile than This

STANDING beside the water and commanding the tide to recede, King Canute made a gesture no more futile than that of the trainmen of the Boston & Worcester Street Railway in their attempt to prevent the operation of buses by that company. They have brought a bill in equity to prevent the receiver from carrying out his intention of operating buses between Boston and Worcester. They contend that such a move would deprive many so-called "blue uniform" men of employment. This action indicates a viewpoint quite as distorted as that of the courtiers of the ancient monarch who were of the opinion that the sea could be controlled by royal edict. Apparently they lose sight of the fact that transportation service is furnished to meet a public demand rather than to provide jobs for railway trainmen. In reality, however, it is only by doing their part in making railway service attractive and sufficiently profitable to justify its existence that they exercise the slightest influence over fundamental economic laws.

According to the contention of the employees, an agreement has been in existence with the company for many years regarding wages, hours of labor and working conditions. This agreement, it is said, provides also that any new form of transportation not covered therein shall be dealt with in conference between the representatives of the men and the company. The men say that this has not been done. To what extent they may be justified in criticising the carrying out of the agreement is open to argument, but to seek to restrain the substitution of buses for cars on the ground that it jeopardizes their employment is a move almost as ridiculous as the famous attempt to control the tide. Electric railway trainmen have in their hands a power which is a large factor in making the service profitable or otherwise. The extent to which they enter into the spirit of merchandising transportation will determine the future of many railway properties. Therein lies the protection of their jobs. The doctrine of no responsibility by labor for the financial success of the enterprise in which it is engaged falls down when the enterprise is in danger of being wiped out. When the goose is dead, court action won't bring back the golden egg.

Double Fares Needed by Buses in Berlin

EVIDENCE accumulates that under present conditions of operating costs mass transportation in our large cities can be conducted more economically by electric cars running on track than by buses. In a communication in the issue of this paper for April 24 Wilhelm Pforr of the Berlin street railway system took occasion to deny the report that there was to be a city-wide replacement of trolley cars by buses in Berlin, and gave among his reasons for this statement that, in addition to increasing street congestion, buses would require double the fare to supply the same service. By a coincidence, Mr. Pforr's communication was received for publication and printed in the same issue as Mr. Loree's unfounded declaration at Kansas City that the \$6,000,000,000 of investment in electric railways in this country could be wiped off the books because the electric car had become obsolete through the advent of the bus.

Mr. Pforr's statement that a city-wide bus system in Berlin would have to charge double the present trolley fare in that city may have seemed a little exaggerated to some people. Nevertheless, it has been strikingly confirmed by some analytical studies of the cost of operation in Berlin by trolley cars and buses recently made by Dr. E. Giese, professor of transportation in the leading technical Hochschule in Berlin, and published elsewhere in this issue. Under like conditions of taxation and loading, this expert finds that the cost per passenger-mile by buses, including interest and depreciation on the investment, is practically twice that of the electric car, so that the fare would have to be twice as much.

It cannot be charged that Doctor Giese's analysis is unduly favorable to the electric car. For purposes of comparison of cost per passenger-mile he took double-deck buses and single-deck cars, though he made some allowance for the non-use of the upper deck seats of the bus in winter, because of inclement weather. On a passenger-mile basis such a comparison certainly favors the bus, although it is obvious that double-deck buses (or cars) cannot make as good time on the streets as single-deck cars (or buses). In his operating cost figures also Doctor Giese assumes the use by the buses of solid tires instead of pneumatics.

The final result of this study was that if buses were running in Berlin today instead of street cars, on the same basis of passenger capacity, the public would have to pay some \$26,000,000 more annually in fares. The author grimly adds that the Berlin public cannot afford any such "luxuries."

Of course, it does not follow that the Berlin figures apply in their entirety to the United States. Some of the items of expense of both car and bus would be different. The cost of fuel for the bus would probably be lower here, but it might well be that transportation wage cost, because of the smaller capacity of the bus, would be higher here, where the wages for platform men are much larger. Corresponding figures for typical American cities prepared by experts on railway and bus operation and based on actual performance would be very much worth while.

The need for such definite information is shown in the present discussion in New York City, where the municipal purchase of certain existing trolley lines is

being suggested so that these lines may be removed and the streets which they occupy "cleared for traffic." At the hearing on June 10 the Mayor was even quoted as saying, "I have heard of no one in public life or out of it that did not admit that the greatest cause of traffic congestion was the street car lines and that the greatest boon would be the elimination of these lines."

No one seems to consider that the buses which are being urged as a substitute for cars would themselves occupy a certain amount of street space. Whether the roadway area required per bus passenger actually would be greater or less than that per car passenger would depend on the types of vehicle under consideration. In actual practice such comparisons have always shown the street car to be a more economical user of street space than is the bus. Moreover, it is worth remembering that in London, where the buses are handling heavy traffic, their speed is much less than that of the tramways. In New York City itself the slow speed made by buses on Fifth Avenue is an example of what may be expected when these vehicles are used to handle heavy traffic on congested streets.

Unquestionably, there is a large field for the bus in this country, but it is a mistake to jeopardize its future by unwise attempts to substitute buses for electric cars at low fare levels. Neither considerations of economy nor traffic efficiency justify such a change.

Some People Deliberately Close Their Eyes to Economic Facts

BACK in the happy days before the World War it was possible for the residents of a certain suburban community to reach the business district of the adjacent town by street car for 5 cents. Rising costs gradually forced the fare up to 6 cents, 7 cents, and finally 8 cents. More recently the electric railway has revised its rates to permit a local ride in either community for 5 cents, while the cost of a through ride has become 10 cents.

Great is the indignation of a group of the suburbanites. A majority of them use the street car only twice a day, morning and night, but they are objecting vociferously to the increased fare which they have to pay. They have appealed unsuccessfully to the state regulatory body asking that the fare limit be abolished and the through rate restored to the original 5 cents. They have tried to boycott the street cars by extensive use of private automobiles. That attempt was not a marked success. They wished to establish a competing bus service which they hoped could be operated at a 5-cent fare, but found that such duplication of facilities was contrary to law.

Now they believe that a way out of the difficulty has been found. This group of people is considering the organization of a club and the purchase of a bus to take the club members to and from their work every day. By this subterfuge they would avoid the legal objection to the operation of competitive bus service. Because they do not all wish to go and come at exactly the same hour it would be necessary for the bus to make two trips in the morning and two trips in the evening. Hence it would be necessary to hire some one to operate it. During the middle of the day there would be nothing for the bus or its driver to do. Garage space would be required for its storage during those hours as well as for its protection at night. In other words, the club

would have to organize a complete little transportation system of its own.

How such a transportation system with limited traffic in the rush hours and none at all during the day could be operated cheaper than the established agency is difficult to see. When, and if, the plan ever is put into effect, the members of the club are likely to have a rude awakening concerning the 5-cent fare. Just what will happen when their single bus must be overhauled or when it breaks down is a matter of conjecture. Probably they will be compelled to resort to the service of the old reliable street railway, which charges them 10 cents for a fast, safe, comfortable ride of several miles and provides service day and night, winter and summer, for all who wish to avail themselves of it.

No Longer Is a City a Single Focal Center

GROWTH of our cities has brought many changes in recent years, not the least important of which is the process of decentralization that has created numerous sub-centers instead of the former single focal center. Not so long ago the average city resembled a series of concentric circles with commerce and industry occupying the central zone while urban, suburban and rural residential districts were grouped around it. Gradually the business area expanded and encroached on the urban residential district. The latter spread outward into the suburbs and the net result was the creation of larger circles arranged in the same general way as before.

Now it has become evident that this method of development has certain serious disadvantages. It lengthens the average distance between home and place of employment, and multiplies the number of rush-hour users of transportation facilities. Congestion is vastly increased on the transit lines and on the streets. Great economic waste results from the alteration in the character of neighborhoods and the destruction of one set of buildings to make room for a new set, different in type, but not necessarily better. Utility services to meet the changed conditions can be provided only at high cost, and usually they lag far behind the demand.

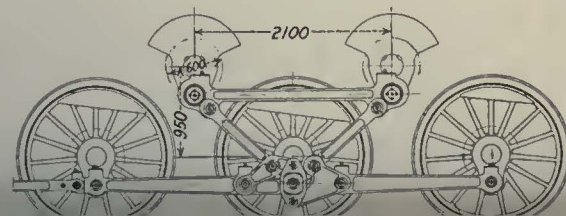
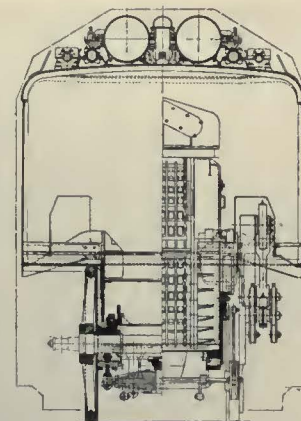
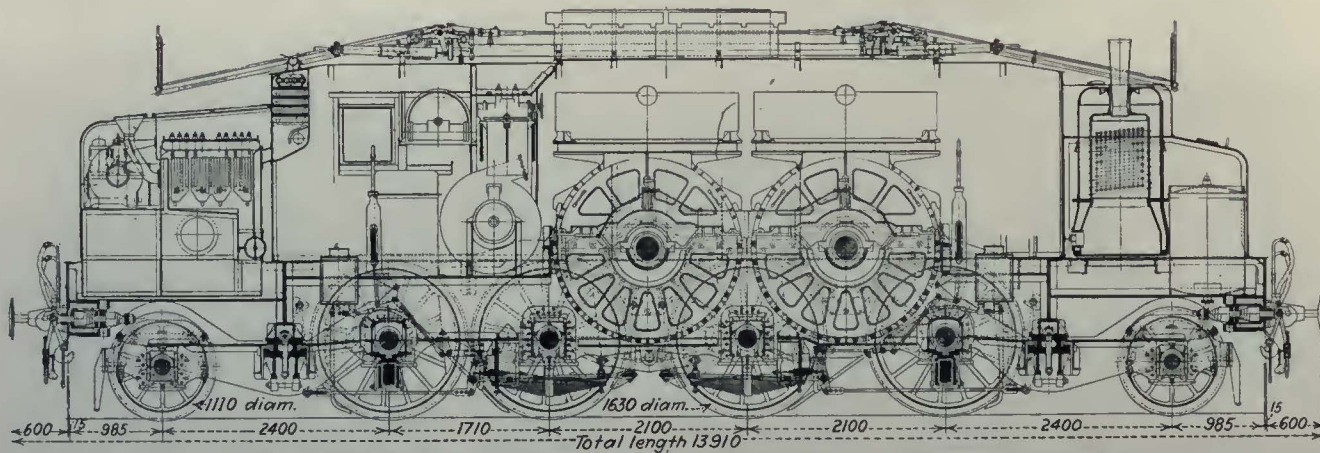
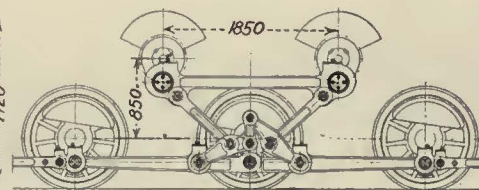
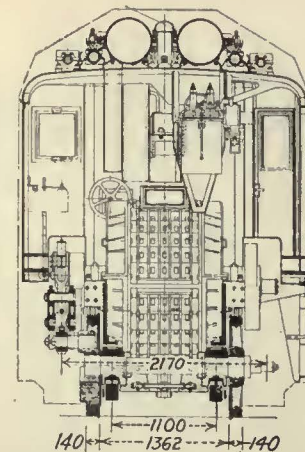
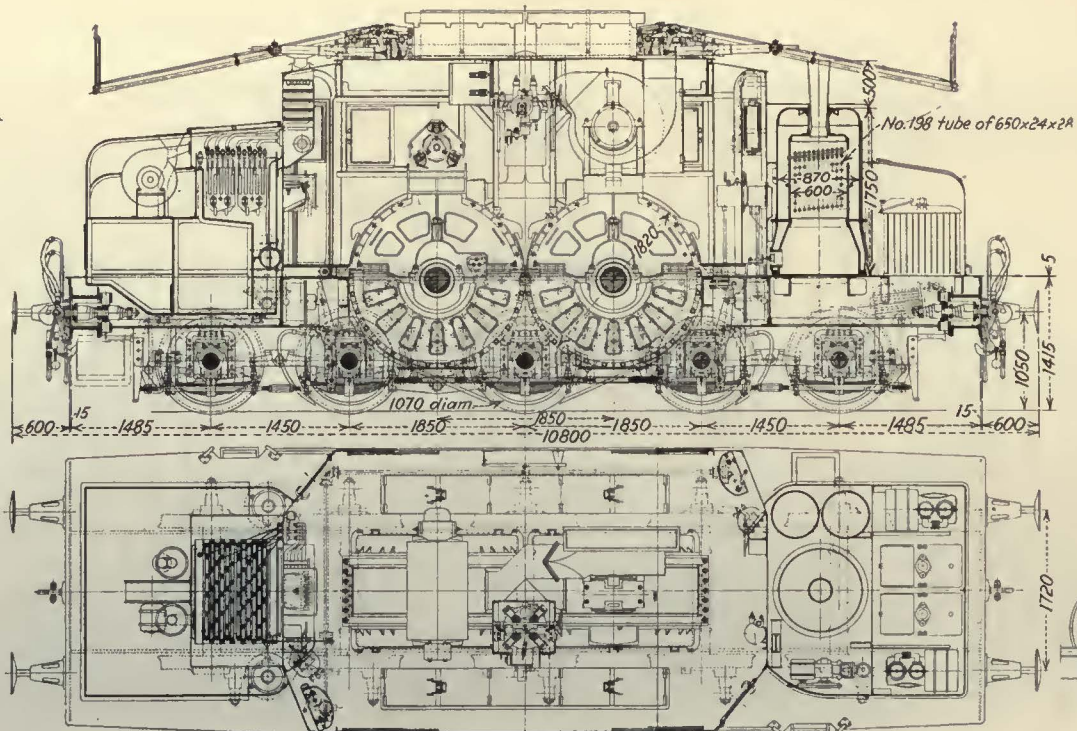
To offset these disadvantages it must be admitted that there is a certain gain in efficiency by geographical concentration of such business enterprises as require frequent contact with each other. If, for example, as the result of decentralization, every merchant had to travel 2 or 3 miles to see his banker, commerce and trade would soon be seriously hampered.

The problem, therefore, is so to arrange the city that those businesses and industries which need to be close together can enjoy that advantage, while those which can function equally well in other localities are distributed throughout the city with residential areas in between. It is clear that two things are necessary to accomplish this. A comprehensive civic plan must be prepared after thorough investigation of all the complicated details of the question. Municipal officials must have adequate legal authority to enforce the plan after it has been made up. Definite establishment of the character of a neighborhood may be anathema to the real estate speculator, but it is a real boon to the ordinary property owner, and will greatly facilitate the utility companies in providing adequate and satisfactory service.

Latest Developments in Three-Phase Locomotives for the Italian State Railways

At top, a new type of freight and passenger locomotive now under construction for mountain lines. A special type of side rods similar to those of the E-330 type is used.

Below, a new type of passenger locomotive under construction. Several improvements have been made over the E-331 type.



25 Years of Electric Operation in Italy

Three-Phase System Has Given a Good Account of Itself and Has Greatly Increased Capacity of Italian State Railways—System Is Being Extended and 3,000-Volt Direct-Current Lines Are Being Built Also

By Giuseppe Bianchi

Chief Mechanical Engineer Italian State Railways



The Lower Giovi Line Handles Heavy Freight. The 400-Ton Train Shown Is Ascending a 3.5 per Cent Grade at 31 M.p.H.

SINCE electric operation was first inaugurated on Italian steam railways in 1901, its use has been extended gradually but steadily until today 859.6 km. (533 miles) of line are in operation by electricity. In addition there are 836 km. (518 miles) of line in course of electrification. It is planned to extend the list of projected electrifications so that some 2,000 km. (1,250 miles) of main lines will be included. Conversion of these lines is a matter of great economic importance, since in addition to increasing the efficiency of operation it will make possible the use of large amounts of hydro-electric energy, thus greatly reducing the purchase of coal abroad, on which Italy is entirely dependent.

Installation of the first electric railway was suggested by a government commission in 1898; soon afterward experiments were started to try out the various systems of electric traction then available. In 1899 between Milan and Monza and between Bologna and San Felice self-propelled cars with accumulators were placed in service and in 1901 a third-rail system, similar to the ones which appeared at that time in America, was placed in operation between Milan and Varese.

On the Lecco-Colico-Sondrio and Colico-Chiavenna

lines, however, it was decided to try an electric system which would permit heavy passenger and freight trains and would afford as regular service as the steam traction at a lower cost of operation.

Although a heavy train service with a third-rail system had already been built in America (the Baltimore tunnel was electrified in 1895) at that time it was not believed that this system would be suited for a line 106 km. long with 2 per cent grades, so it was decided to use an alternating-current system of the type used on the Lugano street cars (1896) and the Burgdorf-Thun Railway (1898) in Switzerland. Instead of the 750 volts used on these lines, 3,000 volts was chosen, as results of experiments made at that time made it appear impossible to collect from a single trolley more than 300 amp., which would not have been enough for the 1,500 hp., 80 per cent power-factor locomotives which were necessary for hauling the trains planned for the Valtellina lines.

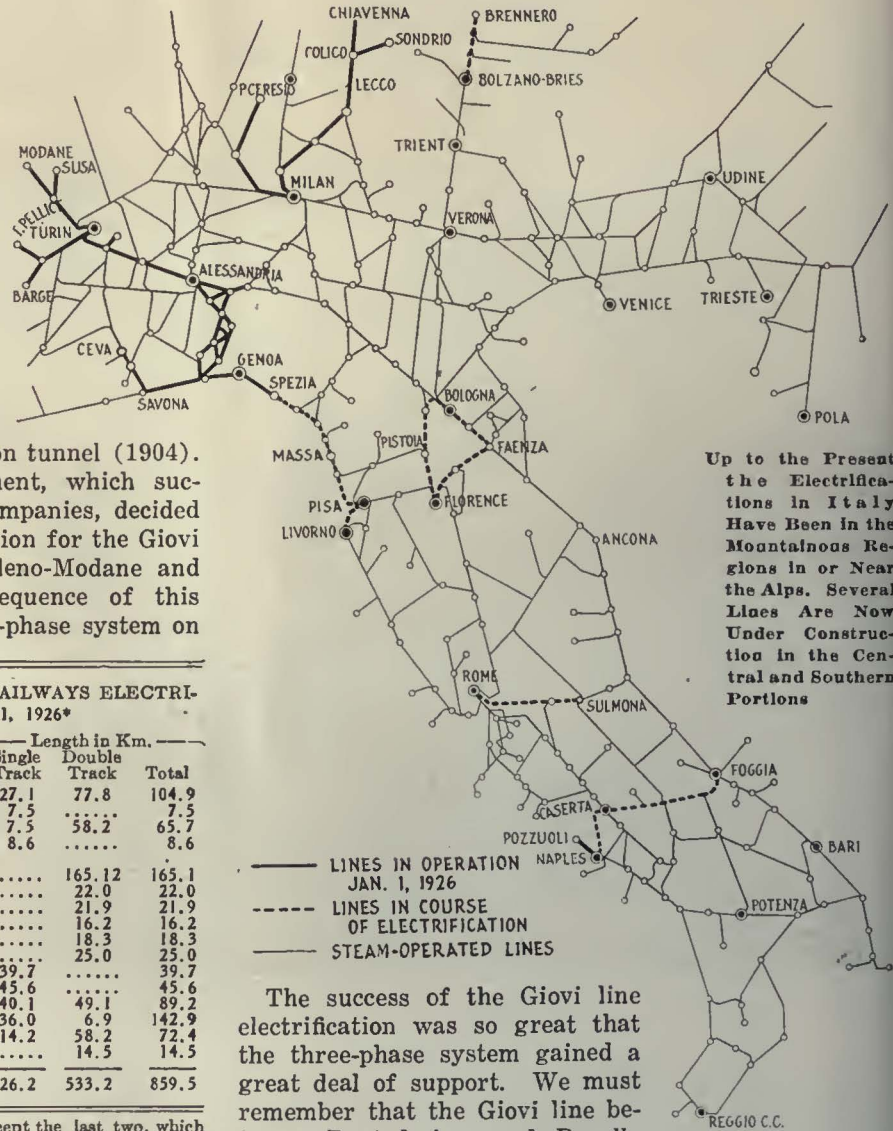
On account of the reactive effect and because at that time direct drive between motors and drivers was in use, the a.c. 16-cycle system was believed to be more suitable and therefore was adopted.

With the adoption of this system, a number of difficulties came up in connection with the speed regulation of the three-phase motors, the trolley and contact lines, the controllers, the mechanical transmission of power between the motors and drivers, the rheostats, etc. These all required a great deal of experimenting and study before they could be satisfactorily solved. The experiment, started in 1901, was, however, satisfactorily solved by the end of 1903. Up to that time the passenger service was handled by single motor car units.

In the year 1904 the first electric locomotives were put in service. These were of the 1-C-1 type, weighing 64 tons, with Scotch yoke drive from two motors with series-parallel connections, giving 32-64 km. per hour with 3,500-6,000 kg. tractive effort.

This type of locomotive gave such good results that the Swiss Government decided to adopt the three-phase system for electrification of the Simplon tunnel (1904). The Italian State Railway management, which succeeded the various private railway companies, decided to adopt the same system of electrification for the Giovi line and for the Savona-Ceva, Bussoleno-Modane and Bologna-Florence lines. As a consequence of this decision, an extensive use of the three-phase system on

the Italian Railways began, which caused much discussion in the succeeding years. However, it must be remembered that at that time (1904) comparative data about the best system of electrification were not available as they are today. The single-phase system was then in its early development stages and the high-voltage d.c. system was not in existence.



Up to the Present the Electrifications in Italy Have Been in the Mountainous Regions in or Near the Alps. Several Lines Are Now Under Construction in the Central and Southern Portions

TABLE I—LINES OF THE ITALIAN STATE RAILWAYS ELECTRICALLY OPERATED AS OF JAN. 1, 1926*

Line	Length in Km.		
	Single Track	Double Track	Total
Modane—Bardonecchia—Bussoleno—Turin.....	27.1	77.8	104.9
Bussoleno—Susa.....	7.5	.....	7.5
Turin—Pinerolo—Briherasio—Torre Pellice—Barge	7.5	58.2	65.7
Trofarello—Chieri.....	8.6	.....	8.6
Torino—Alessandria—Novi—Ronco—Genova (Via Busalla).....	.....	165.12	165.1
Ronco (Via Mignanego)—Quadrivio Torbella.....	.....	22.0	22.0
Alessandria—Tortona.....	.....	21.9	21.9
Tortona—Voghera.....	.....	16.2	16.2
Tortona—Novi.....	.....	18.3	18.3
Tortona—Arquata Scrivia.....	.....	25.0	25.0
Sampierdarena—Savona.....	39.7	.....	39.7
Savona—Ceva.....	45.6	.....	45.6
Genoa—Spezia.....	40.1	49.1	89.2
Monza—Lecco—Colico—Sondrio—Chiavenna.....	136.0	6.9	142.9
*Milan—Rho—Gallarate—Porto Ceresio.....	14.2	58.2	72.4
*Naples—Pozzuoli.....	.....	14.5	14.5
Total.....	326.2	533.2	859.5

*All lines are three-phase, 16-cycle, 3,600-volt a.c. except the last two, which are 650 volts d.c.

TABLE III

Electric locomotives in operation on the Italian State Railways as of Jan. 1, 1926		Electric locomotives under construction	
Three-phase, 16-cycles, 3,600-volts		Direct current, 3,000-volts	
Wheel Arrangement	Number	Wheel Arrangement	Number
0-E-0	384	B+B+B	63
1-C-1	62	.....	.....
2-C-2	24	.....	.....
1-D-1	37	.....	.....
Total.....	507	.....	.....
*Three-phase, 45-cycles, 10,000-volts		Direct current, 650-volts	
Wheel Arrangement	Number	Wheel Arrangement	Number
0-E-0	4	1-C-1	20
1-D-1	24	C+C	12
Total.....	28	Total.....	32
Direct current, 650-volts		Three-phase, 16-cycles, 3,600-volts	
Wheel Arrangement	Number	Wheel Arrangement	Number
B+B	1	0-5-0	26
C+C	5	1-D-1	14
1-C-1	10	.....	.....
Total.....	16	Total.....	40
Grand total.....	551	Grand total.....	135
Total hp. of electric locomotives in operation.....		1,220,000	
Total hp. of electric locomotives under construction.....		320,000	
Total.....	1,540,000	.....	.....

*In service on 16-cycle lines.

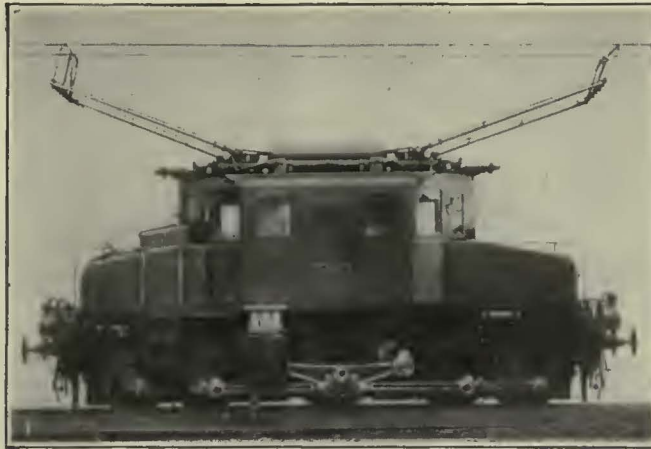
The success of the Giovi line electrification was so great that the three-phase system gained a great deal of support. We must remember that the Giovi line between Pontedecimo and Busalla has grades up to 3.5 per cent and the Giovi tunnel (3,258 m.) has a 2.9 per cent grade.

These steep grades made steam operation extremely difficult; with the best mountain steam locomotives (series 470, ten coupled, 75 tons on drivers) the trains hauled were: 170 tons with one locomotive at 25 km. per hour, 310 tons with two locomotives at 25 km. per hour, and 450 tons with three locomotives at 25 km. per hour.

TABLE II—LINES OF THE ITALIAN STATE RAILWAYS IN COURSE OF ELECTRIFICATION

Line	Length in Km.			Type of Supply	
	Single Track	Double Track	Total	Phase	Cycles Volts
Spezia—Pisa.....	75	75	3	16	3,600
Pisa—Livorno.....	19	19	3	16	3,600
Florence—Pistoia—Bologna.....	93	39	132	3	16
Rome—Avezzano—Sulmona.....	172	.....	172	3	45
Benevento—Foggia.....	102	.....	102	.....	D.C. 3,000
Benevento—Caserta—Naples.....	97	.....	97	.....	D.C. 3,000
Florence—Faenza.....	101	.....	101	3	16
Faenza—Bologna.....	49	49	3	16	3,600
Bolzano—Brennero.....	89	89	3	16	3,600
Total.....	565	271	836	.....	.....

The weights of the trains hauled by the first Giovi electric locomotives (series E-550, ten coupled, 60 tons on drivers, 2,000 hp., of the type shown in Fig. 1, were: 260 tons with a single locomotive at 50 km. per hour, 470 tons with two locomotives at 50 km. per hour, 600 tons with three locomotives at 50 km. per hour. By replacing the steam



with electric operation on the Giovi line the following advantages were obtained:

1. The speed was doubled.

2. The distance between trains was shortened on account of more constant speed.

3. There was better utilization of the locomotives and crews.

4. Increased tonnage of trains was obtained.



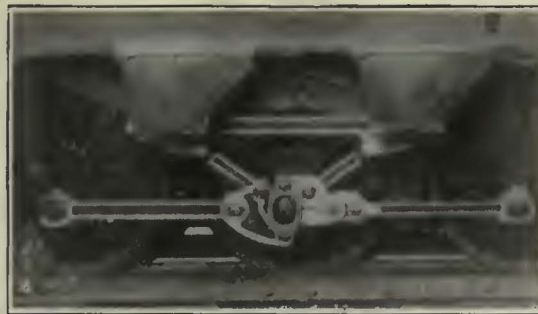
Typical Locomotives of Italian State Railways

All are three-phase, 3,500-volt machines

1. Type E-550 locomotive, of which 185 were built between 1911 and 1917. They weigh 64 tons, all on drivers, and have a rating of 2,000 hp. at speeds of 25/50 km. per hour (15.5/31 m.p.h.).

2. This locomotive is similar to the E-550 type but is more powerful, being rated at 2,000 kw., the weight being 74 tons. Between 1920 and 1925, 186 of these were built.

3. Type E-330 is a four-speed passenger locomotive rated at 2,000 kw. Sixteen of these are now operating. The speeds are 37-50-75-100 km. per hour (23.3-31-46.5-62 m.p.h.).



4. Detail of the articulated drive of the E-330 locomotive shown in No. 3.

5. Passenger locomotive type E-431, rated 2,000 kw. with four speeds similar to the E-330 type. Of this type 37 were built between 1920 and 1924 and are in service between Genoa and Turin.

6. Type E-331 locomotive. This is a recent design with the same electrical characteristics as the E-330 type.

7. A passenger locomotive designed for 45 cycles, 10,000 volts. The apparatus is nearly the same as on the 16-cycle machines, but there are in addition line transformers and a gear reduction is provided between the motors and the auxiliary axles.





On the Upper Giovi Line. A 350-Ton Passenger Train Is Going up a 2 per Cent Grade at 47 M.p.H.

5. There was greater regularity and safety for trains going down the grades, as the regeneration of current allowed them to go down without brakes, with the result of reducing wear on wheels or rails.

6. The coal consumption, which in steam operation was about 86 grams per virtual ton-kilometer, was reduced to 50 grams at the electric generating plant.

Electrification of the Giovi line was regarded as the most satisfactory solution for mountainous railway operation with steep grades and heavy traffic. The Italian State Railways in 1911 decided to apply the same system of electrification to the following lines: Busso-leno - Modane, Savona - Ceva, Sampierdarena - Ronco, Monza-Lecco, Turin-Pinerolo, Sampierdarena-Savona.

In 1915, on account of the war, all work for the new electrifications was suspended. The enormous difficulties of steam railway operation in Italy during the war period, owing to the deficiency and bad quality of coal (the price of which reached 500 lire, or \$20 per ton) were very serious and pointed out the advisability of a careful study. Coal saving on the 435 km. (272 miles) of electrified lines up to 1918 was about 170,000 tons per year, corresponding to 85,000,000 lire (\$3,400,000).

The question of which would be the best system for use on the new lines to be electrified was largely discussed and the advisability of using power from the existing plants and the great progress made by the d.c. 3,000-volt electrification system suggested a tryout with a 42 or 50-cycle, 10,000-volt, three-phase system and with a d.c. 3,000-volt system.

Table I gives the lines electrically operated in Italy as of Jan. 1, 1926; Table II gives the lines in course

of electrification, and the map indicates the location of the above lines; Table III shows the number and types of electric locomotives in service and under construction as of Jan. 1, 1926.

Operating expenses of the 15,625 km. (9,800 miles) of steam railway and of 631 km. (394 miles) (for the Piedmont and Liguria regions) electrically operated lines for the year 1924-1925 are shown in Table IV.

The unit used in these tables is virtual ton-kilometer. This unit was obtained from the following formula;

$$L_v = L_r + \frac{h + \Sigma pl}{5}$$

where

L_v = virtual length in kilometers.

L_r = real length in kilometers.

h = difference of level in meters between two points

l = length of curves in kilometers.

p = coefficient of the radius of the curve.

The p coefficient assumes the following values:

Radius of curve in meters.....	1,000	900	800	700	600	500	450
Values of p	0.5	0.6	0.8	1.0	1.2	1.5	1.7
Radius of curve in meters.....	400	350	300	250	200	180	..
Values of p	2.0	2.4	2.8	3.4	4.2	4.5	..

These virtual ton-kilometer units which have been used by the Italian railway companies since 1880, while they provide a measure of work done on the steam operated railroads, do not take into consideration the energy returned to the system by electrically operated railway trains when regeneration is used on down grade runs.

From the data of Table IV the economic possibilities of electric railway operation in Italy may easily be seen.

TABLE IV—COST OF STEAM OPERATED (15,626 KM.) AND ELECTRIC OPERATED (630 KM.—PIEDMONT AND LIGURIA REGIONS ONLY) LINES DURING PERIOD JUNE, 1924, TO JUNE, 1925

	Cost in Lire				Cost in Lire			
	Total	Axle-Kilometer	Cost per Ton-Km. Virtual		Total	Axle-Kilometer	Cost per Ton-Km. Virtual	
Personnel.....	418,016,459	0.07895	0.00777	0.01000	41,747,632	0.09272	0.00789	0.01175
Fuel.....	545,647,602	0.11114	0.01093	0.014 7	1,269,432	0.00292	0.00025	0.00037
Oil.....	15,722,296	0.003 8	0.00030	0.00039	11,346,147	0.02602	0.00221	0.00330
Maintenance.....	269,593,515	0.05397	0.00531	0.00683	2,898,900	0.00656	0.00056	0.00083
Pumping plants and water.....	6,414,182	0.00130	0.00013	0.00016	61,580,578	0.13982	0.01190	0.01773
Interest and depreciation charges..	87,002,000	0.01865	0.00183	0.00236	13,482,590	0.03057	0.00260	0.00388
Total.....	1,342,396,054	0.26709	0.02627	0.03381	131,325,279	0.29861	0.02541	0.03786

STEAM	Real run of locomotive, train kilometer.....		134,986,121
		Real run of locomotive switching, hours.....	3,979,197
	Real run of hauled axles, kilometer.....	4,445,000,000	
	Hauled ton—kilometer { virtual, kilometer..	45,180,632,300	
		real, kilometer.....	35,105,386,400

ELECTRIC	Real run of engine, train kilometer.....		11,175,193
		Real run of engine switching, hours.....	37,976
	Real run of hauled axles, kilometer.....	429,161,000	
	Hauled ton—kilometer { virtual, kilometer....	5,044,547,000	
		real, kilometer.....	3,384,394,900

The cost for a traffic unit, that is to say one virtual-ton-kilometer, for the electrically operated lines is less than for the steam operated lines. The cost of coal in Italy is now between 180 and 200 lire (\$7.20 to \$8) per metric ton, while the average cost of electric energy for railway purpose last year was only 0.13 lire (0.52 cent) per kilowatt-hour.

The cost for transmission lines, substations and feeders, is about 500,000 lire (\$20,000) for each kilometer of a double-track line, and the cost of an electric locomotive for passenger traffic (2,000 kw., 90 tons) is about 1,400,000 lire (\$55,000).

These conditions are most favorable for electric railway operation, and a study for a more extensive electrification is now under consideration.

It is worth while to point out that the electrification of about 2,000 km. of main lines which are now steam operated will reduce by 40 per cent the present coal consumption for railway use which totals about 2,500,000 tons per year. This reduction in coal consumption will be of great importance due to the scarcity of coal in Italy.

It is not possible to state at this time how many years it will take for the full realization of this program, as it mainly depends on how soon the new hydro-electric plants can be built. However, from the results so far obtained by the operation of electric lines and the improvements which are continually introduced it may confidently be said that the most efficient and economical way to solve the problem of transportation in Italy lies in this direction.

Beaver Valley Enters the World of Art

Louis Hake, Master Car Painter, Pictures the Spirit of Local Industries on the Sides of a Street Car, Which Is Now in Service

EVER quick to seize upon a new idea in public relations work the Beaver Valley Traction Company, New Brighton, Pa., has made a clever tie-in with the industries which form the backbone of Beaver Valley enterprise. Having a car painter who is a master craftsman with the soul of an artist, it was a comparatively easy task to work the plan out.

One of the company's double-truck cars was subjected to an intensive process of exterior and interior decoration, the purpose of which was to show the varied



The Invaluable Aid of the Newspapers Was Not Forgotten

nature of the industrial life of the several communities served by the traction company. On each end appears a map of the trolley and bus lines; beside each of these is a pair of eyes within an outline map of the United States. These lend color to the inscription "The Eyes of the Nation Are on the Beaver Valley." And color plays an important part in the *tout ensemble* of the car. Each of the inscriptions on the sides and ends of the traveling good-will builder carries a distinct message regarding some line of industry which provides employment for Beaver Valley citizens. For the most part the actual names of particular companies are not given, as in many cases there are two or more concerns engaged in the line of work depicted.

While other sections of the country might be inclined to dispute some of the claims made for the charms of Beaver Valley, certainly no one within the valley itself may be expected to be other than highly pleased. The slogan in the center of each side of the car provides an appeal to industry in general to locate in Beaver Valley. "Where the Sun of Prosperity Always Shines."



Probably the Masterpiece of the Entire Gallery Was That Appearing at the Extreme Right Picturing the Brawny Steel Handlers at Work

Other units in the general scheme of design illustrate successfully the products of the steel and iron plants, glassware, chinaware, sanitary ware, art tile, mill work, cork products, bridgework, clay products, drilling machinery, wallpaper, nails and rivets, electric power and transportation and the local newspapers.

A slogan at the top of one side blazons forth the words "Industry, Transportation, Citizenship," the three most important phases of community life in the estimation of the Beaver Valley officials. At the top of the other side appears the phrase, "A County with Ninety Different Products." Naturally it was impossible to feature all of these products at the first showing of the car, so it is planned to withdraw it from service occasionally and replace some of the present designs with new ones.

The car went in service on May 5 and will be operated over the entire system of the company. Thus each of the ten communities served by the trolley lines will be given an opportunity to expand with local pride as the car appears within its environs. And well may Louis Hake, creator of a new school of industrial art, the designer of the first multi-pictured street car, expand also with pride as he listens to the plaudits of the local papers and leading citizens. All of his designs were good, but the gem of the collection was the scene depicting the brawny steel workers following the ancient rites of Vulcan. Across the top in a scroll appeared the words "He Who Toils Here Hath Set His Mark." So accurately had the artist portrayed the scene that the heat could fairly be felt to emanate from the white hot steel in the ladle. To paint life-like human figures in natural colors on the exterior of a street car is no piddling task.

Prior to placing the car in service the railway had placed a series of "Just Smile" cards in the cars, these being varied with more serious messages concerning the service of industry and transportation. Details on these were published in the JOURNAL for April 24.

Nothing has been asked from the local industries in return for the unsolicited boosting which they receive from the use of the cards and the decorated car. Clinton D. Smith, general manager of the company, believes that what redounds to the credit of the valley as a whole will prove of just as great, albeit somewhat more indirect, value to the railway. And he is gaining friends among the local interests which may be inestimably helpful, should the day arrive when the company wishes to enlist the support of its friends and patrons for an increase in fare or a sweeping reorganization of transportation service.

In Commemoration of Easton's Railway

A BEAUTIFUL bronze tablet, 16 in. x 24 in., has been placed on one of the tiers near the south entrance to the Bushkill Bridge, Easton, Pa., commemorating the building by the Lafayette Traction Company of the third electric railway in the United States and the first electric railway in the city of Easton. This line, now a part of the Easton Transit Company's system, ran from Centre Square to College Hill, and its building, which was completed Jan. 14, 1888, was bitterly opposed by residents of North Third Street, who objected to the planting of poles. The marker was paid for and presented by former Mayor David W. Nevin, who was secretary and treasurer of the Lafayette Traction Company.

Subsidized Bus Lines in Houston Serve Recently Established Suburbs

DUE to the ship channel making Houston, Tex., a deep water port, as well as other causes common to the great Southwest development, this city has experienced an unusual expansion. This growth has expressed itself in part by extensive real estate developments from 3 to 5 miles out from the center of the city and remote from any form of transportation except the automobile. Naturally enough the real estate developers have realized the importance of common carrier transportation. The Houston Electric Company, operator of the local transportation system, was naturally unwilling to add unprofitable lines in order to develop new territory.

The compromise made was a contract between the real estate operators and the railway by which the company operates the bus service and the real estate operators agree to pay all costs, including the per car-mile operating charges and a proportion of depreciation, fixed charges, taxes and license fees each month. All revenue is credited, so that in reality the realtors pay only the deficit. The company, however, buys the bus equipment and hence contributes its full part by financing the project.

The contract provides that the Houston Electric Company may take over the operation at any time that it so elects, and agrees to take it over whenever the gross receipts shall show a surplus over all expenses for a period of six months. Any surpluses made during individual months are credited to the realtors subsidizing the project. As there is no state regulation in Texas, permits to operate must be obtained from the city. The company protects itself by getting permits only from year to year, each renewal being based on the mutual desire to continue the contract for another year.

At present there are four of these subsidized lines running from outlying points to the center of the city. One feature of interest is that these lines are operated express from the outlying district to the city center so that a faster service to these communities is being furnished. At the same time there is no conflict with existing car and bus lines that may be paralleled for a distance near the city center. A 10-cent fare is also charged on all such lines with transfer privilege to and from cars. The over-all costs of these express lines are from 26 to 28 cents per bus-mile. Gross business of the lines is gradually increasing and varies between 15 to 18 cents per mile, so that the deficits are not large, because comparatively infrequent service is offered.

All buses operated in this manner are clearly marked so that the patrons know that the line is not necessarily permanent and depends on the subsidy of the development company named in each case. This somewhat temporary feature is recognized and has a certain effect on land purchases. The general belief is that the line will eventually become a paying proposition and become permanent and that the subsidy will last until this point is reached.

The Houston Electric operators are about to start six other bus lines in conjunction with their regular car service. Three of these lines serve new territory and two lines are feeders. Generally on the regular bus lines the fare charged is 7 cents cash and four tokens for 25 cents, except that when a line is operated to give express service the fare that is charged is 10 cents cash.



Electric Cars, Automobiles, Teams and Pedestrians Need Every Inch of Room There Is on the Downtown Streets in Atlanta

Maintaining the Morale in Atlanta

Transportation Men Encouraged to Neatness by Free Shoe Shines and Clothes Pressing at Carhouse—Suggestion Box and Full-Length Mirrors in Trainmen's Headquarters—Social Clubs, Safety Work, Credit Union and Other Activities Among the Employees

VERY trim in appearance are the trainmen in Atlanta. A great deal of stress is laid on the need for neatness by the Georgia Railway & Power Company. The men are encouraged to maintain this standard of appearance by being able to have their clothes pressed and their shoes shined free of charge at any carhouse of the company. There is also a full-length mirror in every division headquarters for the use of platform men. Above this mirror are the words: "Look at yourself and see if you properly represent your company." Besides his regulation uniform, every platform man is required to wear a white shirt, white linen collar and a four-in-hand tie while on duty.

Adjoining the mirror in the transportation headquarters is a box in which the trainmen are invited to deposit suggestions for the improvement of the service. Many good ideas are obtained in this way, particularly on the arrangement of schedules. Every suggestion is considered and is answered, usually by the superintendent of the division with which the man is connected.

On the line of route are several boxes in which conductors deposit envelopes containing the transfers collected on each round trip. These envelopes, one of which is illustrated, are collected once an hour by the auditing department. The auditing work is continued all day. The purpose of the plan is to make conductors more careful in the collection of transfers.

To help the men keep their cars on time a blue-printed time-table of his particular run is posted in front of every motorman or one-man car operator. It is held in a frame carried under the hood.

Within the organization there are several social or recreation clubs. One is the Power Club, to which all employees of the company are eligible. This club has the use of some very attractive camping grounds about 60 miles from Atlanta, on which there are 25 or more housekeeping and other cottages. These recreation grounds are used extensively by the men and their families during the summer.

In addition, there is a social club, with women's auxiliary. This club is especially for the transportation men and has its headquarters in transportation headquarters on Piedmont Avenue. Dances are given twice a week, and the clubroom has other means of recreation like pool, basketball, radio and a stage for the presentation of any entertainment during these programs. The dues of this club are \$1 initiation and 50 cents a month.

Adjoining the clubrooms in the main transportation building on Piedmont Avenue are the offices of the company doctor and dentist. Medical attention by the doctor is free to any employee and his family, and the dentist's charges are much less than those of an outside dentist.

During the past eighteen months the company has devoted a great deal of attention to the reduction of accidents, and in March, 1925, a safety council to represent all departments of the company, light and power, as well as the railway, was appointed. The Safety Council is made up of the department head or other real representative of each department. In addition, each department has at least one safety committee.

In the railway department there is a safety committee for each carhouse, track gang and line gang. The rule of rotation of membership is followed in each committee, each member serving three months, then being replaced by another, so that eventually all will serve. The number of the members in each committee varies according to the size of the gang or division. Most committees have regular meetings. Usually the road gang committee meets on rainy days, the carhouse committees in the evening, and the linemen twice a month on Saturdays.

In addition to the division committees mentioned, there is a large committee known as the first aid com-



Traffic at Most Congested Crossings Is Now Controlled by Light Signals

mittee, whose duty it is to spread information about what to do in case of accidents. Through this committee a class of 27 employees from all departments was formed and received the standard Red Cross first aid instructions, so that all have now first aid committees. These men are now giving instructions to other employees, so that all will have a knowledge of first aid work. All those employees whose duties require them to work near high-voltage apparatus receive special instructions in the prone pressure method of resuscitation.

Each department makes a report to the main safety committee each month, showing the number of man-hours of work, the number of man-hours lost for any reason, the number of accidents for the department and the cause of each accident. Every accident is investigated.

Since this campaign was started the total number of accidents to employees has been reduced 25 per cent. This is considered proof that the campaign is effective.

In the railway department every accident in which an employee is involved is discussed with him, whether he is responsible or not. There is also a talk to all the men on each division each month on the subject of safety. In these talks the accidents reported during the previous month are used as text. The accident records of the railway department show that this plan



Neat Car Stop Sign on Ornamental Lamp Post, Used Generally in Atlanta

is effective. Thus all accidents for 1925 show a reduction as compared with the previous year from 6,778 to 5,599, or more than 17 per cent.

CREDIT ORGANIZATION ENCOURAGES THRIFT

The latest addition inaugurated by the company is a credit union based on the Filene system, which has been adopted by a number of steam railroads and other corporations. Other unions along the same lines have been organized at Louisville by the Louisville & Nashville Railroad, at New Orleans by the Illinois Central Railroad, at Council Bluffs by the Union Pacific Railroad, at Boston by the New England Telephone & Telegraph Company, and in Mr. Filene's own store in Boston, where the membership is 1,636. A law author-



Box Near Terminal of Run, in Which Trainmen Deposit Transfer Slips at the End of Each Trip

izing the establishment of a credit union of this kind was enacted in Georgia last summer, that state being the twenty-fourth to have such a statute.

Briefly, the credit union is a co-operative savings and loan association, for whose stock any employee may subscribe and thereby become a member and from which any member can borrow limited sums at reasonable rates of interest. It therefore helps to stimulate thrift through a system of savings, solves the short-term credit problem of the employee and educates the members in the management of money. While subscriptions to the stock may be paid in cash, members are encouraged to pay for them by installments, so that if a member wishes to save a dollar a week, for example, he subscribes for four shares and deposits 25 cents a week for each share. The par value of each share is \$5 and a limit of \$500 has been placed on the amount of stock which may be held by any one person.

Form 2-848 1MM 3-15-25-Revised

GEORGIA RAILWAY AND POWER CO.

Date _____ 19__

Route No. _____ Block No. _____ Car No. _____

TRIP TIME { in _____
 { out _____

TRANSFERS ISSUED { Serial Number _____
 { Beginning _____
 { Serial Number _____
 { Ending _____

Conductors _____ No. _____ Key _____

Front of Envelope Used by Conductors and One-Man Car Operators for Depositing Transfers at the End of Each Trip

Members may also make deposits, but the maximum deposit permitted any member is \$500.

Loans up to \$50 are made to any member whose name is approved by the credit committee. No security is required for loans up to this amount except the borrower's note. Loans for more than that sum must be secured. The interest rate charged is 6 per cent and interest is deducted at the time the loan is made. A maximum of \$150 is set for secured loans.

The organization is managed by the employees, but in Atlanta one of the fiduciary officers of the company acts as its treasurer. Officers are chosen from and by the members at elections, in which each member has but a single vote, whatever his shareholdings. Besides the officers and directors the organization has a supervisory committee and a credit committee. The latter body passes on all loans and the supervisory committee serves as a check on officers and directors. The overhead expenses are very low, as no salaries are paid to any one, and the company charges the organization no rent for a room in one of its carhouses used as an office. Hence, the greater part of the interest received on loans can be used as income to pay dividends. It is expected that a dividend rate of 4 per cent can be maintained.

Employees of the company who are not owners of stock are permitted to deposit their savings in the union and receive 4 per cent interest, but they are not eligible for loans. The maximum deposit for any non-member is the same as for a member, namely, \$500.

At the time of the organization of the union, early this year, subscriptions for more than 380 shares of stock had been received.

Why Electric Cars Will Remain in Berlin

Transportation Expert Calculates that if Buses Were Substituted for Electric Cars in Local City Service Fares Would Have to Be Doubled

COSTS of handling the surface car traffic in Berlin by buses instead of by electric cars have recently been estimated by Dr. E. Giese, professor of transportation at the Berlin Technical High School. The results appear in the issues for April 30 and May 7 of *Verkehrstechnik*, and Doctor Giese finds that a fare twice that now charged on the surface lines would have to be charged if buses should replace the cars. The street railways in the city are operated by a stock company, but all of its shares are owned by the city, so that the system is essentially a municipal enterprise.

Doctor Giese assumes at the beginning of his study that if the buses were substituted for the surface cars they would have to assume the same street paving charges. The cost of this paving charge to the Berlin tramway system last year was \$1,200,000 (5,000,000 marks) as the company was responsible for the paving of a strip 9.3 ft. (2.84 m.) wide for each track and also for the upkeep of all parked reservations through which the lines operate. Other special obligations of the street railway are a traffic tax, which is now 3.85 per cent of gross (1.1 cents per car-mile or 2.9 pf. per car-kilometer) but will be 5.66 per cent of gross (1.6 cents per car-mile or 4.2 pf. per car-kilometer), and also an 8 per cent gross earnings tax paid to the treasury of the city. In contrast to these charges, the vehicle tax on motor buses is only \$48 (200 marks) a year, and road maintenance charges are exacted only by some of the communities outside Berlin.

Doctor Giese makes the following comparison of the principal items of expense after omitting gross earning and other taxes which have nothing to do with the economics of the case:

	Cents per Car-Mile*		Pfennigs per Kilometer	
	Car	Bus	Car	Bus
Salaries and wages.....	6.1	8.1	15.8	21.0
Power or fuel.....	2.2	5.4	5.8	14.0
Tires (solid).....	.....	1.9	.....	5.0
Maintenance of way.....	1.3	.....	3.3	.....
Street upkeep.....	.....	3.1	.....	8.0
Maintenance of overhead line.....	0.2	.....	0.5	.....
Maintenance of rolling atock.....	2.0	5.8	5.2	15.0
Depreciation.....	2.5	4.4	6.6	11.5
Miscellaneous and taxes.....	2.3	3.8	6.0	10.0
Interest and amortization.....	3.8	2.1	10.0	5.5
Total cost on vehicle-mile or kilometer basis	20.4	34.6	53.2	90.0
	Cents		Pfennig	
Total cost per mile, or kilometer, per passenger capacity, seated and standing....	0.292	0.641	0.76	1.67

*In this table and elsewhere in this article a mark is taken as equivalent to 24 cents and a kilometer as 0.625 mile.

GREATER CAPACITY ACCENTUATES CAR SUPERIORITY

It will be seen that on a vehicle-mile basis the bus costs about 1.75 times as much as the car. On a passenger-capacity mile basis the bus costs 2.2 times as much as the car. This capacity comparison is based on the assumption that the bus operator would use his largest double-deckers. One of these is rated as a 59-passenger bus, made up of 24 seats and room for three standing passengers on the lower deck, room for six standing passengers on the platform and 26 seats on the upper deck. The other bus is like that just mentioned except that it has only 21 seats on the upper

deck. As the upper deck is not much used in bad weather, Doctor Giese assumes the average capacity of all buses as 54.

On the other hand, the trolley service would be made up of 55 per cent motor car and 45 per cent trail car mileage, each unit having a capacity of 70 passengers, estimated as follows: Twenty-four seats and room for fifteen standing passengers inside the car plus room for fifteen and sixteen standing spaces on the platforms. The personnel requirements would be one man for each 47 car riders (three men for 140 passengers), as compared with one man for each 27 bus riders (two men for 54 passengers).

BUSES WOULD REQUIRE DOUBLE FARE

In 1925 the average cash fare on the cars was 3.6 cents (15 pf.). From the comparison of costs given in the table it is apparent that the buses would have to charge a fare 2.2 times as much, or 7.92 cents (33 pf.). Even if the buses had a somewhat better load factor their fare could not be less than 7.2 cents (30 pf.).

As a matter of fact, the trolley fare was less than 3.6 cents (15 pf.), due to the sale of reduced-rate monthly cards. This brought the average rate per through ride down to 3.21 cents (13.39 pf.). The re-routing of the Berlin system in accordance with the American transfer plan has produced a transfer ratio of 42 per cent, yielding a rate of only 2.33 cents (9.7 pf.) per trip. The street railways, largely because they include considerable mileage in thinly settled suburbs, averaged only 8.5 passengers per car-mile (5.18 passengers per car-kilometer), whereas the buses, which operate largely on city routes, averaged 8.99 passengers per car-mile (5.62 per car-kilometer).

The fare on cars for an average ride of 2.94 miles (4.7 km.) was 3.21 cents (13.39 pf.), or 1.09 cents per mile (2.85 pf. per kilometer). The fare on the buses for an average ride of 2.2 miles (3.5 km.) was 4.1 cents (17.2 pf.), or 1.86 cents per mile (4.9 pf. per kilometer), or 72 per cent more than the fare on cars.*

On the basis of 800,000,000 passengers a year and an average ride of 2.94 miles (4.7 km.) per passenger, the street railways run 2,352,000,000 passenger-miles (3,760,000,000 passenger-kilometers). If this figure is multiplied by the present actual difference in fare (4.9 minus 2.85), the public of Berlin would have to pay 77,000,000 marks (or \$18,480,000) a year more for surface transport if street railways were abolished. This estimate is on the assumption that a blanketing bus system would charge only 72 per cent more, but in reality the taking on of thin routes, street railway style taxes, etc., would call for a 100 per cent rise in fare.

The net result would be that buses would charge 214,000,000 marks (\$51,360,000) a year instead of 107,000,000 marks (\$25,680,000).

The Berlin public, says Doctor Giese, cannot afford any 107,000,000 mark luxuries. It is proving hard enough to raise only 10,000,000 marks for the breakthrough of dead-end streets in congested districts.

In further explanation of the figures in the table, Doctor Giese says that the power item for the trolley is figured at 2.15 cents (8.98 pf.) per kilowatt-hour, which is only a little more than 5 per cent above the pre-war rate. Superpower developments are likely to

make for lower rather than higher power costs in the future. On the other hand, automotive fuel (gasoline and benzol) now costs 40 pf. per kilogram, as against pre-war costs of 22 to 28 pf., and it is of poorer quality. The tremendous expansion of the automotive field does not tend toward lower fuel prices.

One reason for the higher power costs of a trackless vehicle lies in the higher tractive resistance. This resistance is only 24 to 30 lb. per ton (12 to 15 kg. per metric ton) for motor cars and 10 lb. per ton (5 kg. per metric ton) for trailers, while buses on asphalt have a resistance of 40 lb. and on rougher paving of up to 70 lb. per ton (20 kg. to 35 kg. per metric ton).

There is a possibility that taxes might be lowered once the government has rebuilt the highways to meet the heavier traffic, but this lies in the future.

Tire cost is based on the use of solid tires, but pneumatics would cost four times the figure given. This increase is 1½ times the entire interest and amortization charge of the street railways. A possible later reduction in the cost of giant pneumatics is only a guess.

A comparison of the cost of new equipment shows that a motor car of 70 passengers capacity costs \$8,400 (35,000 marks) and a trailer of like capacity \$4,800 (20,000 marks). On the basis of the present proportion of motor cars and trailers in Berlin the average replacement cost per car for the present 3,153 cars in Berlin may be taken as \$6,648 (27,700 marks) each, or \$94.80 (395 marks) per passenger served.

A 54-passenger capacity bus would cost \$7,200 (30,000 marks) or \$133.44 (556 marks) per passenger—40 per cent more per passenger than the car. To do the same job as the cars 4,000 double-deck motor buses would be needed.

The present interest and amortization charge is on an investment of approximately \$60,000,000 (250,000,000 marks), of which 80 per cent represents the principal property taken over, viz., the Grosse Berliner Strassenbahn. Interest and amortization are covered by a charge of 6 per cent. New capital for motor buses could not be obtained at this favorable rate.

INCREASING IMPORTANCE OF STREET RAILWAY

Finally, Doctor Giese shows that the street railways have more than recovered their pre-war importance in the Berlin transport scheme. In 1913 street railways carried 50.5 per cent of all traffic. In the unsettled rerouting year 1924 the average was only 39 per cent, but 46.3 per cent was attained in December, 1924. In January, 1926, the ratio was 53 per cent.†

No responsible authorities, concludes the author, could put forward any such proposal as the replacement of the Berlin street railway system. Because of the higher cost of bus operation its field appears to be:

1. Operation in streets where track is not feasible or permitted.
2. To supply additional service where streets are wide enough.
3. For feeders and cross-country runs.
4. For non-stop special fare service and for night operation at owl fares.

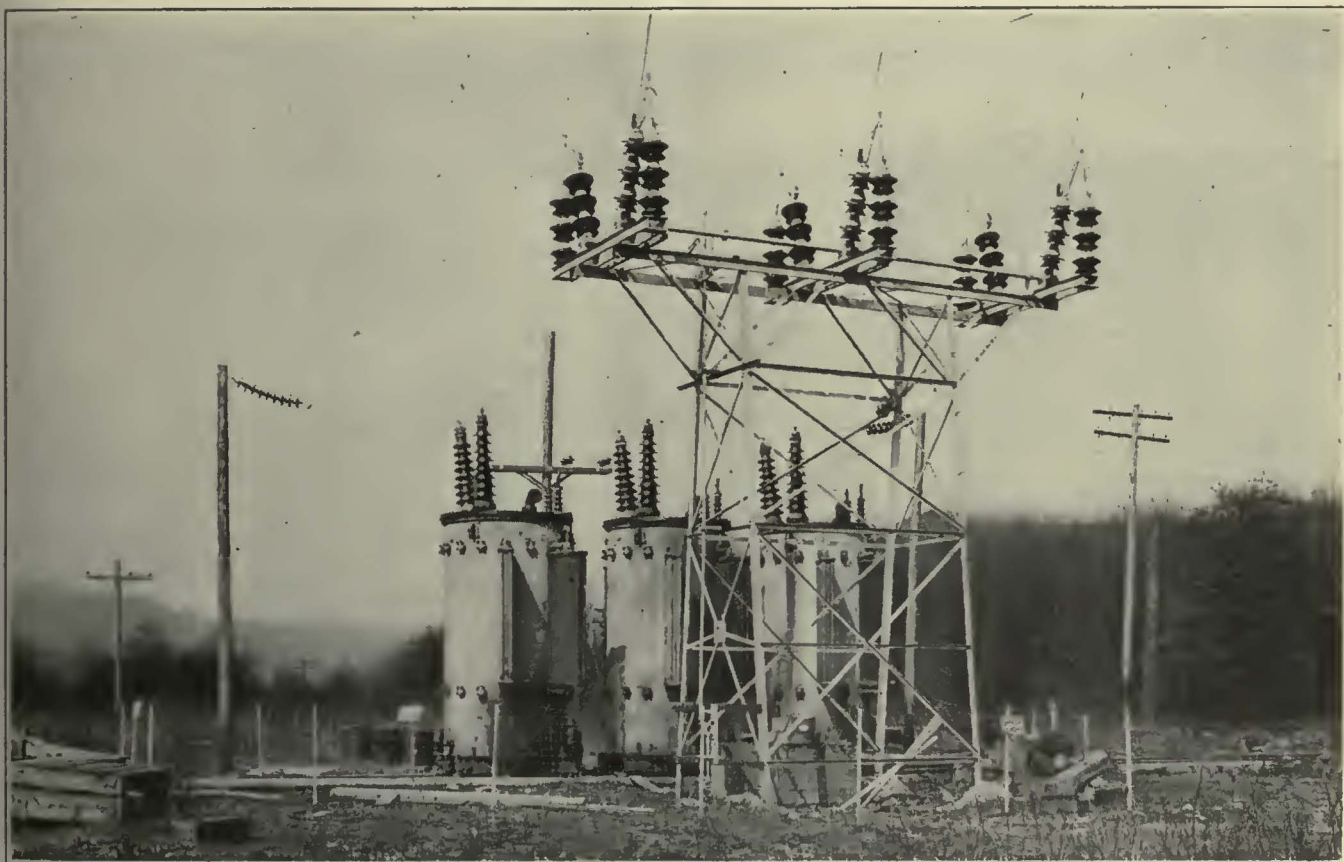
If economic reasons alone were to govern, there would be no further development of motor bus routes in Berlin. However, there is a place for them in a co-ordinated system which would charge correct rates and make each type of transport carry its fair share. In the opinion of the author, such co-ordination should be under municipal control.

*City bus fares are on the basis of 15 pf. for the first zone, 20 pf. for two zones and 25 pf. for three zones. The zones average 2.2 miles (3.5 km.) each.

†In March, 1926, the street railway percentage was 56. In the meantime, the bus percentage had grown from 6.2 per cent in January to 7.5 per cent in March.—EDITOR.

Transportation Service Continued During Flood

Citizens of Oil City, Pa., Carried by Company's Buses and
Emergency Equipment During the Recent Devastating Ice
Jam on the Allegheny—Trolley Service Quickly Restored



Temporary Set-up of Transformer Equipment Made at Petroleum Center to Serve the Floodstricken Area About Oil City

PICTURE an emergency substation constructed in perilous fashion on the top of a coal pile. Grinding, smashing blocks of ice were rising slowly but inevitably in the river alongside a power plant normally furnishing energy for three busy industrial centers. Its equipment was submerged and out of commission after a gallant but futile fight to withstand the icy invader; streets and basements were under water throughout the business districts and the grim prospect of still further rises of the ice-choked river before the frozen barrier would be swept away by sheer pressure of the water behind it. That, in brief, was Oil City, Pa., during the course of the devastating flood which visited the Allegheny River in February and March. Now the flood is history; but its consequences, as is the case with all cataclysms, are destined to make themselves felt for some time.

Even today transformers and various other equipment may be seen standing about in varying stages of disarray within the plant of the Citizens' Traction Company and the Citizens' Light & Power Company, while heating coils of many breeds are placed on, under and

around them. The process of drying out is a slow one and the end is not yet. Scarcely a day passes in which a generator or motor failure does not occur, due to the ruinous soaking which practically all the company's equipment experienced. V. A. Redfield, vice-president and general manager of the two companies, believes that these unfortunate failures, which are a direct result of this devastating flood, will continue for at least a year.

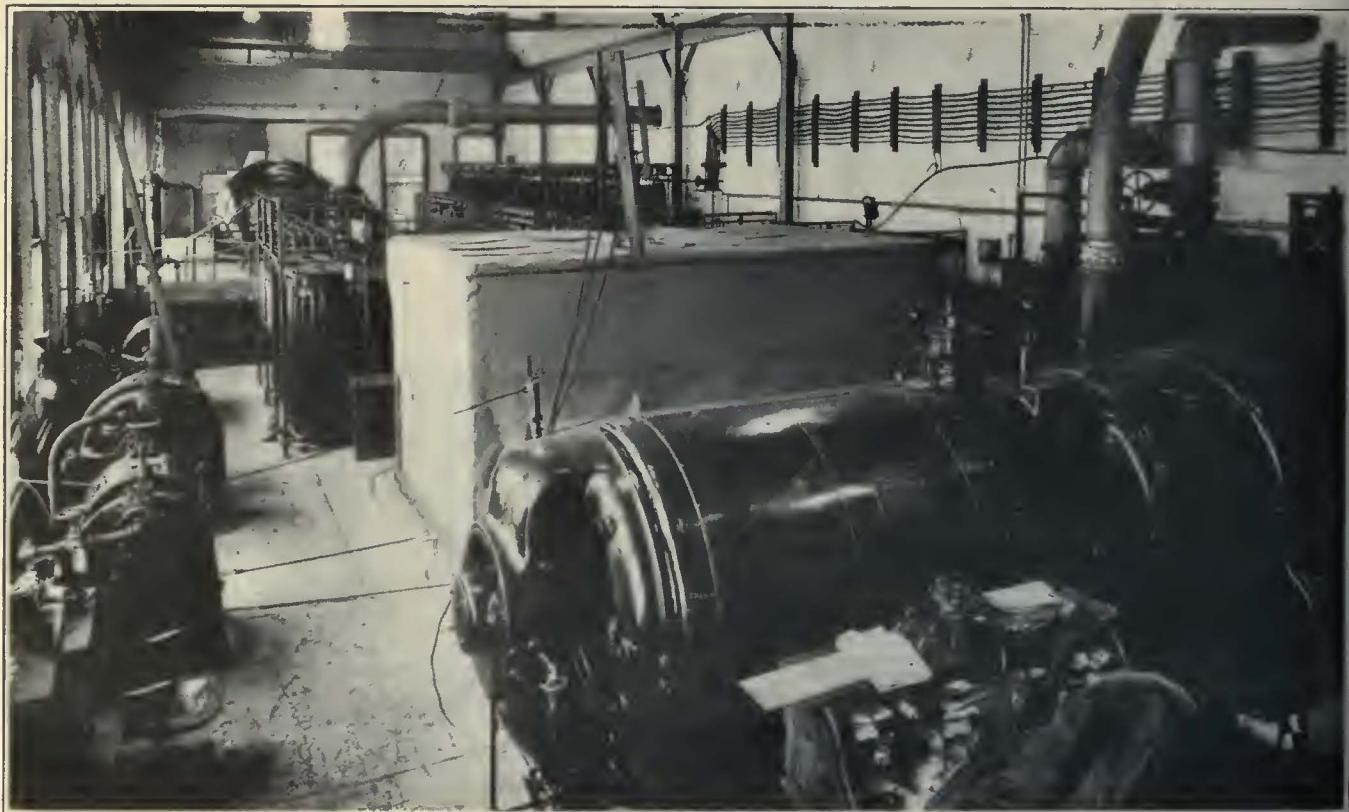
While nature was on the rampage, transportation facilities were naturally much crippled. Were it not that the same conditions which forced the discontinuance of trolley service caused also a marked temporary cessation of industrial activity throughout the stricken area, thus removing the usual peak-load conditions on the transportation facilities, the Citizens' Traction Company would have been forced to acknowledge defeat. Actually, the bus equipment possessed by the company was able to cope quite successfully with the situation during the period from March 22 to March 29, when the trolleys were out of commission. Every available bus was placed in service and kept there, by dint of

24-hour-per-day labor on the part of the mechanical department of the transportation company.

The story of the fight to prevent a total paralysis of power and transportation service to the cities served by the Citizens' company, of the herculean efforts of employees of the company and of hosts of volunteers to save the high-tension power lines from destruction, of the growing fear that the plans to break the ice jam would go for naught and that the gorge would only be freed as the force of the vast body of water, rising several additional feet, finally broke out the ice barrier, perhaps taking large portions of the cities of Oil City and Franklin along with it—all of this is an epic to be written in words of fire. But to attempt to chronicle it here is out of the question. Let the fact of accomplishment stand for the telling!

power, light and electric transportation in the event that the Oil City power house should be inundated. However, the unprecedented rise in the Allegheny nearly set these carefully laid plans at naught by flooding the switches and the transformers located in the yard adjacent to the power house. Hence, it was necessary to move this essential equipment to the highest point on the coal pile of the plant. Picture the workmen laboring mightily over the rising waters on the uncertain footing provided by this coal pile, with swirling torrents, laden with gnashing ice blocks at their feet and the deadly high-tension wires a few feet overhead, the general effect being enhanced by a liberal contribution from above by J. Pluvius!

Transportation facilities in the flood-visited area are now practically back to normal, and the power equip-



A Scene in the Oil City Power Plant Showing the Method Employed to Dry Out Part of the Rotary Equipment

The first high water in the Allegheny occurred on Feb. 21, and at that time it was made evident that emergency steps would doubtless be required to combat the encroaching flood waters. Accordingly, the Citizens' company made arrangements with the Penn Public Service Company to interconnect systems and thus supply the Oil City district from the latter's Piney Dam hydro-electric plant. To do this it was necessary to build $3\frac{1}{2}$ miles of 25,000-volt line and secure three transformers to step down the voltage from the Penn company's 110,000-volt system to the Citizens' Light & Power Company's 25,000-volt line. The three transformers were borrowed from the West Penn Power Company at Kittanning and given a temporary set-up adjacent to the Pennsylvania Railroad right-of-way and the Penn Public Service Company's high-tension lines at Petroleum Center. To plan and carry out this project was no small undertaking, but it was carried through successfully, so that by March 12 the people of Oil City, Franklin and Titusville were assured of

ment is being brought to that stage as rapidly as is possible. It is estimated that the direct consequences of the flood will cost the Citizens' companies approximately \$40,000 or \$50,000, exclusive of losses of revenue during the period of the flood. The loss of the Big Rock bridge will necessitate the abandonment of 11 miles of track which formed the connecting link between Ausley and Franklin. This line may be permanently served hereafter with bus equipment. Abandonment proceedings are now before the Public Service Commission of the commonwealth of Pennsylvania.

Electric power and trolley service was not disturbed in Franklin, due to the emergency arrangements made by the company. Power service in Oil City was out only eighteen hours, a rotary converter being installed in the city on March 28 and service being resumed on March 29. After that date the attention of the company was chiefly taken up with ascertaining the extent of the damage and overhauling equipment for normal service once more.

Police Officers Can Do Much to Improve Transportation

Control of Traffic Should Be on the Basis of Service to the People and in Proportion to the Number Served and Not to Help the Company as Such

BY STANLEY GOOD

Traffic Captain, Police Department, El Paso, Tex.

EDITOR'S NOTE.—Stanley Good was the principal speaker at the session of the recent Galveston convention of the Southwestern Public Utilities Association, devoted to traffic. As reported in the April 17 issue of the *ELECTRIC RAILWAY JOURNAL*, this meeting was one of the first of its kind given over to the discussion of traffic by the police officers of cities. Mr. Good expressed so many sound principles that he was asked to write the present article on this general subject. The broadminded views expressed show the author's intelligent appreciation not only of traffic regulation but of public service *per se*.

PERSONALITY in public service is of outstanding importance and today is being recognized as a greater factor in securing increased business and more satisfied customers than any other form of advertising. In addition to being the most effective, this is also by far the most economical form of publicity.

Officials of all public service companies are giving much serious thought to the training of employees in the art of salesmanship, realizing that in the personality of their employees lies the secret of effecting more sales and creating greater customer satisfaction. Even an imperfection in service is apt to be overlooked where the employee is courteous and solicitous and succeeds in selling himself to the public.

Now the policeman is just as much a public servant as the street railway operator. The public pays for the services of both. If the street railway operator, through his personality, is able to make friends of the public, he gets their support, resulting in increased efficiency and better service. The policeman can do the same thing to an even greater extent. In the case of the police officer, he is able to overcome the feeling of antipathy that the public has borne toward him which it has never felt toward the street car operator.

The purpose of all public utility companies is to render a needed public service at nominal cost. Since, after all, only a small proportion of our population can afford the luxury of individual transportation, a vast majority must depend upon a public service which is able to transport them cheaply and in a mass during rush hours or unusual periods.

The duty of the policeman in charge of the streets is to superintend all traffic and co-ordinate its movements. Being a public servant, he is employed by all of the people, not just a small portion of them. His services must not be to a select few only but to the masses.

It would not be consistent with justice to permit a pedestrian, or an automobile occupied by only one or two passengers, to monopolize that portion of the street allotted to the street car to such an extent that the 40 or 50 passengers in the street car might arrive late at their destination. The rights of the public carrier, as such, does not enter into consideration. It is solely a question of the rights of those being transported, who represent the majority. They have paid for a service which the operator does his best to give and it is the duty of the policeman to see that they get it. If the

traffic officer has been properly trained and capitalizes his personality this should be possible without the necessity for antagonizing any one. If a policeman lacks personality, change policemen.

Men of intelligence, fairness, tact and courtesy in dealing with the public are as necessary at busy street intersections as on the platforms of the street cars. Street car operators have demonstrated to their own satisfaction that a car may be crammed with passengers, but by using politeness, no one complains. By using the same tactics a policeman can unravel any traffic jam. In an emergency, a hard-boiled traffic cop is as useless as a careless street car operator. Neither of them is efficient, nor can they get the necessary co-operation of the public.

Any city where results in handling the traffic problem are measured by the number of arrests made for violations of the law has little efficiency. The most successful police officers are those who recognize that their chief mission is to preserve the peace rather than to prosecute its violations.

In El Paso, Tex., the policemen are taught that it is their duty to prevent violations of the law in a way that will meet with the satisfaction of all concerned. These policemen remain in the open in conspicuous uniforms and make it a point to get acquainted with the people living on their beats, calling them by name whenever they meet. The policemen vie with one another in their efforts to make friends, and when it becomes necessary to make an arrest, they refuse to argue with the person arrested and never assume the right to reprimand a citizen, since that is the power of a judge alone. Needless to say, the policemen in that city are popular, and crime and accidents are steadily decreasing, which goes to prove that personality in police work is no longer merely an untried theory.

Milwaukee Cars Carry Heaviest Traffic

RECENT checks of traffic on Grand Avenue, Milwaukee's busiest street, by the transportation department of the Milwaukee Electric Railway & Light Company, show that while eighteen automobiles passed given spots for every one street car, the street cars carried four times as many persons and occupied only one-third as much street space.

Street cars on the average carried 42 passengers per car between the hours of 6 a.m. and 6 p.m., buses carried 10.4 and private automobiles 1.34.

The study shows that the street car passenger occupied only 9.5 sq.ft. of street space, the bus rider 17.3 sq.ft. and the private auto rider 45.7 sq.ft.

Parked vehicles, between the hours of 6 a.m. and midnight, occupied 38 per cent of the street space between the Northwestern depot and Eighth Street; moving autos and trucks, 44 per cent; street cars and buses, 18 per cent.

7.9 per Cent Were Walkers

IN THE article "Better Car Routing and Traffic Control Proposed for Baltimore" in the May 22 issue of *ELECTRIC RAILWAY JOURNAL*, the figure is given in the table at the bottom of page 888 that 79.9 per cent of the persons working in the central business districts were walkers. This figure should have been 7.9 per cent instead.

Maintenance Notes

Press Can Supplies Thick Paint

THE silk-screen process for sign painting as used by the Department of Street Railways, Detroit, Mich., was described in issues of the *ELECTRIC RAILWAY JOURNAL* for Feb. 14, 1925, page 261, and March 13, 1926. A press can, which is used to supply the thick paint to the

plunger inside the can is made to move up or down by means of a rack and pinion attachment, the plunger itself being directly connected to the rack. The pinion is mounted on a short cross-shaft, the end of which is provided with a four-spoked wheel. The operator can thus move the plunger up or down by turning the spoked wheel by hand.

The bottom of the can is conical

Gas Furnaces for Soft Metal Melting

GAS-FIRED soft metal melting furnaces in which the temperature of the pots is automatically maintained at all times are part of the equipment of the Atlanta shops of the Georgia Railway & Power Company. These furnaces are designed to melt lead, tin, zinc, babbitt and other metals of about the same melting point. The burners are arranged to heat the pot and its contents up to a temperature of 1,200 deg. F., and higher, if desired, and the design and construction are such as to permit of quick heating which assures maximum production.

In the shops are three furnaces, two of 600 lb. capacity each, to melt babbitt, and the third of 175 lb. for solder. The outer shell of each of the babbitt furnaces is of heavy sheet steel, held in place by the top and bottom castings, which are connected by long, heavy bolts. The refractories used are of special forms, of selected grade backed up by proper insulation, while the pots are of cast iron.

These furnaces were designed and manufactured by the Surface Combustion Company of New York and are fired with gas, using burners which are so applied as to discharge tangentially into the combustion chamber. The hot gases pass around the entire surface of the furnace with a swirling, circular motion so that all parts of the pots are evenly heated. The vent is located close to the top of the casing, forcing the burned gases up around the pot, thus utilizing their heat to the fullest degree. The drain hole, also used for lighting, is conveniently located to permit the easy and safe flow of the contents in case of the breakage of the pot. Soft metals demand quick but even heats. Operators get to know the exact amount of heat required for certain metals and with this furnace this degree of heat can be obtained day after day simply by setting the rate of combustion on the gage. Furthermore, this temperature is automatically main-



Thick Paint for the Silk-Screen Process Is Supplied to the Screen by a Press Can and Flexible Hose Attachment in the Department of Street Railways, Detroit, Mich.

screen as required and which adds materially to the efficiency of the process, is illustrated herewith. The thick paint as needed for the sign is supplied from a can of 8-in. diameter and 18 in. high, which is mounted above the center of the bench used for the sign-painting process. This can is placed on a support made of steel bars. It is provided with a plunger and operating mechanism at the top. The

and a $\frac{1}{2}$ -in. pipe attachment is provided. Over this a 1-in. hose serves as the flexible connection for delivering the paint to the screen. The illustration shows the operator in the act of placing some of the thick paint at the top of the screen for squeezing it onto the sign. By turning the hand screw the paint is forced out of the end of the hose and can then be spread over the surface as may be desired.



Thermostatic Control Provides Even Heating Temperatures for Atlanta Company's Gas Furnaces

tained and recorded regardless of the operation of dipping out hot metal and throwing in cold, by a recording and regulating thermostat manufactured by the Brown Instrument Company.

The smaller size solder-melting furnace has a cast-iron body closely conforming in shape to the cast-iron pot, which assures a rapid transfer of heat through the pots. The bottom outlet valves of the improved type make it easy to cast molds. A bottom drain valve is opened by a wheel or lever and the metal drains from it into the mold.

The method of firing utilizes city gas, and was developed by the Surface Combustion Company. Combustion is maintained in a back pressure atmosphere so as to exclude all secondary air, and the flames are directed upon a refractory bed so as to develop the maximum possible amount of radiant heat. The flues are restricted and arranged so as to distribute the hot gases uniformly and to release them at the lowest possible temperature. The prevention of cold air leakage into the combustion chamber is a desirable feature because it prevents oxidizing effects; also by its cooling action the cold air would lower the furnace efficiency.

The installations are so designed that the furnace atmosphere can be varied at will, either by changing

the gas orifice sizes in the inspirators in the high-pressure gas system, or by changing the insert in inspirators in the low-pressure air-gas system. This is an advantage because in certain classes of manufacture, such as vitreous enamel baking, an oxidizing atmosphere must be maintained in the furnace to insure against the reduction of the metallic oxide bases in the enamel. In certain other uses, such as metal treating, an oxidizing atmosphere would be injurious to the metal, causing it to oxidize with the formation of scale. To minimize this production of oxide or scale, a reducing furnace atmosphere is maintained.

The burners are made or molded of alundum or fire clay material to form burner tunnels, which are inclined in such a way as to direct the flames in the most effective manner upon the highly refractory carborundum-faced bed.

In the high-pressure gas system small compressors are utilized to boost the city gas from line pressure to about 10 lb. per square inch before it enters the patented mixing tubes. These venturi mixers maintain fixed air-gas ratios over a wide range of consumptions, irrespective of the quantity of gas used.

Temperatures are controlled by the regulation of needle gas valves, which govern the gas flow. By raising or lowering the pressure indi-

cated on small pressure gages before each inspirator, the amount of gas supplied is increased or decreased, thereby raising or lowering the temperature. That is, the pressure is an indication of the quantity of gas being consumed. These gages have a range of 0 to 15 lb. per square inch.

In the low-pressure air-gas system the air instead of the gas is controlled by needle valves. In this system pressure or turbo blowers are utilized to supply air to the inspirators at pressures varying from 1 to 2 lb. per square inch. A diaphragm gas-pressure regulator reduces the gas pressure to atmospheric before it enters the inspirator, where it is proportioned with air in the correct amount for complete combustion. Otherwise these two systems are identical as far as method of firing is concerned.

Battery Charger Used for Economy

SO THAT the inconvenience and expense of sending storage batteries to an outside firm for charging might be eliminated the Beaver Valley Motor Coach Company, a subsidiary of the Beaver Valley Traction Company, New Brighton, Pa., has just installed a battery charger. It is of the 115-volt, 60-cycle, alternating-current type and is capable of charging ten



Wall Location of Battery Charger Economizes Shop Space

batteries simultaneously at the maximum charging rate of 10 amp., or twenty batteries simultaneously where the 6-amp. rate is used.

Batteries are first charged at the maximum rate for several hours and are then reduced to a 6-amp. charge, the entire process requiring from ten to twelve hours. It is estimated that the charger will save its own cost in less than a year, entirely aside from the greater convenience of charging batteries right in the company's garage. A Westinghouse Rectigon charger is used.

Waste Cans Insure Uniform Saturation

GALVANIZED sheet-steel, journal packing waste cans, 22 in. in diameter by 30 in. high, are supplied to each of the maintenance shops of the Grand Rapids Railway, Grand Rapids, Mich. All waste is saturated at the principal repair



Each Shop of the Grand Rapids Railway Has Its Own Individual Waste Cans

shop of the company and is delivered by shop trucks in these cans to the particular shops where the packing is to be done. This insures uniform saturation of the waste, since it is all done by one man. The cans are provided with covers which fit tightly and thus prevent dust and dirt from entering the waste after it is saturated.

New Equipment Available

Pantograph Air-Break Switch

QUICK, positive and powerful movement of the switch blade is provided in a new pantograph air-break switch being marketed by Schweitzer & Conrad, Inc., Chicago, Ill. The straight-line action of the pantograph permits the blade to enter a fully-housed and protected contact clip. As the blade withdraws from the clip it rises into the arc-

ing position. This, with the fixed horn, forms a pair of arcing horns on which the arc rises and breaks. The contact end of the blade is effectively protected from burning by the arcing fingers which it carries.

Current is carried by flat, flexible copper braids fastened securely to the switch blade and to the hinged terminal of the switch. The pantograph motion links are thus not required to carry current. Motion is communicated to the pantograph by



Pantograph Switch on Single Wood Pole Galvanized Steel Mountings

a crank on top of the middle insulator which rotates through an angle of 90 deg. A feature of the design is that this crank passes dead center in closing the switch, thus locking each phase in the closed position independently of the operating handle or connecting rods between phases. Each phase is adjusted independently. The operating handle moves through a vertical arc of 180 deg. and communicates a reciprocating motion to the vertical operating rod.

Particular attention has been devoted to the contact clips. Independent floating contact fingers are pressed against the flat copper switch blade by phosphor-bronze leaf springs. The clip is thus perfectly self-aligning. Very liberal contact area is provided. A full housing open only at one end protects the clip from the weather. Provision is made for drainage of any water which may work into the housing. All bearings are brass or bronze on one side. Grease cups are provided at important points. In the larger switches, ball bearings are used at top and bottom of the rotating insulator.

Back Gearing for Shop Motors

ABACK-GEARED attachment designed to operate under the most unfavorable conditions is announced by the General Electric Company, Schenectady, N. Y., for use with its "500 series" induction motors. This attachment is of unusually strong construction and is easily installed and adjusted.

The base, to which the motor and back shaft pedestals are bolted and doweled, is a single large casting. A special unit-type pedestal is used, one casting forming the housings for the large back shaft bearings. Thus maximum rigidity and permanent correct alignment of shafts and meshing of gear and pinion are assured. The back shaft is provided with shoulders to limit end play and is made of special steel. It is supported by two extra large, double-seated, split bearings in dustproof housings, holding oil sufficient for a number of months operation.

A split gear case, fabricated from steel plates, protects the gear and pinion from dust and retains the grease or oil in which the gear runs. Two standard gear ratios are available. Steel or fabroil pinions with cast-iron gears may be used.

Association News & Discussions

Operating Problems Hold Attention at Canadian Convention

Bus Operation, Budgetary Control and Maintenance Practice Are
Principal Topics at Quebec Meeting—Attractive
Exhibits Are Shown

BEAUTIFUL Quebec gave a cold reception to 275 members and guests at the 22d annual convention of the Canadian Electric Railway Association, held there June 2-4. The low temperature, however, merely served to increase the attendance and the enthusiasm manifested at the meetings.

The theme of the convention was given in the annual address of the president, W. S. Hart, treasurer Shawinigan Water & Power Company and Quebec Light, Heat & Power Company, Ltd. He emphasized the point that operators must improve their service with cars and must realize the value of the bus. Better publicity is needed. In this, he said, there always is room for improvement.

Following the presentation of reports of the treasurer and the secretary, committee reports were reviewed. That on accident prevention was read in brief by Chairman W. R. Robertson, general superintendent Hydro-Electric Railways, Toronto. Of all electric railway accidents in Canada, 65 per cent are collisions with automobiles, the largest portion of which are caused by autos turning out from the curb. Investigation shows that the one-man car is not a source of accidents. So far no case of accident on the Hydro-Electric Railways has been caused by the treadle door.

In the report of the motor bus and truck committee, read by Chairman F. D. Burpee, vice-president and manager Ottawa Electric Railway, results of a questionnaire were analyzed. Out of 25 member companies, 23 believe in having bus transportation furnished by the electric railways. In the opinion of the committee the best method which the railway members can adopt to eliminate motor bus competition is to go into the bus business themselves. This procedure may open up new and profitable channels of business.

In the discussion which followed, Gordon Lee, American Car & Foundry Motors Company, urged that officials of the various properties refrain from incorporating original ideas into the design.

G. H. Scragg, International Motor Company, said that some of the laws that have been passed in the United States are such that buses cannot run in adjacent states. Most of the restrictions are on bodies, so that the customer gets lower value in bodies than in chassis.

L. Tait, manager London Street Rail-

way, London, Ont., outlined some of the methods of bus competition practiced in his city. One line started by the railway itself parallels a car route. It has built up a new business without hurting the car line.

BUS OPERATION CONSIDERED

The principal paper presented at the second day's session was that on bus operation, by D. J. Locke, staff engineer Public Service Railway, Newark, N. J., on "The Motor Bus in Urban Transportation." Mr. Locke's paper is abstracted elsewhere in this issue. A lively discussion followed, and Mr. Locke answered many questions regarding the practices of his company. C. M. Shaw, Montreal, felt that by adding bus service it would be possible to make more money on the investment and give the public more service.

A. T. Spencer, Toronto, stated that in Toronto a differentiation is made between motor buses and coaches. The bus is used as an adjunct to the street railway, while the coach is used independently for sightseeing, chartered service and at present on one regular route.

Mr. Locke outlined the history of bus operation in New Jersey. By 1923 the railway was so seriously affected by bus competition that it had to get control of the buses or abandon its rail operations. It was decided to get the buses. The company believes that the duplicate service which now exists in many sections is wasteful and that much better service will be given when co-ordination of the two vehicles is completed. He pointed out that at present the company is largely rendering a mass transportation service with its buses, a large part of which is uneconomic because it offers duplicate service.

Major Burpee pointed out that in Ontario one-man permits are allowed. An operator of a single bus can frequently make a profit for himself. The company may have to take a loss to operate the one vehicle, although the operation of the single bus in competition may mean an equal loss. Mr. Locke stated that most of the buses bought out by the Public Service Railway were operated by individuals. Whether or not a particular bus should be purchased is a local and individual problem involving many factors.

D. E. Blair, Montreal, agreed with Mr. Locke that the advantages of the

combined rail and bus organization are that it saves duplication in supervision and maintenance. Replying to his question, Mr. Locke said that the geography of a system enters largely into the problem of housing and maintenance of buses. It has not been found desirable to group buses in numbers of more than 100 to 125 at any one point. On the Public Service system the units average less than this, in the smaller centers being not more than 20 or 30 buses. The availability of railway owned property is an element in this, and another is the dead mileage. In general a company must plan for expansion of its bus business. Another factor is the availability of the existing railway organization and its facilities. In most places on the Public Service system it has been unnecessary to set up a new operating organization.

The Irvington shops are used both for rehabilitating purchased buses and for regular operating overhaul. Mr. Locke believes that eventually many of the repairs will be made in the garages with overhauled units and the overhaul shop will be reserved for complete overhauling of large units of the equipment and for new construction. Body work can be handled to advantage by the railway organization on account of the similarity of the operations, while engine and chassis repairs may better be handled separately.

A. H. Foster, Brantford, is of the opinion that buses are here to stay. The railways are going to their use rather unwillingly, partly since they lack data on operating costs and fares that should be charged. He questions whether the rates charged in many cases will be found adequate.

Replying to a question by Mr. Shaw, Mr. Locke said that members of the Public Service street car and bus operating organizations are largely interchangeable. The operators of trolleys and buses are in one organization with one seniority list. On the semi-annual pick an operator may elect to change from trolley to bus or vice versa. Certain parts of the training are common, but special training is given for the two kinds of work. Road supervisors are the same to a certain extent, but some of these men are separate. The car-house men are largely the same. Above these ranks the duties are mainly handled in common. The chassis maintenance is, however, separate.

The life of the earlier types of buses with truck chassis is comparatively short, being about four or five years. It is hoped that the gas-electrics will last at least ten years. The company is setting up 3 cents per mile for depreciation for a fleet of more than 800 buses of many types.

E. J. Murphy, statistician American Electric Railway Association, referred briefly to the work of that organization, particularly with regard to motor

buses. He pointed out that the Accountants' Association has drafted a uniform system of bus accounting.

BUDGETARY CONTROL DISCUSSED

Presentation and discussion of the paper on "Budgetary Control," by H. C. Patten, was the principal business at the Friday session. An abstract of this paper will appear in a future issue. Mr. Hart pointed out the value of the budget in guiding the activities of a company. W. R. Robertson believes that it is of inestimable value, as it makes a comparison between divisions and departments.

H. E. Weyman, Levis, stated that even a small company can utilize a budget system. He finds it best to figure on the minimum revenues and maximum expenses. Then if the cost estimates are to be exceeded careful consideration should be given. The monthly figures are not of much value on the small property. If too much attention is paid to them the budget becomes unstabilized. Special expenditures are shown as extraordinary items. On the Levis property some 70 per cent of the costs are fixed, so that it is not always wise to hold to a car-mile basis.

Mr. Foster stated that he puts large expenditures into a special account and allocates them over a certain length of time.

Mr. Spencer in his estimates divides trackwork into ordinary and extraordinary expenses. The first covers the current work, while the second consists of work of large character, but which does not go into the renewal account. Postponing or advancing the work in any department will distort the budget but can be explained readily by the department concerned.

Mr. Tait is of the opinion that all companies practice some degree of budgetary control, although perhaps unconsciously. There always is an endeavor made to forecast what will take place.

OPERATING PRACTICES CONSIDERED

In past years a list of "Timely Topics" has been prepared for discussion, but the program has been so full that this year they have not been considered. In this convention the innovation was made of placing two such topics on the program each day, with two leaders assigned to head up each discussion. On the first day transfers and sweepers were considered. The discussion on transfers was led by J. McCulloch, traffic superintendent Toronto Transportation Commission, and C. M. Shaw, superintendent of transportation Montreal Tramways.

There was some controversy as to the relative value of single-truck and double-truck sweepers. Major Burpee stated that for conditions such as those obtaining in Ottawa with heavy snow the double-truck type are much better. The single-truck sweepers are satisfactory with light snow. In Ottawa sweepers have cleared as much as 3 ft. of snow. There the snow-fighting organization is lined up before winter begins. Volunteers are called for to take sweeper runs for the season. These men are relieved from their regular duties and report for snow

COMING MEETINGS

OF

Electric Railway and Allied Associations

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 21-25—American Institute Electrical Engineers, annual convention, The Greenbrier, White Sulphur Springs, W. Va.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

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

work as soon as the snowfall begins. The pay for this is 5 cents per hour more than the regular rate. A. M. Lindsay, superintendent of rolling stock Montreal Tramways, believes the single-truck sweeper is better for all-around work. Given sufficient weight and power there are relatively few situations it will not handle.

Schedule speeds were also considered. G. E. Waller, Hamilton, believes that causes of low speed and delay should be avoided as much as possible and existing causes should be removed wherever they can. In addition to delays which can be charged against railway operation some are entirely beyond its control, while there are others over which the railway has only partial control. A. J. Tobin, superintendent Ottawa Electric Railway, told of methods used for maintaining headways on his property. His talk was illustrated with charts and time-tables from actual records.

Dipping and baking armatures was the second topic for the day. A. M. Lindsay, Montreal, holds that a good baking varnish tends to increase the life of armatures. On old armatures the penetration is small, seldom more than half the depth of the slots. Armature breakdowns are due to (1) insulation failure, caused by drying out of the insulation, (2) injury caused by vibration, (3) accumulation of moisture. Dipping and baking tightens up the coils in the slots, seals up the cracks in the insulation and dries out the moisture. All baked armatures have shown an increase in the number of miles operated per failure. Similar results are shown on other properties.

D. Chenard, master mechanic Levis Tramways, began dipping armatures in 1923, but it took a year to show the value of the practice. In 1924 there was a 5 per cent decrease in pull-ins.

A. T. Spencer, Toronto, opened the discussion on patching of concrete paving. Unless a quick-setting cement can be used the various asphalt or coal-tar products must be used for patching. Repairs to all classes of paving can be avoided by care in maintenance. T. U. Fairlie, Hydro-Electric Railways, Toronto, does not believe in making repairs with concrete under traffic, hence some form of mastic filler is essential. Numerous steam railroads have used this method.

Car painting was discussed under the leadership of F. S. Beattie, superintendent car department Ottawa Car Manufacturing Company, and F. E. Holland, manager railway sales the Sherwin-Williams Company of Canada. Mr. Beattie stated that spray painting can be done at lower cost and gives a better appearance, both interior and exterior, than the brush method. When colors are changed, there is no practical difference in method from that needed with the brush.

Mr. Holland feels that the pleasing effect on the passengers of paint is worth more than the protection afforded the material of which the car is constructed. Many companies have adopted the spray method to advantage. With the brush three-fourths the cost is for labor, and with the spray there is a saving of 35 to 45 per cent in the total cost of painting. The correct material must be used and the method must be followed rightly. If done properly better results will be obtained with the spray than with the hand brush.

As in past years the convention was held in conjunction with that of the Canadian Electrical Association. The sessions were entirely independent, however, except for the luncheons the first two days and the banquet Thursday evening.

At the Wednesday luncheon, Dr. C. A. Eaton of the Nela Lamp Works of the General Electric Company, gave an inspiring address on the possibilities of Canada.

The luncheons on Friday were held independently for the two associations. The electric railway men were addressed by Morris Buck, managing editor ELECTRIC RAILWAY JOURNAL, who reviewed the progress that has been made during the past few years along the lines of co-ordination, and the new viewpoint of railway operators toward better merchandising and a better conception of their place in the community as purveyors of transportation.

Many excellent exhibits of railway material and buses were shown.

At the close of the convention the following officers were elected for the ensuing year:

Honorary president, P. W. Ellis, chairman Toronto Transportation Commission and Toronto Hydro-Electric Systems.

Honorary vice-president, Acton Burrows, president Acton Burrows, Ltd., and proprietor *Canadian Railway and Marine World*.

Honorary advisory council: T. Ahearn, Ottawa; E. A. Evans, Quebec; D. E. Galloway, Montreal; George Kidd, Vancouver; A. W. McLimont, Winnipeg.

President, W. R. Robertson, general superintendent of railway, Hydro-Electric Power Commission of Ontario.

Vice-president, H. E. Weyman, manager Levis Tramways.

Treasurer, H. E. Patten, comptroller Toronto Transportation Commission.

Executive committee: The president, vice-president, treasurer, immediate past-president (W. S. Hart) and T. W. Brackenreid, Port Arthur; D. E. Blair, Montreal; F. D. Burpee, Ottawa; A. H. Foster, Brantford; G. Gordon Gale, Hull; D. W. Houston, Regina; H. K. McLean, St. John, N. B.; D. W. Harvey, Toronto; J. E. Watkins, Winnipeg; C. L. Wilson, Toronto.

C.E.R.A. Program Announced

NOT a moment will be idle on the boat trip of the Central Electric Railway Association, which constitutes the summer meeting of that body. The formal program of the sessions, which has just been announced, covers Tuesday and Wednesday mornings and Thursday afternoon. It is given below:

PROGRAM

Tuesday, June 29, 9:30 a.m.

"Developing Off-Peak Regular-Schedule Business," by Walter Draper, president Cincinnati Street Railway, Cincinnati, and Ralph Emerson, general manager Cleveland Railway, Cleveland. Discussion.

"The Unequal Utility Tax Burden," by Lesley Vickers, economist for managing director, American Electric Railway Association, New York. Discussion, by A. C. Blinn, vice-president and general manager Northern Ohio Power & Light Company, Akron.

"Why Associations?" by D. L. Gaskill, secretary-treasurer East Central Division National Electric Light Association, Greenville, Ohio.

Wednesday, June 30, 9:30 a.m.

"Electric Railway Fires; Their Cause and Prevention," by J. S. Mahan, Western Actuarial Bureau, Chicago, Ill., president Western Section International Association of Electrical Inspectors.

"The Electric Car of Tomorrow," by John A. Dewhurst, associate editor ELECTRIC RAILWAY JOURNAL.

"Maintenance as Related to Selling the Service":

From car equipment standpoint, by J. F. Ufert, superintendent of equipment New York State Railways, Rochester.

From maintenance-of-way standpoint, by Jonathan Wolfe, Chicago Surface Lines, Chicago.

From overhead standpoint, by M. W. Cooke, superintendent of current control Pittsburgh Railways, Pittsburgh.

Thursday, July 1, 3 p.m.

"Advertising for Traffic," by Labert St. Clair, director of publicity American Electric Railway Association, New York.

"How Employees Can Sell Transportation," by H. M. Lytle, vice-president Chicago North Shore & Milwaukee Railroad, Chicago.

"Developing Excursion Bus Business," by L. H. Palmer, vice-president and general manager Fifth Avenue Coach Company, New York, and G. B. Powell, general manager Kentucky Carriers, Inc., Louisville.

While the entertainment schedule is not yet rounded out a tentative outline follows:

Monday, June 28

Buffalo to Cleveland. Preliminary contests with various ship deck games. Equipment will be available during the entire cruise for those desiring to play cards.

Dancing every evening, beginning at 9 o'clock.

Tuesday, June 29

Toledo to Detroit, and Detroit River to Lake Huron.

Cards and deck games for those not attending meetings.

Afternoon set aside to give all an opportunity to view the beautiful scenery of Detroit River, Lake St. Clair and St. Clair Flats.

Evening, after dinner, community singing led by Tudor W. Jones of the Union Traction Company of Indiana.

Entertainment to be given by the children aboard the boat, under the supervision of Miss Rowell.

Wednesday, June 30

Afternoon, golf at Mackinac Island. Sight-seeing trip for non-golfers.

Immediately after dinner, mixed South American bridge party, one hour.

Thursday, July 1

Golf in morning at Harbor Springs.

For non-golfers, South American will cruise down Traverse Bay, returning to Harbor Springs about 3 p.m. to pick up golfers.

Cards and deck games for those not attending meetings.

The Carpenter-Henry birthday dinner.

Dinner community singing led by Mr. Jones.

Immediately after dinner, "C.E.R.A. Derby"; E. M. MacIntosh, official judge.

Awarding of prizes for all events during cruise.

Dancing.

Friday, July 2

Ship docked at Benton Harbor 7 a.m. to 11:30 a.m. Sightseeing Benton Harbor and vicinity.

11:30 a.m. to 3:30 p.m., Benton Harbor to Chicago.

The Motor Bus in Urban Transportation*

Co-ordination an Essential—Rail Service Should Not Be Duplicated—Extent to Which Facilities May Be Used in Common Is Discussed

By DEAN J. LOCKE

Staff Engineer Public Service Railway, Newark, N. J.

WHY, where, when and how should motor buses be used by street railways? It is safe to say that nearly all street railway men on this continent have had these questions to consider during the past two or three years. It has been a most serious problem with most of them. There are, however, many who now believe that they have taken the problem too seriously and by so doing have postponed or lost an opportunity to serve the public and have permitted others to poach upon a well-established business.

One of the principal reasons why street railways should use buses is that they may protect their investments. If they fail to utilize this newer form of transportation, competitors may become established. That the long-established system of transportation in a community should be the one to furnish all forms of public transportation is rapidly becoming accepted as a creed of the industry. We should consider ourselves transportation men rather than street railway men, and we should welcome the opportunity and assume the obligation, where possible, to serve our public in whatever way transportation service is needed. The public buys its transportation much as it buys its other commodities, and in so doing is nearly as fickle. We are learning what the merchant has always known, therefore we must offer what the public wants or a competitor will sooner or later find the way.

Where can motor buses best be used in urban transportation? The answer is—as integral parts of co-ordinated transportation systems. There are several places where their use has been found to be of benefit to the community and of profit to the operator, as follows: Feeder, extension and crosstown connecting service; non-competing or complementary service; de luxe service; tourist and charter service.

In each of these services volume of traffic largely determines the most economical form of transportation. Where the volume is small buses may be a valuable means of handling a business which would not justify rail construction. Where the volume of business is heavy the railway remains, and probably always will remain, the most reliable, practical and economical

form of transportation. The dividing line between the economic fields of utility of the two types of vehicle may vary widely as between different properties, depending on local conditions.

PARALLELING EXISTING SERVICE UNECONOMIC

While one large railway is today operating in parallel with its trolley lines, bus lines which were originally established by competitors and which long established public demand requires should be continued, such a system is basically uneconomic. The problem there is to fit each type of vehicle into its most economical sphere as soon as practicable and to render satisfactory services without duplication of service and expense; in other words, to co-ordinate the services.

In many cities there are areas which receive what little transportation service they have by way of circuitous trolley lines. To such places the bus offers relief by means of an operation which is complementary to the railway service.

In the field of de luxe bus transportation there are great opportunities for street railways to develop a new and distinctive class of transportation. With routes properly chosen, with the right kind of equipment and with proper service a new patronage can be built up which will in no way poach upon the preserves of the older established business or compete with trolleys used for mass transportation of passengers.

When shall street railways employ buses to round out their transportation systems? Many of us are still seeking the answer. Others of us are convinced that in our search for the answer we have waited too long and have brought upon ourselves the plague of competition. However, the best answer is that we should anticipate demands and opportunities for bus service and be the first to render such service. This does not mean that we should rush in the moment a competitor appears on the horizon, but rather that we should so cultivate public opinion that we will be sought out when legitimate needs for transportation service arise and fly-by-night operators will receive no encouragement.

The operation of buses by railways can often be undertaken to advantage when costly rail extensions of uncer-

*Abstract of a paper presented before the Canadian Electric Railway Association, Quebec, June 2-4, 1926.

tain or low earning power are demanded or when the rehabilitation of branch or feeder lines becomes necessary because of physical depreciation or the improvement of adjacent highways. Another opportunity for the use of the bus arises when the operation of a trolley line becomes burdensome because of diminishing business. The substituted bus may, because of its popularity and its flexibility, build up and hold a new business of its own which the trolley never could secure.

We hesitate to abandon unprofitable rail operations because of the capital invested in the fixed rights-of-way, tracks and power generation and distribution facilities. An investment in bus equipment is not fixed in the same sense, and if a bus operation proves to be unprofitable we can abandon it and use the equipment elsewhere without loss of capital. It may be better to suffer a small loss from a bus operation installed in advance of a threatened competitive operation than to suffer a large loss by reason of the existence of the competitor.

FIELDS FOR BUS SERVICE

How shall motor buses be used by street railways? First, careful consideration should be given to the selection of the buses themselves. They should fill service requirements and at the same time operate economically. Only the best equipment should be employed, of designs which will provide attractive accommodations for patrons, which will give uninterrupted service and which will not be expensive to operate and maintain. Buses are now being built which can handle the peak loads imposed upon them during rush hours to the extent of 125 per cent of their seating capacity, but their use is generally not justified except where the rate of fare is low and the ride is short.

Character of service largely determines the design. When buses are to be used as an adjunct to and co-ordinated with street railway service, such as in feeder, crosstown and complementary service, they should be painted the car colors and everything else possible should be done to identify them with the railway system. Bus operators should wear the same kind of uniform as the trolley operators. The railway transportation departments should control the operation of such buses.

On the other hand, where the bus service is non-competitive and is not complementary to the railway—that is, where a preferred service is offered—the buses should be distinctive in color and appearance and should be operated separately. The passenger should be made to feel that he is getting a higher class of service than is available to him on the railway bus. However, the bus chassis and body may be the same for both types of service. In fact, interchangeability and standardization of units for maintenance make this highly desirable.

Volume of traffic and frequency of service have great weight in determining the size of bus to use. On lines which have heavy peak loads with standees, the most economical size to use during the peaks is the largest ca-

capacity bus which can be maneuvered in traffic, but for many hours of the day smaller buses would be amply large. Because the carrying charges on the investment generally constitute a smaller part of the cost of bus service than of trolley service, it may pay to provide large capacity buses for use during rush hours and additional smaller buses for use during non-rush hours. Many operators find it desirable to standardize on one size of vehicle. In such cases the relative duration of the rush and non-rush periods may determine the most economical size to use. There is a definite field for the smaller bus with its lower operating costs, such as on lines where comparatively frequent headways are desirable but where the traffic is light. If the smaller vehicle is continually overloaded (a common danger) the cost of repairs, depreciation, tires, gas and oil may nearly equal that of the larger bus.

Never was the application of the old adage "a stitch in time saves nine" more justified than in connection with the maintenance of buses. Unquestionably the "stitch" is regular, frequent and adequate inspection, incorporating generous lubrication and a high standard of cleanliness. This is the everyday preventive medicine which we must give the bus if we are to keep it on the road and out of the repair shop.

But if we are to operate effectively we must organize for efficient and economical maintenance beyond inspection. On a large system it is highly desirable to have: Standardized equipment; an experienced superintendent of bus maintenance; a centrally located repair shop well equipped with machinery for the overhaul and repair of buses; a system for the rapid and careful purchase and distribution of materials and supplies; a uniform and complete system of cost accounting.

METHODS FOR CO-ORDINATING SERVICES

On almost every property, regardless of size, there are opportunities to effect economies in operating costs of both the railway and the bus branches of the business by co-ordinating the managerial, operating, maintenance, purchasing and accounting departments of the two, which would necessarily have to be self-sustaining in each company if the services were independent.

Beginning with the managerial organization, we find that the general manager of the railway, the general office staff and the various railway department heads and their staff usually absorb the direction of the bus operations, and that the total cost of these services for the two operations is but little greater than that of the railway alone. In the transportation department the degree to which bus operations may be absorbed depends largely on whether or not both trolleys and buses are operated from the same house or houses. Where buses can be operated from carhouses or near-by garages the stationmaster's or supervisor's organization can often absorb the direction of bus operators and the bus clerical work with but little increase in staff. Where the garage is distant from a carhouse, additional supervisors and receiving clerks may have to be provided.

Street railways, when adopting buses, are frequently able to utilize for housing facilities railway property which has long been idle or not fully utilized. A bay or two of a four-bay carhouse or an old power house can frequently be adapted to bus uses at comparatively small expense.

The extent to which the maintenance facilities for railway cars and buses can be co-ordinated depends largely on local conditions. Certain kinds of inspection and maintenance work employing carpenters, painters, upholsterers, farebox and register repairmen, blacksmiths, machinists, etc., are practically the same for both types of vehicle, while the electric motors, controllers, brakes, trucks and wheels of trolley cars and the engines, transmissions, axles and chassis appurtenances of buses each require a separate corps of specialists. On small properties it usually is not economical to have separate facilities and organizations for the two kinds of work, but on large properties, where hundreds of trolleys and buses are operated, it is possible and often advisable to specialize to a large extent.

Inspection work usually merits a separate personnel, even on small properties, because of the highly specialized and exacting nature of the work. Car and bus cleaning crews may be combined or not, as local conditions may demand.

The cost accounting and auditing of bus operations by street railways present few new problems, and the work is usually absorbed by enlargement of the railway clerical force.

The use of the motor bus in co-ordinated transportation is in its infancy, and much still remains to be done in perfecting its design and its operation. If properly used, it will help solve our traffic problems and some of our financial ones, and will be of distinct benefit to the public. Improperly used, it will only increase the public's and the operators' burdens.

American Association News

Merchandising Transportation

ON MAY 21 the merchandising transportation committee held an all-day session at the association headquarters in New York, editing and discussing the work of the eight sub-committees delegated to write the various chapters of the committee report. Certain sections were revised by action of those members of the committee present and it is planned to get the section into final shape immediately so that the report can be completed at the next meeting to be held in the middle of June.

Those members present were R. N. Graham, chairman; O. A. Broten, J. B. Donley, John A. Dewhurst, Ralph W. Emerson, S. E. Emmons, E. A. Palmer, Clinton D. Smith, A. C. Spurr, J. C. Thirlwall, W. H. Boyce and G. C. Hecker, special engineer of the association.

The News of the Industry

More Trackage for Key System

Application has been made to the California Railroad Commission by the Key System Transit Company, Oakland, for permission to construct a viaduct as an approach to the Key Mole in order to afford more trackage and to speed up traffic to and from San Francisco. The cost of the new project has been estimated at \$1,246,450. It is further estimated that the new plan will adequately care for 40 per cent more traffic than is accommodated under the present plan. The engineers propose to make the new viaduct 4,840 ft. long, with 10 per cent grades.

Two new main line tracks will be built, if the application is approved, to connect with the present main line tracks at a point just east of Hollis Street in Oakland and to cross over seven Southern Pacific tracks and one set of Santa Fé tracks. All four main line tracks are to be connected by right and left hand ladders at the west end of the viaduct for emergency use.

A significant feature of the proposition is that it would be useful in any new plan for a new terminal layout to Goat Island shoal or for a bridge on the Goat Island-Telegraph Hill location.

The installation of two additional main line tracks will bring about reduction in time. Under the present schedule the interval of time between the arrival or departure of the last train that connects with the same boat is seven minutes during rush-hour periods. It is estimated that with four main line tracks this interval can be lessened by at least half. This congestion of trains under the existing two-track outlet plan has long been a problem for Key system engineers. They have made an intensive study of the problem and now declare that the viaduct proposal is a long step toward the solution of it.

A normal daily movement on the six lines of the Key division and the San Francisco-Sacramento Railroad is about 400 trains to and from the mole. This number is reduced by about 100 trains by the consolidation of trains of four divisions.

Another proposal that is being studied is the proposition to "stagger" the Southern Pacific and Key ferry schedules. At the present time the schedules which are in effect are practically identical.

Richmond Common Council Overrides Mayor's Franchise Veto

Mayor J. Fulmer Bright's veto of the Virginia Electric & Power Company's blanket traction franchise was overridden by the Common Council of Richmond, Va., on June 7 by a vote of sixteen to two. The vote was taken after a fifteen-minute talk by the Mayor, which he termed a supple-

mentary statement, and which, he said, was largely a repetition of the language used in his veto message. During his argument, he said that he was persuaded that the traction company could pay the present rate of tax and prosper without increasing its carfare. It had been done in the past, was being done now and could be done as long as

present conditions obtained. He believed that if the tax rate were reduced to the extent proposed in the blanket franchise "you will face a condition which may necessarily result in making up the loss the city will sustain from other sources and other taxpayers." The issue now goes to the Board of Aldermen for concurrence.

St. Louis Files Answer to Fare Request

City Counselor Suggests Deferment of Increased Fares Until Completion of Present Transfer Negotiations—Receiver Wells Explains Decrease in Traffic

THE 8 per cent return on the fare basis valuation of United Railways, St. Louis, Mo., is an excessive demand, higher than the return allowed electric railways in other cities and quite unwarranted by the present condition of the money market, City Counselor Muench of St. Louis informed the Missouri Public Service Commission in an answer of the city protesting the granting of an application made by Receiver Rolla Wells for an increase in fare to 8 cents, two tokens for 15 cents. The present fare for adults is 7 cents straight. The protest was sent to Jefferson City on June 5. Receiver Wells filed his application on June 3.

Counselor Muench said that the injury and damage reserve of 9 per cent of gross receipts was much beyond the reasonable amount that should be set aside for that purpose, and before allowing such a percentage the commission should make a careful investigation to determine to what extent such heavy damage claims are the result of bias or lack of sense of civic obligation. The unfavorable showing in the company's financial status for 1925 compared with other years and with the first four months of 1926 indicates that the maximum inroads on the business of the company have passed and the present business has taken a favorable turn, according to the city.

Mr. Muench further points out that in the very near future the United Railways property will be transferred to the reorganization committee's St. Louis Public Service Company and that this change will strip the company of various legal hamperings and make for an elimination or reduction of certain fixed charges and for greater economy. In view of this fact he terms the grant of an order for a fare raise "inopportune and illegal." If a fare raise is found to be absolutely essential it should only be granted after the reorganization of the company and the transfer of the railway property have been completed and the financial affairs of the St. Louis Public Service Company adjusted and stabilized.

Continuing, Counselor Muench asserts that the reason for the deficit of

\$207,000 experienced by the company last year does not lie with the lines in the city, but was caused by the non-paying offshoots of the city lines, and that it would be manifestly unfair to place upon the city car riders the burden of carrying the expense of arteries that stretch into the county and cause red ink entries on the company books. Attention is called by him to an item of \$4,891,032 which is said to represent the net amount of the company's investment alleged to have been made for betterments and additions of the property between Jan. 1, 1919, and April 30, 1926. He contends that this is in excess of the amount.

In concluding his reply Mr. Muench again asks for an audit, even though the commission should decide that the company is entitled to an immediate increase in fare; he urges this so that a true value of the company's property may be established to form the basis of the finding the commission will be required to make in connection with the service-at-cost franchise now being negotiated by the city and the reorganization committee.

In his application for the increase Receiver Wells asked for immediate action by the commission and that the fare of 8 cents, two tokens for 15 cents be effective not only in the city but in each of the St. Louis County fare zones. Receiver Wells made his application with full authority from United States District Judge Faris, who has jurisdiction over the receivership.

United Railways officials have estimated that the increase if granted will net the company upward of \$1,200,000 additional revenue annually. For the year ended April 30, last, the net income was \$2,748,000, or about \$1,200,000 of the amount required to pay a 7 per cent return on the \$56,600,000 valuation fixed on the company's property by the Public Service Commission. However, no rate of return on this valuation has ever been fixed by the commission, and in his application Receiver Wells asked for an 8 per cent return, which would require upward of \$2,000,000 a year more revenue.

Receiver Wells issued a statement to

explain to the public his request for a higher fare. He cited a large decrease in the number of revenue passengers due to the increased use of private automobiles and competition of buses and service cars. He said the number of passengers in 1924 was approximately 13,500,000 less than in 1923 and in 1925 9,100,000 less than in 1924.

This combination of decreased income and increased expenses "makes it impossible to maintain the high character of service desired, make further improvements in service and pay a reasonable return on the valuation of the property allowed by the Public Service Commission and agreed to by the city and the receiver."

"In view of this situation the receiver has felt it necessary, in connection with the property maintenance of the service and in protection of the equities in the property, to apply to the Public Service Commission, and he has been instructed by the United States court to apply to the Public Service Commission for increase in fares to a basis of tickets at the rate of 7½ cents and single cash fares of 8 cents. However, he is not now asking for an increase in the present children's fare of 3 cents," Receiver Wells' statement concludes. In view of the action of Receiver Wells it is considered probable that Mayor Victor J. Miller will immediately give out for public consideration and discussion the new service-at-cost franchise under which the St. Louis Public Service Company will operate when it takes over the street car property, in the hope that the public may help to decide on points now in controversy. Briefly, these are: Whether franchise shall regulate terms and conditions under which the company will employ its workers, especially carmen; whether the use of one-man cars shall be prohibited on lines entering the congested districts of the city; whether the mill tax and present franchise taxes shall be continued, and what rate of return the company shall be permitted to earn on both its present investment and further investments for extension of service.

Appropriation for Loading Platforms in Chicago

Substantial appropriations for the establishment of street car loading zones in every section of Chicago have been recommended to the city finance committee by the local transportation committee of the City Council. The action came after traffic experts had reported that present facilities for loading trolley riders safely were inadequate. A representative of the Chicago Surface Lines offered similar testimony and strongly urged the establishment of safety islands. He opposed the construction of elevated zones, especially in the Loop district, as a hindrance to heavy vehicle traffic.

The tentative plan of the committee's engineers for making zones is to install strips of 1-in. yellow rubber vulcanized under enormous pressure upon steel plates ¾ in. thick and imbedded in the road flush with the level of the pavement. It was declared that the rubber will withstand wear much better than enamel or other materials.

Ordinance Introduced Before City Council

Proposed Franchise for Kansas City Incites Kansas City, Kan., Mayor to Express Views on Equal Consideration—Public Will Be Invited to Hearings

IN ORDER to bring the matter of a new street railway franchise to the point of public discussion, the application for a new 30-year franchise, as submitted to the city manager recently by William G. Woolfolk, president of the Kansas City Public Service Company, Kansas City, Mo., was introduced into the City Council in the form of an ordinance on June 7 in the name of Councilman A. N. Gossett. Mr. Gossett said the franchise is one of the most important questions confronting the city government and thought the introduction of the bill at this time proper in order to allow its discussion by a Council committee and in public hearings. He said:

Public hearings on this matter are a necessity, so that some plan resulting in the introduction of an agreeable ordinance may be reached. If the Council finds that the ordinance is not right, or that the franchise should be granted by the people, then I would not be for this ordinance.

However, I believe the matter is one that should receive the serious consideration of this Council.

The public will be invited to attend the informal hearings by the Council.

It is rumored that the Kansas City Public Service Company, the successor under reorganization to the Kansas City Railways, will meet with quite a little opposition in the matter of the ordinance as introduced. Several Democratic Councilmen were on hand at the introductory meeting for the purpose, it is said, of killing the bill without public hearings. This plan was side-tracked, however, in favor of public hearings.

COMPANY HAS COMPLIED WITH NEW TERMS

Mr. Woolfolk said that several times recently the statement has been made that the Kansas City Public Service Company, the successor to the Kansas City Railways, should not ask for a new franchise until the company has complied with the provisions of the present grant. "I have made a close study of what the old company has done," he said, "in the way of complying with its franchise requirements and I believe in all fairness it should be made public. Our books are open to prove all I state."

Mr. Woolfolk, in this connection, recently issued a statement wherein was set forth a number of figures showing the manner in which the old company has more than complied with the terms of the present franchise, especially in the matter of extensions to the Missouri property of the company, the purchase of new cars within the stipulated periods and the full provision of \$250,000 which should be available for further extensions deemed necessary by the city. The text of the statement admits the failure of the old company to comply fully with the provision requiring full maintenance of the paving between the car tracks. Mr. Woolfolk said that his company stands ready to remedy that condition, which he justifies in the face of the financial difficulties into which the old company found

itself within a few years after the present franchise was granted.

According to the statement, the ordinance further provided that if the net earnings of the company in the aggregate exceeded, or were less than 35 per cent of the gross receipts of the company in any year, then the amount to be expended in extensions and additions to the property should be increased or diminished correspondingly, and that an analysis of the company's earnings and expenditures in extensions up to Dec. 31, 1925, shows the capital additions to the company's property in the period amounted to approximately twice the franchise requirement.

OLD OBJECTIONS REVIVED

H. F. Schaible, acting Mayor of Kansas City, Kan., said that this city must receive equal consideration with Kansas City, Mo., in franchise negotiations with the new operators of the railways. He announced that he will ask the commissioners to call a conference with officials of the Kansas City Public Service Company and of the Kansas City Railways for consideration of the proposed franchise.

Mr. Schaible is quoted as saying that not a line of track had been extended in Kansas City, Kan., for more than ten years, and virtually every request for adequate service and routings that would benefit Kansas City, Kan., had been ignored. He said thousands of laborers working in the central industrial district were forced to walk blocks to and from work as a result of the abandonment of the "L" road.

Several of the objections voiced by Mr. Schaible have for several years formed the chief bones of contention between the Kansas City Railways and the officials of Kansas City, Kan., the latter having fought the granting of articles of incorporation to the Kansas City Public Service Company by the Kansas board at the time such approval was requested. The objections at that time, however, were over-ruled by the board after company officials promised to do everything possible in coming to a satisfactory agreement with the city officials and public in the matter of service, fares and equipment.

Sandston Electric to Operate in Virginia

The Sandston Electric Railway, Richmond, Va., with a capital stock of from ten shares to 50 shares without par value, has been granted a charter by the Virginia Corporation Commission to operate a street railway at Sandston, Va., about 5 miles northeast of Richmond. The incorporators are Oliver J. Sands, president of the American National Bank & Trust Company, president; J. B. Bourne, secretary. Other officers are J. A. Baird, Samuel W. Zimmer, Petersburg, Va.; Oscar E. Parrish and Robert M. Sharp, Richmond, Va.

Litigation Ends in Shreveport

Court Rules Company May Charge Straight Seven-Cent Fare—Details in the Long Battle Reviewed

The United States District Court, Eastern District of Louisiana, handed down a decision recently declaring null and void and confiscatory the order of the Louisiana Public Service Commission, rendered on March 16, 1925, ordering the Shreveport Railways, Shreveport, La., to offer seventeen tickets for \$1 and four tickets for 25 cents. The new order authorizes the company to discontinue the sale of four tickets for 25 cents and seventeen for \$1, and to charge 3½ cents a ride for school children during school terms and school hours. The court also ordered an injunction restraining the Louisiana Public Service Commission, Huey P. Long, chairman of the commission, and other members from attempting to enforce the said order of March 16, 1925, or from interfering in any way with the plaintiff in charging and collecting a 7-cent fare on the street railway systems and a 3½-cent fare for school children who are under the age of eighteen years.

This decision ends litigation which has been carried on for some three years between the Shreveport Railways and the courts. A review of the preceding events is necessary for a proper understanding of the situation in that city. The Shreveport Railways has been fighting for the principle of operation with a profit instead of a loss, and has from time to time applied to the Public Service Commission for relief. In January of this year the company asked to be relieved of the sale of tickets and to be allowed to charge a flat 7-cent adult fare and 3½-cent, or 35 cents for ten tickets, school children rate. The application included a statement of the company showing a deficit of \$2,987 for the year, allowing nothing for a return on the value of the property. The commission did not grant a hearing until April 26. After the hearing the chairman stated the case would be continued indefinitely.

A delay of three months with losses continuing monthly compelled the Shreveport Railways to apply to the United States District Court for an order restraining the Public Service Commission from interfering with the railway in discontinuing the sale of adults tickets seventeen for \$1 and four for 25 cents and granting the railway the right to charge all adult passengers a 7-cent fare and ten school tickets for 35 cents.

Trouble began in Shreveport in July, 1923, when the United States District Court for the western district of Louisiana granted the Shreveport Railways an injunction against the Louisiana Public Service Commission restraining it from interfering with the company in the collection of a 7-cent cash fare. In November of the same year a committee of Shreveport citizens prevailed upon the Shreveport Railways to withdraw its suit in the United States District Court and accept an order of the Louisiana Public Service Commission

fixing the fare of 6 cents for adults and 2½ cents or ten tickets for 25 cents for the school children. This was done with the understanding that if this rate of fare did not yield a fair return on the property the commission would increase the rates. After one year's test of this rate of fare it was found that the earnings did not yield a fair return. The Shreveport Railways, therefore, made application to the Public Service Commission for an increase in fare to 7 cents for adults and 2½ cents, or ten tickets for 25 cents, for school children.

In March, 1925, the Public Service Commission issued an order fixing the cash fare at 7 cents, but required the company to sell tickets seventeen for \$1 and 4 for 25 cents. The price of school tickets remained unchanged. The Shreveport Railways did not feel that this rate would yield a fair return, but it agreed to try the arrangement and see what the results would be. The earnings under this arrangement dropped off immediately and it found it was operating at a loss each month.

Another angle to the dispute is the 1907 ordinance requiring a motorman and a conductor on each car operated in Shreveport. Some ten years later, after the one-man safety cars had passed the experimental stage, the railway contested the right of the city to enforce this ordinance. The case went to the Supreme Court of the State and to the Supreme Court of the United States, where it was held that the ordinance was a police regulation and the courts did not at that time feel justified in interfering with it. Since that time the railway has secured a modification of the ordinance so as to permit one-man safety cars on two of its lines.

64 per Cent of Cleveland Shoppers Use Street Car

Three-fourths of the shoppers in Cleveland's downtown Euclid Avenue stores make the trip from their homes in street cars or buses operated by the Cleveland Railway. This is shown by a traffic survey conducted by the Cleveland Railway and the retail merchants' board of the Chamber of Commerce.

Less than 4 per cent walk to the stores, a little more than 21 per cent come in their own automobiles, more than 64 per cent come by street cars and a little more than 10 per cent by buses.

According to Ralph W. Emerson, general manager of the railway, the poll was perhaps the largest of its kind ever taken in this country. It was conducted in the downtown Euclid Avenue stores.

Mr. Emerson is inclined to believe that thousands from the poorer neighborhoods failed to vote or refused to do so, and that they would show an even higher percentage of car riders. He also believes that shopping districts away from Euclid Avenue probably would show more car riders. A total of 93,355 persons voted in the poll.

William H. Gray, secretary of the retail merchants' board, declared the survey showed the buying public depends principally on the Cleveland Railway for transportation.

Utica Fare Hearings Concluded

Hearings were completed by the Public Service Commission on June 10 upon the petition of the New York State Railways for permission to increase fares in its Utica zone. The city of Utica was given until June 21 to file a brief. Counsel for the company stated that no brief would be filed by it.

After cross-examining engineers of the company concerning their appraisal of the Utica zone property, the city of Utica opened its case by presenting Dr. Milo R. Maltbie, consulting expert, and two members of his staff. The city claimed a reproduction cost of the property in the Utica zone as of Sept. 30, 1925, of \$3,854,255, from which there was deducted for depreciation \$1,462,823, giving a net reproduction cost less depreciation of \$2,391,431. This figure is exclusive of overhead costs.

At the last hearing the engineers of the Public Service Commission estimated the reproduction cost as of Sept. 30, 1925, at \$5,325,517 without depreciation and at \$3,359,384 after depreciation had been deducted.

Surface Lines Head Attacks Proposed Traction Ordinance

Taking exception to the opinion expressed by Francis X. Busch, corporation counsel of the city of Chicago, in an address before the Chicago Association of Commerce (referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 5, page 988), Henry A. Blair, president of the Chicago Surface Lines, in a letter to the chairman of the City Council committee on local transportation on June 9, declared that the question of subway construction should be settled before any attempt is made to draft new traction ordinances. Mere unified operation of the surface and elevated lines could not materially improve service until congestion in the Loop district had been relieved by subways. Mr. Busch had previously stated that subway construction could not be undertaken until other phases of the traction problem had been thoroughly investigated and acceptable ordinances drafted.

As to the proper method of financing subway construction, Mr. Blair said that subways should be built by the city because the cost of construction was too great to be met out of earnings of the transportation company without considerably increasing the rate of fare. Earnest consideration should be given the question of whether the present law with reference to special assessments needs clarification or enlargement. Consideration should also be given to the restriction in the present law which prohibits the city from leasing subways for a longer period than twenty years.

Mr. Blair asserted that before the ordinances be made effective they must be submitted to a referendum vote of the people. But even if the people should give their approval, legislation must be then obtained which will compel the state to surrender to City Councils all regulatory power, which will validate the removal of the present twenty-year limitation of the right of cities to issue grants to street railways.

District Commission Wants Information on Suggested Merger

Another request from the Public Utilities Commission as to what progress, if any, has been made toward a merger of the two transportation systems of the District of Columbia has been sent to the Capital Traction Company and the Washington Railway & Electric Company. Indicating that further delays might result in indefinite postponement of negotiations, the commission in a letter to both companies said:

In view of the short time intervening between the adjournment of Congress and the present time, the Public Utilities Commission desires to know what progress, if any, has been made toward the proposed merger of the two railways since the last congressional hearings on this matter.

This information is asked because the commission believes not only that it is necessary because of its possible influence on future actions of the commission, but also because it is felt that the Senate and House district committees should receive this information before the present session of Congress adjourns.

John H. Hanna, president of the Capital Traction Company, said that officials of his company had conferred with the North American Company, large stockholders in the railway.

William H. Ham, president of the Washington Railway & Electric Company, declined to comment on the letter.

Council Refuses Ten-Cent Fare in Atlanta

The request of the Georgia Railway & Power Company for a 10-cent cash fare, relief from the gross receipts tax levied by the city and permission to charge 2 cents for transfers was denied on June 7 when the City Council, by a vote of 22 to 2, adopted the report of the special committee appointed to study the "special relief petition" filed by the company two years ago. The Council recommended, however, that the charter of the city of Atlanta be amended by the state Legislature at its next session so that paving costs chargeable to the street railway may be fixed upon a basis of 12 ft. instead of 16 ft. for double-track and 8 ft. instead of 12 ft. for single-track lines, which the company is now paying. It was further recommended that the maximum paving costs chargeable to the company for the year 1927 be fixed at an amount not to exceed \$75,000 and that at the beginning of each year hereafter a maximum amount be fixed by the proper authorities so that the railway may know the amount it will be required to pay.

The refusal of the City Council to allow a 10-cent cash fare with a 2-cent charge for transfer does not, however, mean that this relief cannot be obtained. The Council simply considered that changes in fare should be made by the Public Service Commission, and left it up to the company so to petition before the proper authorities.

Out of the seven requests contained in the original petition, made by the Georgia Railway & Power Company two years ago, three have been granted, three may possibly be granted in the near future and only one has been denied. Requests granted have been the elimination of unfair jitney competition, permission to reroute many cars

and eliminate many stops in the interest of speeding up service, and more rigid enforcement of the city's traffic regulations. The three requests which have not yet been granted, but on which the way has been left open, are those for reduced paving costs, a 10-cent cash fare and a 2-cent charge for transfers. The only request thus far specifically denied is that for relief from the gross receipts tax levied by the city.

Baltimore Hearings Concluded

The Maryland Public Service Commission has completed its public hearings on the proposed rerouting of a number of the street car lines in Baltimore operated by the United Railways & Electric Company. The commission gave three days to hearing both sides of the subject and has taken the case under consideration.

Changes in the car routes were recommended by Kelker, DeLeuw & Company, Chicago engineers, who made a survey of the city. These recommendations were approved by the Baltimore Traffic Survey Commission, which, in turn, submitted them to the Public Service Commission with the request that the United be ordered to make the proposed changes. It was on this request that the Public Service Commission held open hearings. These were attended by representatives of numerous merchants' associations which opposed the removal of street cars from some of the business streets. The merchants also submitted an alternative plan, which proposes that certain changes be made in routing.

H. D. Potter, general manager of the United, testified at the hearing on the closing day. He pointed out that the company is in accord with the Traffic Survey recommendations with the exception of some details. A statement also was made by Charles D. Emmons, president of the company. He pointed out that the company said last year when the valuation case was under consideration that it would try to work out its financial problems under the existing 7½-cent fare, and although it has prospered there has not been sufficient leeway to permit large expenditures for rerouting unless there is assurance that the changes will be advantageous to both the company and the riding public.

When the hearings were opened on June 1 representatives of several merchants' organizations were present and protested the proposed changes in several of the routes that had been recommended by the report. C. D. Emmons, president of the United, pointed out that the rerouting would not result in any great savings in operating costs.

Explanation of the good to result from adopting the proposed changes was presented by Major R. F. Kelker, Jr., of the Chicago engineering company. He also cited the advantages of the removal of car lines from certain downtown streets.

The Baltimore Traffic Survey Commission adopted the vehicular traffic survey report as a tentative plan.

Under the plan as adopted by the commission all parking in the downtown business section of the city would

be eliminated between 7:30 and 9:30 a.m. and 4:15 and 6 p.m. daily except Saturdays and holidays. It is recommended that parking be prohibited between 12:30 and 2:30 p.m. on Saturdays. Recommendation also is made that parking be prohibited during the rush hours on some of the streets leading into the business section, only the side of those streets affected by the greater flow of traffic being involved.

Angular and perpendicular parking during the day on streets less than 60 ft. wide in a large part of the downtown section is opposed.

It is said that the territory exempted in the business section will provide parking space for the parking of 2,000 cars during the rush hour and 5,000 at other times.

The report of the experts making the survey also recommends that a number of streets or portions of streets be made through streets, before entering or crossing which automobiles would be required to come to a full stop.

P.R.T. Now Aids Its Stricken Foe—the Private Automobile

Under the guerdon of the Philadelphia Rapid Transit Company, the Yellow Cab Company, Philadelphia, is entering the towing business. Killing two birds with one stone, the company is making use of a number of old taxi bodies remodeled for this purpose and is at the same time establishing a new criterion for comprehensive transportation service in the city which it serves. So far as is known, there has been no example in this country prior to this new departure on the part of the Philadelphia company of towing service in which standard meter rates have been affixed. It is hoped to drive the towing "pirate" off the street with the Yellow service provided by the P.R.T.

Six of these towing trucks have been placed in service. They are stationed in various parts of the city so that rapid response to calls may be made at any hour of the day or night. Crippled cars will be towed to any point designated by the owners or drivers. The meter flags are thrown as soon as the towing truck reaches the car. It remains down in a recording position until the car has been landed at its destination and the towing truck dismissed. The charge for the first mile or fraction thereof is \$2, each additional mile or fraction thereof is charged for at the rate of 50 cents, while waiting time, each ten minutes or fraction thereof, impresses another charge of 50 cents.

It is of course necessary for the Yellow Cab division of P.R.T. to keep towing trucks on hand for servicing disabled cabs and the public towing service started recently makes it possible greatly to reduce overhead charges by providing for the trucks a service more or less continuous. In a leaflet issued by the Yellow Cab Company, dealing with the new towing service, it is stated that as the volume of towing business increases rates for the service will be reduced. Even at the present time, however, it is claimed that the rates are lower than those of any other towing medium in Philadelphia.

Survey Shows Bus Is Not Replacing Electric Railway

Lucius S. Storrs, managing director of the American Electric Railway Association, states that buses are increasing the local transportation service throughout the United States, but not supplanting electric railway cars in any marked degree. The traction companies are rendering 15,000 miles more service today than six years ago and adding 5,500 buses and 2,658 cars. Since 1915 buses have supplanted only about 2,000 miles of track, mostly in sparsely settled sections. More than 300 electric railway companies are utilizing the bus in the place where it belongs—that of giving supplementary service. Routes operated embrace more than 12,250 miles with some 6,000 buses. Most of this service is over new routes. Electric railways during the last year carried approximately 16,000,000,000 passengers, or about 43,000,000 a day.

At best all of the buses, including the 6,000 run by electric railway companies, probably carried one-eighth as many riders as the electric lines. There is no indication that the electric lines are going to be seriously affected in urban centers by the bus, but there is every indication that the electric railways will continue to use the bus as a helpful supplemental agency. The fact that no city of more than 50,000 is being served exclusively by buses proves the necessity for the street car.

Demands of Indianapolis Men Announced

Harry B. Dynes of Indianapolis, a commissioner of conciliation of the United States Department of Labor, has been assigned by the department to observe the street car situation in Indianapolis, Ind., following reports that some employees were considering a call for a strike.

Word of the appointment was received following a meeting of approximately 500 employees of the Indianapolis Street Railway.

John M. Parker and Robert Armstrong, the association organizers, attended the meeting, but did not address the employees. They had been enjoined by Judge Robert C. Baltzell of the United States District Court from continuing their organization work which in any way interfered with employees.

Demands of the association have been placed before company officials, it was said by Mr. Barker. Their demands call for an increase in wages, reinstatement of several men said to have been discharged by the company because of their allegiance to the labor organization and settlement of all disputes between employers and employees by arbitration.

The wage scale sought is as follows: For the first three months, 55 cents an hour; next nine months, 60 cents an hour; after first year, 65 cents an hour. An additional 5 cents an hour to the regular scale is asked for men employed on one-man cars and buses. The present scale of wages is 37 cents an hour for the first year, with an increase of 1 cent a year for five years, after which there is no change.

The demands would have all labor disputes first discussed in conferences; this method failing, arbitration by a board selected by both parties would be called into play.

James P. Tretton, superintendent of the car company, said that the scale demanded by the union would mean approximately \$2,000,000 a year increase in wages for the company.

News Notes

Will Run Mozart Line Another 30 Days.—The City Council of the city of Wheeling on May 25 voted to permit the Wheeling Traction Company to operate the Mozart Park traction system for an additional 30 days pending a report of the franchise committee. The time extension becomes effective on June 15. The Wheeling Traction Company assumed operation of the line when it was abandoned by the Wheeling Public Service Company, at which time it was suggested that the line be taken over for a test.

Seeks Fare Increase.—The Denver Tramway, Denver, Col., is seeking permission of the Public Utilities Commission to increase its rates between Denver and Arvada to 50 rides for \$2.25 because an improvement in service has been sought by the patrons. Some time ago, in an effort to stimulate riding between Denver and Arvada, the company reduced the rate from Lakeside, the city limit of Denver, to Arvada, making the fare 50 rides for \$1.66. The line was not used enough to justify the running of one car every hour.

Injunction in Favor of Railway Continued.—United States Judge W. C. Lindley at Danville, Ill., on June 5 continued the temporary injunction granted the East St. Louis Railway against the city of East St. Louis, Ill., and city officials restraining them from tearing up the company's tracks on Third Street between Broadway and Missouri Avenue. Judge Lindley set the final hearing for June 25, at which time the court shall determine whether the city of East St. Louis or the Illinois Commerce Commission has the authority to renew the franchise for the tracks in question. The old franchise expired at midnight May 31.

Wage Agreement Renewed.—The Toronto Transportation Commission, Toronto, Canada, concluded an agreement on April 17 with its platform employees for two years from April 1, similar in all important respects to that in force during the two preceding years. The request of the employees for two weeks holidays was refused on the ground that employees paid at an hourly rate and in receipt of additional pay for overtime were not, as a rule, granted holidays with pay.

Contract Renewal Prevents Wage Cut.—An amicable settlement was arranged recently between the Amalgamated employees and officials of the Michigan Electric Railway, Jackson, Mich., by which the men have agreed to work for the next two years under the same contract that has been in

force the past two years. The rate of pay that they will continue to receive is 49½ cents an hour for interurban motormen and conductors for the first six months and 54½ cents an hour thereafter; 44½ cents an hour for the motormen and conductors of the two-man city cars for the first year and 47½ cents thereafter; 49½ cents an hour for the one-man city car operators and bus drivers for the first year and 52½ cents an hour thereafter. The union had demanded 5 cents an hour increase in payment, time and a half for overtime and the inclusion of the bus operators of the Southern Michigan Transportation Company under its charter. The status of the bus operators, decided by arbitration, was discussed in the *ELECTRIC RAILWAY JOURNAL*, issue of May 22, page 902.

Ordinance Provides for Experts in Fare Case.—The Albany, N. Y., Common Council has passed an ordinance authorizing the employment of experts, engineers and accountants to assist in the preparation and presentation of the city's case in the matter of the application of the United Traction Company for an increased rate of fare. The sum of \$35,000 was appropriated.

Detroit Wage Conferences Not Scheduled.—No definite date has been set for the conference between officials of the Department of Street Railways, Detroit, Mich., and officers of the street railway men's union on the proposed new wage scale and changes in working conditions submitted by the men recently. It is understood that the matter is being held in abeyance pending investigations being made by accountants for the Detroit Street Railways to determine just what the demands made by the men mean in increased costs.

Commission Hears Higher Fare Petition.—The Missouri Public Service Commission at Jefferson City, Mo., on June 3 heard testimony for and against the granting of the application of the Hannibal Railway & Electric Company, Hannibal, Mo., for authority to increase its fare from 6 cents to 8 cents with two tokens for 15 cents. The commission was told that the company is operating at a loss under the present 6-cent fare, that buses have made considerable inroads into company revenue and the increase sought is absolutely necessary if the company is to continue operations and obtain a fair return on its investments. The petition of the company was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of May 29, page 945.

Men Seek Increase in Wages.—The carmen in the employ of the Eastern Massachusetts Street Railway, Boston, Mass., have asked for an increase in wages of 16 cents an hour, a wider spread in the differential for the one-man car operators and a reduction of the working day to eight hours. The present rate is 61 cents an hour for motormen and conductors on two-man cars and 66 cents an hour for operators of one-man cars. There have been several conferences over these demands, and the matter is to be submitted to a special arbitration board within a few days. A year ago the men received an increase of about 3 cents an hour.

Foreign News

British Service Normal

General Working Agreement in Effect Prior to Strike Succeeded by Variety of Local Settlements

All over Great Britain tramway and bus services were restored to normal within three or four days after the end of the general strike. Here and there delays were caused by settling the terms of reinstatement. In many towns the tramway and bus authorities, with the aid of volunteers, were able to maintain skeleton services during the strike, although in certain places there was practically complete stoppage. In the case of some of the smaller undertakings the employees did not belong to a trade union and the services were uninterrupted.

When the strike was called off municipalities and tramway companies were of course anxious to restore their services as soon as possible and the employees were just as keen on getting back to work. Hence with the least possible delay agreements for re-engagements of men were entered into, differing, of course, somewhat in different places. The general scheme hitherto in operation as fixed by the National Industrial Joint Council for the tramway industry thus came to an end.

No meeting of this joint council was held to consider the new situation, however, until most of the local arrangements had been completed. When the meeting did take place the representatives of the employees admitted that in striking, the men had ignored the national council and had broken the national agreement. The employers' representatives announced that the council could continue in action if the employees' representatives would agree (1) that they would not give instructions to their members to strike without previous negotiations and without giving three months notice; (2) that they would give no support to their members who acted without authorization; (3) that they would not allow supervisory and clerical staffs to be members of their union; (4) that the reinstatement of employees should be left to each local authority for settlement; (5) that neither the employers' representatives nor the employees' representatives on the council should be subject to any interference by any other organization.

After much discussion the employees' side would not agree to item 3 and there was also a difference of opinion on item 4. The meeting broke up with a declaration from the employers that for the present the council had ceased to function.

A report submitted to a meeting of the London County Council on May 18 revealed the exact terms of settlement with the Council's tramway employees. As this is the largest tramway undertaking in the country, a summary of terms is of interest. They include the re-employment of all men, but not necessarily reinstatement in their former positions; the men to be re-engaged

as soon as circumstances permit; an understanding that the volunteers remaining in the service will not be interfered with; no general alteration in wages and conditions of service; the Council not to undertake to re-engage men convicted of creating disturbances, but each case to be considered on its merits by the general manager. The Council decided to grant three additional days holiday with pay to each member of the staff who remained at the disposal of the Council during the emergency.

Lord Ashfield, chairman of the companies and of the London General Omnibus Company, has since addressed a letter to all volunteers who helped the companies, thanking them for their able and diligent service. The companies also thanked the general public for the good will and encouragement which it extended to the 10,000 men and women who were engaged in re-establishing the London transport services. During the emergency the trains, buses and tramcars in the group ran 750,000 miles and carried more than 4,000,000 passengers.

Australian Roads Face Serious Problems

Absorption of Private Buses by Municipal Tramways Debated—Forty-four-Hour Week Legalized

Transit conditions in the larger Australian cities are unsettled. The difficulties which the electric railways face are much the same as those which have prevailed in the United States in recent years. Bus competition and hours of labor loom as big problems at the present time.

A brief historical sketch of the situation is necessary for full understanding. Electric service was first established in New South Wales in Sydney in 1899. Until 1914 the tramway traffic steadily increased. Since that time, however, no funds have been allotted for extension of lines. In May, 1924, there were in this state 251 miles of track, over which 1,417 cars were operated. Because no money was available for extensions, it was proposed some time ago that bus service be started. So far nothing has been done by the municipality along these lines. More than 200 private buses now compete with the rail service and have caused heavy loss to the tramways. A law recently was passed to limit work to 44 hours a week and a reduction of fares is now being discussed. Thus it appears that some definite action must be taken in the near future to put the transportation service on a more stable basis.

Sydney has a difficult traffic problem, particularly during two weeks at Easter time each year, with an agricultural fair and races, and during the Christmas and New Year holidays. Intermittently there are other rush seasons as when the Royal British Naval

Squadron or the American fleet is in port. During these periods provision must be made for special power supply, an increase in traffic men, superintendents, etc. A particularly difficult problem has arisen lately in connection with the Speedway, which accommodates about 50,000 people and which is inadequately provided with transportation facilities.

Brisbane, the capital of Queensland, has a zone system of fare collection, each section averaging 1 mile in length and the fare 1d. The system originally was operated by an American company, but was later taken over by the government, and about the middle of last December control passed to the Greater Brisbane Municipal scheme. A 44-hour week has been in effect in Brisbane for some time past and the tramways are now seeking increased fares. From the failure of this system to operate successfully with a 44-hour week and 1d. fares, it may be presumed that a similar scheme would be unsuccessful in Sydney.

In Melbourne, in the state of Victoria, the transit problem has been somewhat relieved by the extension of electric lines, including the electrification of a number of suburban steam railways. On Feb. 1, 1925, the motor omnibus act came into effect there, putting the control and regulation of bus traffic under the supervision of a committee appointed by the government. This committee consists of a chairman and four other members including representatives of the municipalities, the railways department and private motor bus owners. The board applied for permission to operate buses on five routes, but only one was granted, the Minister being of the opinion that the other routes should be reserved for private operators. Prior to this, in January, 1925, bus service had been started by the municipality on one suburban route. A short time ago, at the request of the Minister of Public Works, the loading of the buses was limited to the seating accommodations and measures were taken to prevent overcrowding at rush hours. This reduced the earnings, and the revenue fell to about 15d. (30 cents) per bus-mile. Considerable opposition has developed to the plan of municipal bus operation. This appears, however, to be based largely on a misconception concerning the place of the bus in the transportation field.

Added to this is a somewhat disconcerting bill recently passed establishing a 44-hour week to be worked as far as possible on five days. This, of course, cannot be applied to the transportation services, but all other industries will be obliged to conform. The 44-hour week is made compulsory, and there are severe penalties in the shape of overtime rates. In the transportation department alone at least 300 additional men will be needed by the tramways. The effect of the five days operation is expected to decrease the passenger revenue seriously because department stores and factories formerly were open for half a day on Saturday. All this travel will be lost and the only traffic available will be the pleasure seekers during the week end. The additional expenses to the tramways are estimated at £180,000 a year without any compensating revenue.

Recent Bus Developments

California Registration Act Unconstitutional

The California motor vehicle registration law was held unconstitutional by the Supreme Court of the United States as it was applied to the Frost & Frost Trucking Company by the Supreme Court of California. The trucking company was a private carrier operating over California highways. It was forbidden by state authority to continue operations unless it obtained a certificate of public convenience and necessity and became a common carrier subject to the regulation imposed on that class of carriers. The Supreme Court of California held that the state had the power to require as a condition precedent to operation over its highways that private carriers obtain certificates as common carriers.

Justice Sutherland, delivering the opinion of the court, said it was not controverted that a private carrier could not be converted against his will into a common carrier by mere legislative command. As applied by the California court, Justice Sutherland held, the law violated the rights of the trucking company as guaranteed by the process clause of the fourteenth amendment, and "that the privilege of using the public highways of California in the performance of their contract is not and cannot be affected by the unconstitutional condition imposed."

The significance of this decision as applied to New York State is that a new transportation corporation law was enacted by the last legislature which declares that a corporation organized to establish, maintain and operate for the public use any stage, omnibus or motor vehicle route or routes for the conveyance wholly within or partly without this state of persons or property is a common carrier as defined in the public service commission law.

Stage Line Between Logan and Utah-Idaho State Line

The Utah-Idaho Central Railroad, which operates an interurban line between Ogden, Utah, and Preston, Idaho, has been granted a certificate of convenience and necessity by the Public Utilities Commission of Utah to operate an automobile stage line for the transportation of passengers and express between Logan, Utah, and the Utah-Idaho state line and intermediate points.

In its application for a permit the Utah-Idaho Central Railroad pointed out that it had invested more than \$5,500,000 in its railroad system, and during the winter months it would discontinue its bus service. The decision of the commission pointed out that the commission, whenever practicable, favors co-ordination between railroad service and automobile bus service over the public highways, with respect to both passenger and express.

The application of Gust Chopp for a

permit to operate an auto stage line between the same points was denied on the ground that this applicant had not complied with the laws of the state, due to his failure to pay the tax on the line which he has been operating between Pocatello, Idaho, and Logan.

Electric and Steam Roads Aligned in Massachusetts Case

There is a "key" case before the Massachusetts Department of Public Utilities, affording the commission an opportunity judicially to define to what extent buses may be permitted to compete with street railways and railroads.

This case is based on the petition of the Service Bus Line, Inc., for a certificate of public convenience and necessity to operate its bus lines from Orient Heights in Boston, through the Point of Pines and out to Revere Beach. This line started three years ago, under a license from the City Council of Boston, and its license was made self-perpetuating so that it could not be revoked except for cause. It did not have to come up for renewal, like other licenses. The new bus law says it shall be *prima facie* evidence of public convenience and necessity if a line had been running a year when the new law became operative. The Service Bus Line, Inc., it appears, qualified under this provision.

Now it is attacked by the Boston, Revere Beach & Lynn Railroad, which is a narrow gage railroad from Boston to Revere. The bus line and the railroad parallel each other. Karl Adams, president of the Boston, Revere Beach & Lynn, addressing the Public Utilities Department on the situation, declared that the Boston city government "slipped it over" on the railroads when it issued this license three years ago, because no public hearings were held and the railroad and street railways never had an opportunity to oppose the operation of the line. As the license was self-perpetuating there has been no opportunity since the original issue to oppose the line and as it was in operation a year before the new law the bus company has the *prima facie* evidence in its behalf. Moreover, Mr. Adams questions the legality of a corporation operating under a license issued to an individual, and he declares that in the case of the Service Bus Line, Inc., the original license was issued to an individual before there was a corporation. That point is to be investigated.

Fred A. Cummings, vice-president of the Eastern Massachusetts Street Railway, says that he subscribes to the statements of President Adams and adopts them as applicable to his own road. He says that the competition of the bus line is savage, unjust, unwarranted; that it is nothing but scalping.

The question before the Public Utilities Department is whether the license held by the Service Bus Line, Inc., should be made permanent. In view of the points at issue the court ruling may become the "key" for a basic decision.

Bus Permits Stir Ire of Holyoke Company

The Holyoke Street Railway, Holyoke, Mass., which has been in touch with the Boston & Maine Railroad relative to operating the electric line between Mount Tom Junction and Easthampton, Mass., has announced that the recent granting of bus permits to the railroad to operate buses between Mount Tom Junction and Easthampton practically puts an end to the other plan. The latter idea also included the operation of the Williamsburg and Northampton line electrically. It was reported some time ago that the hitch in the negotiations had grown to such proportions that the Boston & Maine was losing interest. It is probable the new method of transportation will also mean that the East Street trolley line between the junction and Easthampton will have to be abandoned. The line at present is said to be a losing proposition.

The matter is to be placed before the Selectmen of Easthampton to decide whether they wish the trolley or bus. The bus move is considered to mean that the railroad is planning to take steps eventually leading to the establishing of Northampton as its bus terminal. The Holyoke Chamber of Commerce desires the railroad to make Holyoke the terminal.

No Legislation on Interstate Buses

Both the Senate and House committees on interstate commerce have agreed to pigeonhole until the next session, and perhaps until the next Congress, the bill to bring interstate bus and truck traffic under the jurisdiction of the Interstate Commerce Commission.

The Senate committee concluded the time was not ripe for such legislation and that it should not be hastily passed. Extensive hearings were held on the bill and though it had the backing of state commissioners and the bus division of the American Automobile Association considerable opposition developed. Much of this opposition was predicated on the belief that the bill would stifle competition. Several suggestions were offered, but the committee has given little consideration to them.

Commission Over-rules City's Bus Ordinance

An attempt to interfere with the state regulation of public utilities by the city of Zion, Ill., when it issued an order on March 29 prohibiting buses of the Chicago, North Shore & Milwaukee Railroad from stopping for passengers within its corporate limits on Sundays, was recently over-ruled by the Illinois Commerce Commission. That body decided that the charter granted to the utility by the state denies the right of a municipality to pass ordinances or take other measures to alter features of service as set forth therein. In response to the protests of more than 400 inconvenienced Zionites, the North Shore line appealed to the commission on May 18 for authority to renew the Sunday service. It was then that the commission issued its over-ruling order. Accordingly, an attempt was made by

the company to restore bus service on the original schedule. The driver of the first bus to stop within the city limits was arrested, however. Pending a promised action against the company by city officials, Sunday service in Zion has again been suspended.

Lines to Beaches Opened.—The New York State Railways, Rochester, N. Y., opened its bus lines on May 31 to Manitou and Grand View Beaches, cottagers' colonies on the shore of Lake Ontario near the city. The lines will remain in operation until the fall.

Competition Between Railway and Independent.—Competition with the Schenectady Railway, Schenectady, N. Y., is threatened by an ordinance passed by the Albany Common Council authorizing William G. Shultz to enter the city of Albany and to operate motor vehicles for hire over certain highways and streets for the purpose of carrying passengers and baggage between the city of Albany and the city of Schenectady. Mr. Shultz is restricted from carrying local passengers within the city of Albany.

Passage of Bus Ordinance Finally Recommended.—The city utilities committee of Seattle, Wash., has finally recommended the passage of an ordinance directing the Board of Public Works to call for bids on the purchase of fourteen new buses. The only string the committee tied to the recommendation is that the bodies be built in Seattle. An appropriation of \$80,000 is available for the purchase of the buses, which will be used to augment present motor transportation lines operated by the city and to replace lines in the North End now privately operated.

Buses for Tourists' Season.—The Department of Street Railways, Detroit, Mich., through H. U. Wallace, general manager, has announced plans for extended bus service in the city during the coming tourists' season to run between the Michigan Central station and the business district. The schedule provides for coaches leaving the station and downtown every fifteen minutes between 9 a.m. and 4 p.m. and the fare will be 10 cents. The station street cars will continue to operate over their present routes. The service was requested by the Retail Merchants' Association, Detroit Hotel Association and Detroit Convention and Tourists' Bureau.

Richmond Bus Franchise Up for Consideration.—The streets committee of the City Council of Richmond, Va., is scheduled to meet June 16 to consider the proposed bus franchise. The bus situation has been considered from many angles. Phases of that unit of the transportation service cropped out during the prolonged consideration of the blanket traction franchise of the Virginia Electric & Power Company. Members of the committee believe that little time may be consumed in disposing of this auxiliary franchise. It will mean, they say, that the proponent parts will be discussed and that the public will be invited to appear before the committee at the proper time to enter protest or consent to the proposed routes. The Virginia Electric & Power Company will be represented at the meetings.

Financial and Corporate

Reorganization Plan Approved

Protective Committee of Fort Wayne, Van Wert & Lima Bondholders to Organize New Company

A plan of reorganization dated June 1 has been approved and adopted by the protective committee for the holders of first mortgage 5 per cent 25-year gold bonds of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind. The bonds were due April 1, 1925.

Holdings of such bonds not now deposited under the protective agreement may become parties to and participate in the benefits of the plan by depositing their bonds with all coupons due Jan. 1, 1920, and thereafter attached on or before June 23.

The property is covered by a mortgage dated April 1, 1905, of which \$1,470,000 is now outstanding. All but \$62,000 of said bonds are now deposited with the committee. The property has been in the possession of Henry C. Paul, receiver, since Feb. 1, 1921, appointed by the United States District Court for the District of Indiana and by the United States District Court for the Northern District of Ohio. As soon as in the judgment of the committee a sufficient number of bondholders have assented to this plan, the committee proposes to request the trustee to apply to the court for the entry of a decree foreclosing the mortgage and directing a sale of the property. The committee will bid for all or any part of the properties to be sold, whichever it deems advisable.

The committee proposes to organize a new corporation which will acquire all or such part as the committee may determine of the property which may have been purchased at the foreclosure sale, giving and paying therefore to the committee \$441,000 of its general mortgage bonds and all its common stock. The new company will also assume all liability incurred by the committee and will reimburse the committee for all advances, expenses or disbursements. Capitalization of the new company will consist of \$100,000 first mortgage bonds, \$441,000 general mortgage bonds and 10,290 shares of common stock with or without par value. First mortgage bonds will be secured by a first mortgage upon all its properties including after-acquired property, will mature fifteen years from date thereof, will bear interest of 6 per cent and will be redeemable at such prices as approved by the committee and will contain other provisions including a sinking fund.

General mortgage bonds will be secured by a mortgage upon all properties, including after-acquired property, subject only to the \$100,000 of bonds secured by the first mortgage. General mortgage bonds will mature thirty years from the date thereof, will bear interest of 5 per cent, payable semi-

annually, and will be redeemable upon any interest date at \$105.

Upon consummation of the plan and acquisition by the new company of the properties, and the issue by the new company of the stock and general mortgage bonds, the stock will be placed under a voting trust for a term of five years. The voting trust certificates and general mortgage bonds will be distributed by the committee to depositors as follows: Each holder of a certificate of deposit for \$1,000 first mortgage bond of the present company will receive \$300 of general mortgage bonds of the new company and voting trust certificates representative of seven shares of common stock of the new company.

Surplus of \$11,241 in Quebec

After deducting operating expenses, bond interest and other fixed charges and depreciation a surplus of \$11,240 was realized by the Quebec Railway, Light, Heat & Power Company, Quebec, Canada, for the year ended Dec. 31, 1925. This fact was disclosed in the sixteenth annual report of the company.

STATEMENT OF EARNINGS OF THE QUEBEC RAILWAY, LIGHT, HEAT & POWER COMPANY, LTD.

	1925	1924
Gross income from all sources	\$3,243,123	\$3,133,806
Operating expenses	2,194,987	2,156,492
Net operating income	\$1,048,135	\$977,314
Fixed charges	*816,895	712,642
Depreciation reserve	\$231,240	\$264,671
	220,000	250,000
Surplus (subject to deduction for income tax)	\$11,240	\$14,671

* This figure includes \$44,664, percentage of city division earnings payable to the city of Quebec; \$756,362, interest on bonds, and \$15,867, interest general.

In his statement to the stockholders Julian C. Smith, president of the company, explains that during the year \$518,000 of the company's 7 per cent general mortgage bonds were sold and the proceeds applied to the necessary construction and betterments. In accordance with plans prepared in 1923, additional extraordinary repairs and improvements to the property in general were made and further betterments to the system are contemplated. In addition, the building of new workshops is under consideration. As the present shops are small, old and inefficient, it is felt that by putting this project into execution economies and better operation will result. Mr. Smith said the directors were pleased to report the renewal of the street railway franchise for a period of 30 years. Substantial adjustments of the capitalization of the company, under consideration at the time of the last annual meeting, were made. The capital stock was reduced from \$10,000,000 to \$2,500,000 and the assets were correspondingly adjusted. The accompanying statement shows the results of operation in 1925 compared with 1924.

Interstate Public Service Reports Improvement in 1925

The Interstate Public Service Company, Indianapolis, Ind., has acquired by purchase all of the competing bus lines operating in the territory served, which has placed it in exclusive control of the interurban and bus transportation facilities between Indianapolis and Louisville. Forty-one buses are in regular daily operation. This statement was contained in the annual report of the Interstate Public Service Company for the year ended Dec. 31, 1925. The balance carried to surplus was \$310,723. In his statement to the stockholders Harry Reid, president of the company, stated that the annual report reflected most gratifying growth and improvement over the preceding year. The gross operating income exceeded that of 1924 by \$2,116,415, and the net earnings indicated an increase of \$853,072.

INCOME ACCOUNT OF THE INTERSTATE PUBLIC SERVICE COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Operating revenues.....	\$8,916,453
Operating expenses (including retirement reserve, \$248,466).....	5,640,094
	\$3,276,359
Uncollectible bills.....	\$27,699
Taxes.....	546,255
	573,955
Operating income.....	\$2,702,404
Rent for leased lines.....	171,296
Net operating income.....	\$2,531,107
Non-operating income.....	38,502
Gross income.....	\$2,569,609
Deductions from gross income:	
Interest on funded debt.....	\$1,264,582
Miscellaneous interest deductions.....	54,433
Amortization of debt discount and expense.....	95,816
Dividends paid on preferred stock of Indiana Power Company to date of purchase of property.....	36,933
	1,451,765
Net income for the year.....	\$1,117,844
SURPLUS ACCOUNT	
Surplus, Jan. 1, 1925.....	\$803,544
Net income for the year, as above.....	1,117,844
	\$1,921,388
Dividends paid and accrued:	
Prior lien stock.....	\$584,935
Preferred stock.....	222,185
Common stock.....	385,416
	1,192,537
Miscellaneous credits and debits (net)....	\$728,850
	61,711
Surplus, Dec. 31, 1925.....	\$790,562

Mr. Reid refers to the increasing utilization of the parlor-buffet cars on the company's Indianapolis-Louisville interurban railway and states that the sleeping car service nightly in both directions between Indianapolis and Louisville has proved very popular and is being well supported by the public. This service is an important factor in creating through passenger revenue between the terminals that would not otherwise be secured. Several leading trunk line steam railroads have joined with the company in establishing a joint interline tariff which makes the company a participating carrier on interchange freight movements, receiving its proportionals on all published rates. This arrangement will materially increase the company's freight revenue.

In addition to other activities of the company, Mr. Reid refers to the employees' circulating library which has been created and maintained in the gen-

eral offices for the availability of employees, also to the good public relations department, the women's committee and the safety work which has been continued, resulting in a low ratio of accidents. The accompanying statement shows the income account of the Interstate Public Service for the year ended Dec. 31, 1925.

Higher Fare in Richmond Benefits Property

For the year ended Dec. 31 1925, earnings from the transportation department of the Virginia Electric & Power Company, Richmond, Va., were \$4,821,493. This compares with \$4,749,044 for the previous year. It is the amount received from the 72,120,802 revenue passengers carried on the railways in Richmond, Norfolk, Portsmouth, Petersburg and on the interurban line between Richmond and Petersburg. Included in the amount are earnings from bus operation in Norfolk by this company and in Richmond by the Richmond Rapid Transit Company, acquired on Sept. 11. Miscellaneous revenue from advertising in cars and buses, and from other minor sources, is also included. Increased interurban fares and a change from 6 to a 7-cent railway fare in the city of Richmond have had a beneficial effect on the earnings of the transportation department. This was part of the explanatory statement made in the report of the directors of the company for the year 1925.

The report states that the acquisition of the Richmond Rapid Transit Corporation eliminated bus competition in Richmond. The operating deficit that was assumed when it was taken over was rapidly being reduced at that time, and the results of operation have since then been satisfactory. A unified street railway and bus transportation system operated exclusively by the Virginia Electric & Power Company became effective in Norfolk early in 1926.

ANNUAL REPORT OF THE VIRGINIA ELECTRIC & POWER COMPANY FOR 1925

	1925	1924
Total earnings.....	\$12,143,975	\$11,539,195
Expenses:		
Operation.....	\$4,627,441	\$4,477,522
Maintenance.....	1,402,467	1,430,367
Taxes.....	981,627	897,669
Total operating expenses and taxes.....	\$7,011,536	\$6,805,559
Net earnings:		
Interest, amortization charge and lease rentals.....	\$5,132,439	\$4,733,636
	1,512,202	1,427,307
	\$3,620,237	\$3,306,328
Dividends on preferred stock	718,878	581,543
Dividends on common stock	717,018	.....
	\$2,184,340	\$2,724,784
Special credit to surplus....	2,798,191	.....
	\$4,982,532	\$2,724,784
Net direct charges to reserves and surplus.....	\$129,688	\$322,487
Retirement reserve.....	1,756,633	1,659,413
Sinking fund charges.....	322,184	304,080
Total deductions.....	\$2,208,506	\$2,285,980
	\$2,774,025	\$438,804
Deficit, Richmond Rapid Transit Corporation.....	87,517	.....
Balance to surplus.....	\$2,686,508	\$438,804
Ratio operating expenses to gross earnings, per cent....	50.5	51.8

Financial Progress in Terre Haute Merger Awaited

Further steps in the proposed merger of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., and its subsidiaries with the Central Indiana Power Company, an Insull holding company, are expected shortly. On June 5 letters had been received from the holders of the 5 per cent cumulative preferred stock of the Terre Haute, Indianapolis & Eastern from a committee representing the stockholders suggesting that the stock be exchanged share for share for preferred stock of the merged company, which is to be known as the Indiana Electric Corporation. The basis of the merger agreement was entered into several months ago by Samuel Insull and the late Randall Morgan, who was one of the chief stockholders of the Terre Haute, Indianapolis & Eastern. Although no announcement was made, it is understood the merger plans were delayed by the death of Mr. Morgan shortly after the agreement was made.

The committee proposes to the holders of the 5 per cent cumulative preferred stock of the Terre Haute, Indianapolis & Eastern to exchange the stock par for par for shares of the Indiana Electric Corporation participating adjustment preferred stock of a par value of \$100 a share.

The new stock is to receive from the company's surplus and net earnings non-cumulative preferred dividends for 1927 and 1928 of 2 per cent per annum; 1929 and 1930, 3 per cent per annum; 1931 and 1932, 4 per cent per annum; 1933 and 1934, 5 per cent per annum, and 1935 and thereafter, 6 per cent per annum. In addition it is proposed that this stock shall be entitled in 1925 and thereafter to an extra dividend of 1 per cent before more than a total of \$600,600 shall be paid in total dividends to the common stock in any year.

Cincinnati Street Railway Will Purchase Milford Line

Purchase of the Cincinnati, Milford & Blanchester Traction Company by the Cincinnati Street Railway, Cincinnati, Ohio, has been approved by Edgar Dow Gilman, Director of Public Utilities, Cincinnati. The purchase price is approximately \$49,000. Walter A. Draper, president of the Cincinnati Street Railway, said that operation of the line would undoubtedly begin within 30 days, that there would be improvement in equipment and service and operation of through cars from Mariemont to the heart of the city. The rate of fare will be fixed at 15 cents from Mariemont to the city.

While the Cincinnati, Milford & Blanchester Traction Company has made application to the Ohio State Public Utilities Commission to abandon that portion of the line from Milford to Blanchester, it is likely that the street railway will continue the operation of the system from Milford to Cincinnati, operating cars on a half hour schedule from Mariemont to Milford.

The Cincinnati, Milford & Blanchester

ter Traction Company, which is a standard gage railroad, is owned by a Toledo syndicate, headed by L. G. Van Ness, president of the Cincinnati, Georgetown & Portsmouth Street Railroad. The sellers will retain the power plant and go into the business of supplying towns along the route with electricity.

Revenue Lower on San Francisco-Sacramento Line

The operating revenue of the San Francisco-Sacramento Railroad, San Francisco, Cal., for the year ended Dec. 31, 1925, was \$975,388, a decrease of \$15,162 over the preceding year. Operating expenses were \$868,966, an increase of \$25,314 over the preceding year. The company had \$57,194 available as net income for the twelve months' operation with which to pay bond interest and other deductions. Of this net income the company paid \$50,489 for bond interest and \$6,521 in interest on unfunded debt and miscellaneous deductions, leaving \$183 transferred to surplus. These figures were contained in the sixth annual report of the company to the stockholders.

Because of the increased automobile competition the passenger earnings of the railroad have been steadily declining, and as the company sees it, the railway must, if it is to increase its earnings, increase its freight revenue. Owing to the stringency of the terms of the present deed of trust, it has been

impossible to finance the necessary freight feeders. To meet this condition the company arranged with the Western Pacific and the Sacramento Northern, the latter company a subsidiary of the Western Pacific, to have the Sacramento Northern build a branch line of some 13 miles into the Holland Land District. The value of the Western Pacific and Sacramento Northern contract lies in the fact that it provides for the building of a valuable freight feeder immediately and in the future possibilities accruing from the trackage agreement. The accompanying table shows earnings and expenses for the year ended Dec. 31, 1925.

Reorganization Proposed for Illinois Interurban

Holders of the first mortgage 5 per cent gold bonds of the Rockford, Beloit & Janesville Railroad, Rockford, Ill., were notified recently that under a projected plan of reorganization they will be enabled to exchange their bonds for preferred stock of the company, which will be issued as soon as necessary legal steps are taken to foreclose the mortgage securing the bonds. The foreclosure proceeding follows an announcement that the receiver of the Rockford & Interurban Railway had agreed to surrender the property of the Rockford, Beloit & Janesville, which was a subsidiary of the former line, on the ground that it is now being operated at a loss and will endanger the security of bondholders of the Rockford & Interurban, if continued in operation by the receiver. A committee has arranged that the bondholders may exchange their bonds at a rate of three shares of new cumulative preferred stock, par value \$50, and one share of no par common stock out of a total issue of 7,000 shares of such stock for each \$1,000 in principal amount of bonds surrendered.

It has since been announced that T. Milton Ellis, president of the Beloit Traction Company, Beloit, Wis., has arranged to take over the Rockford, Beloit & Janesville Railroad and operate the line for the bondholders until given legal title to the line by the court.

Cessation of Service Sanctioned.—Discontinuance of trolley service by the Burlington County Traction Company between Burlington and Moorestown, N. J., was approved on May 27 by the New Jersey Board of Public Utility Commissioners. In another decision the board sanctioned the transfer to the Public Service Transportation Company of permits held by the Burlington County Transit Company for the operation of buses over the same route.

Surplus for Ten Months.—For the ten months ended April 30, 1926, the total revenue of the Interborough Rapid Transit Company, New York, N. Y., from all sources was \$51,405,431, an increase of \$2,451,949 over the corresponding period of last year. This increase is partly accounted for by the receipt in July, 1925, of a cash payment of \$770,000 as part consideration for the new advertising contract, which became effective on Nov. 1, 1925. There

was no similar payment in the previous year. Operating expenses, taxes and rentals paid to the city for the old subway increased \$187,496. Income deductions increased \$381,137. The net result for the ten months was a surplus of \$1,849,467. This represents an improvement of \$1,883,315, compared with the corresponding period of 1925, due largely to the new advertising contract.

Recommends That Claims Be Allowed.—Unsecured claims against the United Railways, St. Louis, Mo., reported to United States District Judge Faris by Special Master Fred L. Williams amount to \$448,000. He recommended to the court that these claims be allowed. Most are damage suit judgments obtained prior to the receivership. Approximately \$400,000 of the claims have been assigned to Stanley Clarke, attorney for the reorganization committee, having been settled by the committee.

\$11,299 Available for Surplus.—The Santa Barbara & Suburban Railway, operating in Santa Barbara, reports to the California Railroad Commission its 1925 operating revenue at \$123,531, compared with \$137,053 for 1924. The operating expenses, excluding taxes, for 1925 are reported at \$102,989 and at \$103,755 for 1924, leaving net operating revenue of \$20,542 for 1925 and \$33,298 for 1924. During 1925 taxes charged to operation amounted to \$9,242 and for 1924 to \$10,769. Deducting the taxes leaves operating income of \$11,299 for 1925 and \$22,528 for 1924.

Bonds Not Paid.—The \$300,000 of first mortgage 5 per cent bonds of the Shawnee-Tecumseh Traction Company, Shawnee, Okla., due June 1, were not paid off on that date nor has any provision been made for their extension. These bonds are all owned by the small syndicate which built the road and still owns the stock. It is said there is no likelihood of foreclosure proceedings being instituted.

Directors Favor Burlington Purchase.—An offer has been received for the purchase of the Burlington Traction Company, Burlington, Vt., and is favored by the directors. The traction company owns the trolley system in Burlington and the Military Post Street Railway, which operates lines between Burlington and Essex Junction via Winooski. The name of the purchasing company is at present withheld. Letters to stockholders state the directors have voted to purchase the stock of the Burlington Traction Company at par. The purchaser will pay in cash or 7 per cent stock of the new company, or part cash and part stock, as each stockholder may choose.

Line in Connecticut May Discontinue.—Court action which may result in the abandoning of railway operation by the Hartford & Springfield Street Railway between those cities was set for June 11. On that day Judge Isaac Wolfe was to hear the application of the company for permission to end service after June 25. The road was sold April 27 under a foreclosure of its bonded mortgage for \$860,000, but Francis R. Cooley, who bid in the road as an individual bidder, did not take possession.

COMPARATIVE STATEMENT OF EARNINGS OF THE SAN FRANCISCO-SACRAMENTO RAILROAD FOR YEAR 1925

Revenue from transportation:	
Passenger.....	\$657,851
Baggage.....	550
Parlor and chair car.....	9,894
Special car.....	25
Mail.....	1,500
Express.....	21,962
Milk.....	1,666
Freight.....	264,214
Miscellaneous.....	269
Total.....	\$957,935
Revenue from other railway operation:	
Station and car privileges.....	\$4,611
Parcel room receipts.....	511
Storage.....	341
Demurrage.....	1,978
Rent of equipment.....	5,983
Rent of buildings and other property.....	3,087
Miscellaneous.....	938
Total.....	\$17,451
Total railway operating revenue.....	\$975,387
Operating expenses:	
Way and structures.....	\$228,690
Equipment.....	98,979
Power.....	105,890
Conducting transportation.....	249,427
Traffic.....	52,823
General and miscellaneous.....	141,560
Transportation for investment credit.....	8,405
Total railway operating expenses.....	\$868,966
Net operating revenue.....	\$106,421
Taxes assigned to railway operation.....	\$52,376
Operating income.....	\$54,045
Non-operating income.....	\$3,148
Gross income.....	\$57,193
Deductions from gross income:	
Interest on funded debt.....	\$50,489
Interest on unfunded debt.....	3,581
Miscellaneous debits.....	2,939
Total deductions from gross income.....	\$57,010
Surplus.....	\$183

Book Reviews

Report of the Third Annual Convention of the International Strassenbahn- und Kleinbahnverein

Published by the association. 332 pages.

This is a report of the meeting held in Budapest June 21-25, 1925. In addition to the proceedings, there are several articles on electric railway developments in Budapest, a list of the attendants at the convention and a list of the members of the association. A table of the membership shows there are now 324 railway members and 101 manufacturer members, making a total of 425. This is an increase of 35 over the previous year. Abstracts of a number of papers presented at this meeting were published in the *ELECTRIC RAILWAY JOURNAL* during the latter part of last year.

Railway Engineering and Maintenance Cyclopedia

Simmons-Boardman Publishing Company, New York. 1,072 pages. 2,500 illustrations. Price, leather, \$10; cloth, \$8.

This is one of the comprehensive railroad encyclopedias issued by the publishers, companion books being the *Car Builders' Cyclopedia* and the *Locomotive Cyclopedia*. The volume just issued is a second edition of the *Maintenance of Way Cyclopedia*, which was published in 1921, but it has been changed in name to indicate its scope more accurately. It now includes a definitions section of 71 pages, a track section of 278 pages, a bridge section of 141 pages, a building section of 141 pages, a water service section of 84 pages, a signal section of 187 pages and a general section of 82 pages. The information in these sections has been compiled and edited in co-operation with the American Railway Engineering Association and the signal section of the American Railway Association.

The volume is an important contribution to the literature of railroad engineering and represents an amount of painstaking work which can hardly be realized by any one who has not engaged in a somewhat similar undertaking. The typographical appearance of the book is also good, the sizes of the type and illustrations being well chosen. Elmer T. Howson, Western editor of *Railway Age* and editor of *Railway Engineering and Maintenance*, had general charge of the publication of this cyclopedia.

Handbook of Automotive Standards

Issued by the Society of Automotive Engineers, 29 West 39th Street, New York, N. Y. 600 pages. Price \$2.50 to members; \$5 to non-members.

For the first time, all of the standards of this huge industry have been published in a bound handbook, of pocket size, 7½x4½ in. and only ¾ in. thick. The book contains all of the 500 odd standards and recommended practices approved by the society and revised to date. These include many drawings, tables, charts and forms and much elucidating text.

The contents are divided into sections relating to power plant, lighting, electrical equipment, parts and fittings,

iron and steel, non-ferrous metals, non-metallic minerals, transmission, axles and wheels, tires and rims, frames and springs, controls, bodies, tests, nomenclature, general, and standards committee regulations.

Hereafter revised editions are to be issued semi-annually, as the society approves new or revised standards and recommended practices only twice a year.

Pegasus or Problems of Transportation

By Col. J. F. C. Fuller. E. P. Dutton & Company, New York, N. Y. 1926. 83 pages. \$1.

A story of future movement is told by a British war veteran, Col. J. F. C. Fuller, in "Pegasus or Problems of Transportation." His accounts of the "Battle of the Iron Horse," fought by George Stephenson, the father of the locomotive, and his suggestions for "The Conquest of the Elysian Fields" are so sympathetic and realistic that a reader is easily won over to the doctrine of the caterpillar or semi-caterpillar type of vehicle as a practical solution for many present transportation problems.

The accomplishment of the tank in France in the World War inspired Mr. Fuller with its potentialities in England in a time of peace, confronted with the difficulties of surplus population and unemployment. He sees three solutions to the problem—"we must stop breeding, we must create new home industries and so absorb our surplus population, or we must transport the surplus to less thickly populated areas overseas." Birth control he summarily dismisses, for the government does not believe in it. The second solution joins the first because of the existing subsidy for the coal mining industry and the subsequent lack of protection for new industries. As regards the third, he believes very little has been done outside of private effort. He says the problem has been tackled from the wrong end. Instead of persistent efforts to shift the unemployed, attempts should be made to shift the men already employed.

It is his belief that the empty spaces of the world will be settled only as transportation is quickened. The steamship and the railway must be used first and then the motor vehicle. He sees the roadless vehicle as most useful because it can go anywhere and take the man to his work and his products to market in less time than the motor truck rolling along a prescribed area.

The technicalities of the roadless vehicle are not discussed, but he mentions two main types: An all-tracked machine of the tank type and a half-tracked machine which has wheels in front and tracks in the rear. In the manufacture of these vehicles three main problems must be solved—the vehicle must be able to use roads without damaging them and it must not damage the surface of the ground over which it travels, it must be able to move across country without damaging itself, and the cost per ton-mile must be equal or lower than that of existing vehicles.

Although Colonel Fuller believes that the roadless vehicle can replace the motor car, he states it cannot replace the railway if the railway is an efficient one. But the problem, according to him, is, first, to bridge the gap between the producer and the railway, and, second, to create in undeveloped countries sufficient wealth to enable more railways to be built. Co-operation with existing railways must be the aim.

He compares his dream of the great future of the roadless vehicle to the prediction of Mr. Balfour, who on May 17, 1900, in the House of Commons said: "In addition to railways and tramways we might see great highways constructed for rapid motor traffic." But as Stephenson won the battle for the Iron Horse by imagination, perseverance and an indifference to the jibes of the ordinary mortals, so will the transport difficulties of today be solved when Pegasus with wings "conjures up images of things to be."

Safety Rules for the Installation and Maintenance of Electric Utilization Equipment

Prepared by the Bureau of Standards, Government Printing Office, Washington, D. C. 72 pages. 15 cents.

Handbooks Nos. 6 and 7 of the Bureau of Standards, safety rules for the installation and maintenance of electric supply stations and for electric utilization equipment are printed in small handbooks containing a single part of the code by the Department of Commerce, Bureau of Standards, George K. Burgess, director.

In response to a demand that the fourth edition of the National Electrical Safety Code be issued in separate publications dealing with the several subjects covered, the Department of Commerce, Bureau of Standards, has issued Nos. 6 and 7. No. 6 gives the safety rules for the installation and maintenance of electric supply stations and contains sections No. 9 to 18 inclusive of the National Electrical Safety Code. Handbook No. 7 gives the safety rules for the installation and maintenance of electric utilization equipment and contains sections 9 and 30 to 39 inclusive of the safety code.

The first editions of these rules is the result of a revision which was carried out according to the procedure of the American Engineering Standards Committee and the revised rules have had the approval of the sectional committee organized according to those rules of procedure. Two sizes of type have been used in the text of the handbook, the larger contains the rules proper, whereas the explanatory notes, etc., are in smaller type.

The Electrician—Annual Tables of Electricity Undertakings

Benn Brothers, Ltd., 8, Bouverie Street, London, E.C. 4. Price, 10/9.

This is the 39th edition of the Annual Tables of Electricity Undertakings, published annually since 1888. The tables have been thoroughly revised and further useful details have been added. Particulars of many additional undertakings in Great Britain, Europe and the colonies and countries overseas have been included, the total number now dealt with being more than 2,000.

Personal Items

W. R. Robertson New Canadian President

W. R. Robertson, since 1920 general superintendent of railways Hydro-Electric Power Commission of Ontario, was elected president of the Canadian Electric Railway Association at its 22d annual convention held in Quebec on June 2-4. Many years of experience in electric railroading have made Mr. Robertson an expert with statistics. Ask him any question pertaining to the subject and he will reach into his brief case and bring out the most convincing figures. This has become such a habit with him that a taxicab is needed to carry his well-filled cases.

Mr. Robertson became identified



W. R. Robertson

with the utility business at the age of twelve, when he started work for the Bell Telephone Company. After holding various positions in the steam railroad field, in the latter part of 1897 he accepted a position with the Port Dalhousie, St. Catharines & Thorold Railway, one of the first electric lines in Canada. The next year he left to enter the foundry business. The transportation urge was too strong, and in 1899 he went with the Niagara Central Railway just prior to its electrification. Promotion followed, and he advanced through the grades of inspector, assistant superintendent and transportation manager until he was made superintendent in 1903.

Meanwhile the company was expanding, and in 1909 Mr. Robertson was made general superintendent, the name having been changed to Niagara, St. Catharines & Toronto Railway & Navigation Company. He remained in that position until the road was taken over by the government as part of the Canadian National Railways. At present he is general superintendent of the entire system of Hydro-Electric Railways, which operates transportation services in Peterboro, Guelph and Windsor, and also the Toronto and York "radials," or interurbans, the

who.e comprising more than 200 miles. Mr. Robertson was born in Hamilton, Ont., on June 28, 1875.

Changes in Milwaukee Bus Personnel

Alvin McEvoy, who has been connected with the Wisconsin Motor Bus Lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., since their inception, has been promoted from supervisor of personnel to assistant superintendent of operation.

Andrew H. Johnson, who has been chief clerk for four years of the Wisconsin Motor Bus Lines, Kinnickinnic station, and prior to which he was associated with the electric railway division since 1913, has been promoted to inspector of service in the bus traffic department.

Norman Mangert, city line supervisor, has been selected to fill Mr. Johnston's post.

Eugene S. Gregg, for five years chief of the transportation division of the Department of Commerce, resigned recently to accept a position in the executive offices of the Western Electric Company, 195 Broadway, New York City. After graduation from Austin College and the University of Chicago, Mr. Gregg had extensive experience in transportation work as first lieutenant and captain, in the shipping section of the General Staff, U. S. A., War Industries Board, Shipping Board and later as chief of the shipping section of the American International Corporation. Mr. Gregg was appointed from Texas to the service of the Department of Commerce in August, 1921, as chief of the transportation division.

J. A. Federhen has recently become associated with the Fort Smith Light & Traction Company, Fort Smith, Ark., as assistant to Robert C. Coffy, in charge of public relation. Mr. Federhen is an example of an outsider who has made a success in other lines of endeavor and hopes to find in the public utility industry the opportunity to do bigger things. In June, 1913, he became associated with the Springfield Post Office, serving in all departments, including the civil service bureau. He was promoted to superintendent of mails in the Fort Smith, Ark., post office in August, 1922. The desire to enter a broader field led him into public utility work. Mr. Federhen was born in Milwaukee, Wis., and moved to Springfield, Ill., at an early age.

E. L. Fariss, general stores keeper for the Georgia Railway & Power Company, Atlanta, Ga., has resigned to join his brother in operating a Ford agency at Tampa, Fla. Mr. Fariss joined the Georgia Railway & Power Company in 1908 as a meter reader. Shortly afterward he was transferred to the stores department, and in 1925 he was made general stores keeper for the company.

H. E. Borton Heads Southwestern Public Service Association

As a tribute to his untiring efforts in promoting Southern enterprise and in recognition of his accomplishments in that section of the country Harold E. Borton was elected president of the Southwestern Public Service Association at the recent convention in Galveston, Tex.

Mr. Borton has had a long and varied experience with public utilities. His early history is interwoven with the activities of the Fred A. Jones Construction Company, engaged in building the Texas Traction Company and the Southern Traction Company, operating lines to Denison and Waco. These two roads are now included as part of the extensive interurban system of the Texas Electric Railway. This was one of the great developments in the utility field in the South, the company now owning 272 miles of line. Mr. Borton later turned his attention to



H. E. Borton

the Corsicana Gas & Electric Company, which he served as operating superintendent from 1911 to 1916. This served to round out his other engineering and management experience. Relinquishing his affiliations with this company, he assumed the general management of the Calvert Water, Ice & Electric Light Company, and remained in this capacity for seven years. Then it was that he became associated with the Texas Power & Light Company and affiliated companies, among which he holds the office of vice-president of the Mineral Wells Electric Company.

Mr. Borton has a great capacity for work, for although he was at times practically overwhelmed with the immediate duties of the offices of the company with which he was identified he always kept up his association activity, giving more than his passive presence at the meetings. During two different terms he served as vice-president and chairman of the electric section.

Other officers of the Southwestern Public Service Association elected at the meeting in Galveston are E. H. Kifer, first vice-president and chairman of the electric section; W. H. Burke, second vice-president and chairman of the railway section, and C. K. Fletcher, third vice-president and chairman of the gas section.

Obituary

J. D. Spreckels

A railway magnate, sugar promoter, shipping owner, banker, capitalist and philanthropist died in Coronado on June 9. This man was John Diedrich Spreckels, a romantic figure of the West and a practical idealist of the twentieth century. His death marks another milestone in the tradition of the famous Spreckels family, all of whom were imbued with a spirit of adventure and pioneering and in the history of San Diego, which has become of late years synonymous with the name of Spreckels. At the time of his death Mr. Spreckels was president of the San Diego Electric Railway and the San Diego & Arizona Railway.

One of his early connections with the street railway business was the purchase, with his brother, Adolph B. Spreckels, who died a few years ago, of the San Francisco & San Mateo Electric Railway, which after reconstruction was sold to Eastern capitalists who acquired other lines in the city, and all were finally consolidated into the United Railroads of San Francisco. He first visited San Diego in 1887. To this accidental acquaintance with that city can be traced not only the development of one of the most progressive electric railway systems in the country but also the success of many large industrial enterprises. He and his brother bought the horse car line in 1890. They reconstructed and electrified it and began operation with twelve 24-passenger cars. Today the system operates 105 miles of line and owns 178 motor passenger cars. Not in terms of equipment or mileage is its good will measured, but rather in its never-ending campaign to satisfy its customers. In this phase of the work he was fortunate in having at the helm a son, Claus Spreckels, a man with a capacity for clear thinking and a willingness to do right by his superiors and subordinates, and with him as general manager of the property is shared the laurels for the successful management of this system. What Claus Speckels and Ed Burns, his assistant for a time, accomplished through human relations activities in San Diego is a matter of record.

Limning John D.'s railway career alone presents an unfinished picture. A son of a "sugar king," he too found a place for himself in the sugar trade, which had made his father, the late Claus Spreckels, a prominent figure on the West coast and on the Hawaiian Islands. He needed ships to advance his interests, so with characteristic temerity and tenacity he launched a commercial fleet which later was to plow its way to the Fiji Islands and Australia. His shipping interests grew into the present Oceanic Steamship Company.

In the midst of his busy career he found time to devote himself to many philanthropic projects and public service requirements.

John D. Spreckels was not a product of California soil. He was born in Charleston, S. C., 72 years ago. When a very young boy his parents moved to California. He was educated at the

Polytechnic School at Hanover, Germany, and at Oakland College, Cal.

A. C. Baker, who retired recently as director in chief of the Sesqui-Centennial Exposition of Philadelphia, died on June 5. Upon mentioning his retirement in the ELECTRIC RAILWAY JOURNAL of May 29, page 951, it was stated that E. L. Austin, business manager and comptroller, would succeed Mr. Baker.

Samuel H. Dannatt, manager of the New York office of the Electric Service Supplies Company, died May 30 at his home in Mount Vernon, N. Y. Mr. Dannatt was associated with this company for five years. Prior to his connection with the Electric Service Supplies Company he was associated with the Westinghouse Electric & Manufacturing Company, the Electric Power Equipment Corporation and the Una Welding & Bonding Company.

Manufactures and the Markets

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

Graham Brothers' Sales Gain

Total factory shipments of Graham Brothers' trucks and motor coaches from Jan. 1 to May 15, 1926, amounted to 13,022, a gain of 5,027, or 63 per cent over the corresponding period one year ago.

Shipments of Graham Brothers' trucks and motor coaches in several days less than four months of 1926 exceeded the entire factory production of 10,728 units shipped in the twelve months of 1924.

In 1922 factory sales showed a gain

of 181 per cent over the previous year, while in 1923 the gain was 105 per cent over 1922. Sales for 1925 showed a gain of 123 per cent over 1924.

Gas-Electric Rail Cars

Delivery of two combination passenger and baggage gas-electric rail cars, one combination mail and baggage trailer, and one passenger and baggage trailer has been made to the Central Vermont Railroad by the J. G. Brill Company, Philadelphia, Pa. One combination passenger and baggage gas-

East Taunton Gets New Cars



Delivery has just been made to the East Taunton Street Railway, Taunton, Mass., of two double-truck light-weight one-man trolley cars by the Wason Manufacturing Company, Springfield, Mass. The seating capacity of these cars, which have an over-all length of 36 ft. 10 in., is 44. They are of semi-steel construction. Principal specifications follow:

Weight:	
Car body	12,934 lb.
Trucks	9,400 lb.
Equipment	5,600 lb.
Total	27,934 lb.
Bolster centers, length.....	17 ft. 8 in.
Length over all.....	36 ft. 10 in.
Truck wheelbase.....	5 ft. 6 in.
Width over all.....	8 ft. 1 in.
Height, rail to trolley base.....	10 ft. 11 1/2 in.
Body	Semi-steel
Interior trim.....	Mahogany
Headlining	Agasote 1/2 in.
Roof	Arch
Air brakes.....	General Electric
Armature bearings.....	Plain
Axles	4 in. diameter, 4 1/2 in. gear seat
Bumpers	Channels, 6 in.

Car signal system.....	Faraday buzzer
Car trimmings.....	Statuary bronze
Center and side bearings.....	Brill
Compressors.....	CP-27B
Conduits and junction boxes.....	Standard
Control	K-35-JJ
Couplers	Bar
Curtain fixtures	Pinch handle
Curtain material.....	Fabrikoid double faced
Destination signs.....	Hunter illuminated
Door operating mechanism.....	Manual
Fenders	Lifeguards
Finish	Enamel
Gears and pinions.....	G. E. solid
Hand brakes.....	Peacock type G-14.34
Heater equipment.....	Gold 405-E. B.
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	Brill
Lightning arresters.....	G. E. MD.
Motors.....	Four G. E. 25-hp., inside hung
Sanders	Ohio Brass
Sash fixtures.....	J. L. Howard rack
Seats.....	Brill "Waylo"
Seating material.....	Rattan, spring upholstered
Springs	Brill
Step treads.....	Mason safety
Trolley catchers.....	Wilson type "T"
Trolley base.....	U. S. automatic
Trolley wheels.....	G. E.
Trucks	Brill 177-EX
Ventilators.....	Eight Brill exhaust type
Wheels	26 in. diameter

electric car is also being built for the East Broad Top Railroad & Coal Company.

Armco Culvert Industry Celebrates Anniversary

This year the thirtieth anniversary of the invention of the corrugated culvert is being celebrated by the Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio. A feature of the celebration is the display in the association's research laboratory at Middletown of the first corrugated culvert ever made. This culvert was manufactured by the inventor, James H. Watson, and placed early in 1896 under a public highway near Crawfordsville, Ind., from which location it was recently removed for exhibition purposes. It is one of many similar culverts still in service near Crawfordsville.

Thirty years ago James H. Watson and his immediate successor, W. Q. O'Neill, conducted a small hand-operated factory at Crawfordsville and succeeded in getting a number of culverts placed, with many misgivings, under nearby roads. Today the Armco culvert industry operates more than 30 thoroughly modern and efficient plants.

Yellow Truck Earnings

Yellow Truck & Coach Manufacturing Company, Chicago, Ill., reports a net income of \$2,330,743 in 1925, after depreciation, taxes and other charges. This compares with \$2,742,408 for the Yellow Cab Manufacturing Company, the predecessor company, in 1924. Allowing for the year's dividends on the \$15,000,000 7 per cent preferred stock, the balance would be equal to 91 cents a share of \$10 par value earned on the combined 600,000 shares of class B stock, and 800,000 shares of common stock, comparing with \$1.20 a share on the same basis in 1924.

World's Largest Office Building to Take Graybar Name

Announcement was made recently by Frank A. Ketcham, executive vice-president of the Graybar Electric Company, following signing by his company of a contract leasing the entire fifteenth floor of the proposed largest office building in the world, that the new structure will be known as the

Graybar Building, taking its name from the Graybar Electric Company. The new building will be located adjacent to the Grand Central Terminal, facing Lexington Avenue and situated between 43d and 44th Streets. The building will occupy more than 1½ acres of ground and will be ready for occupancy May 1, 1927.

The Graybar Electric Company was incorporated Jan. 1 of this year as the successor to the supply department of the Western Electric Company.

Rolling Stock

Northern Ohio Traction & Light Company, Akron, Ohio, has just ordered a Differential car wheel truck and tractor from the Differential Steel Car Company, to be fitted to its Thew electric shovel.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., plans to turn out soon twelve new one-man cars made in their entirety in the St. Catharines shops of the Canadian National Railways. The cars are bright yellow in color, of steel construction and are in every way complete as to modern running gear and safety devices. The cars weigh 29,000 lb. and seat 44 passengers. They will be used on the city and local lines in St. Catharines and Niagara Falls.

Utah Light & Traction Company, Salt Lake City, Utah, is making a number of improvements in its one-man street cars. Installation of automatic rear exits will constitute one of the principal changes. A treadle on the back platform, which may be operated by passengers when they wish to leave the car at the rear door, is expected to facilitate loading and unloading in the rush hours. Larger carrying capacity will be provided in the remodeled cars by removing the side seats from the front to the back, thereby making a larger and more comfortable bench at the rear of the car. Better lighting and ventilating facilities have been provided and arrangements have been made to keep the cars more sanitary by improved sweeping and mopping conditions. New fenders and lifeguards have been added to the cars. The lifeguard is operated automatically and the least touch on the fender in front will cause the scoop under the car to drop. Two of the new type are completed.

Track and Line

Los Angeles Railway, Los Angeles, Cal., has started the extension of the Eighth Street line to Western Avenue.

Springfield Street Railway, Springfield, Mass., will start construction early in July on the relaying of trolley rails and paving the roadway on Main Street between Vernon Street and Sharon Street. The company will also lay a concrete base under both tracks on Fort Pleasant Avenue.

Pacific Northwest Traction Company, Everett, Wash., will receive bids until June 21 for the construction of a steel or wood overhead crossing 100 ft. long spanning the North Trunk Highway 5 miles north of Seattle. Bids will be received at the office in Everett.

Power Houses, Shops and Buildings

Nashville Railway & Light Company, Nashville, Tenn., has completed the new \$45,000 railway substation on Wedgewood Avenue near the Tennessee Central Railway crossing. As the new station was completed, a 500-volt synchronous condenser was also placed in operation.

Mobile Light & Railroad Company, Mobile, Ala., will occupy its new \$40,000 brick office building at its yards on Springhill Avenue by Sept. 1. The structure will be two stories high; all the second floor and part of the first will house the business offices. On the first floor will be shops for minor repair work. A. H. Downey is the architect of the structure.

Trade Notes

Robert June Engineering Management Organization, Detroit, Mich., has moved to larger quarters at 2208 West Graham Boulevard, where it now occupies the entire building. This is the organization's fourth move in four years to larger quarters. The new building will provide greater facilities for giving service to clients.

Industrial-Utilities Service Bureau, Louisville, Ky., A. R. McLean, principal, announces that to keep pace with Louisville, and the bureau's constantly increasing business, it has been found necessary to formulate a program of expansion. The first move in this direction will be larger quarters at Suite 303 and 304 the Lincoln Bank & Trust Company, Louisville. The bureau specializes in the handling of matters connected with personnel.

Johnson Fare Box Company, Chicago, Ill., announces that its New York offices and service station have been moved to 2 West 61st Street, near Columbus Circle. The new telephone number is Columbus 8859.

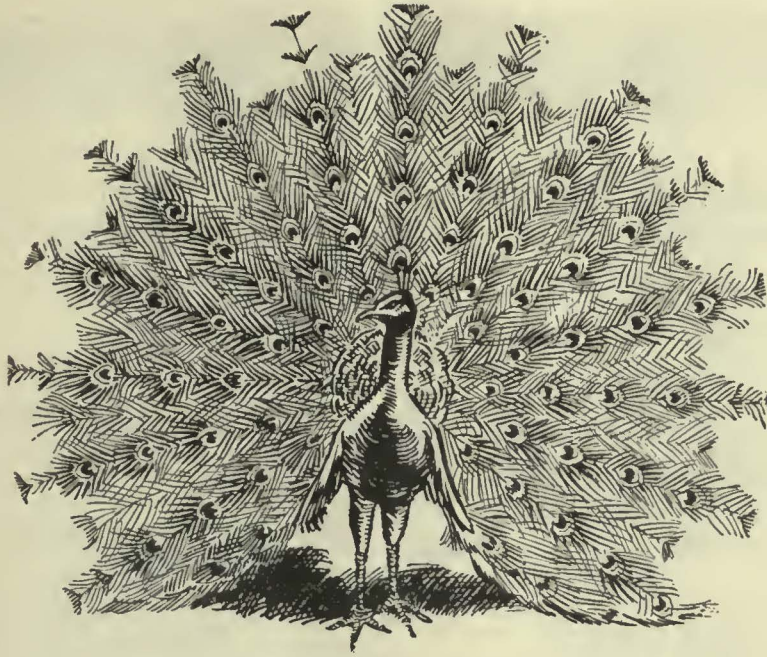
New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued a booklet, "Traffic Signal Systems." It is designated as bulletin No. 217 and deals not only with the traffic signals but with the necessary control apparatus which accompanies them. Signals for overhead suspension or for street mounting and of various colored light systems are listings.

Westinghouse Electric & Manufacturing Company has released special publication 1643-A describing the application of oil circuit breakers. It describes fully the general application of oil circuit breakers, the determination of short-circuit current and the precautions necessary, and devotes a number of pages to tables and charts. Several interesting halftone illustrations are also included. This publication may be obtained from any of the district offices of the Westinghouse company or from the department of publicity at East Pittsburgh, Pa.

Metal, Coal and Material Prices

Metals—New York		June 8, 1926
Copper, electrolytic, cents per lb.		13.90
Copper wire, cents per lb.		16.00
Lead, cents per lb.		7.675
Zinc, cents per lb.		7.49
Tin, Straits, cents per lb.		58.75
Bituminous Coal f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons		\$4.50
Somerset mine run, Boston, net tons		1.925
Pittsburgh mine run, Pittsburgh, net tons		1.825
Franklin, Ill., screenings, Chicago, net tons		1.675
Central, Ill., screenings, Chicago, net tons		1.75
Kansas screenings, Kansas City, net tons		2.50
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.		\$6.25
Weatherproof wire base, N. Y., cents per lb		18.00
Cement, Chicago net prices, without bags		2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb		11.20
White lead in oil (100-lb. keg), N. Y., cents per lb		15.00
Turpentine (bbl. lots), N. Y., per gal.		\$0.88



Light-weight cars call for light-weight equipment—

Modernization in car design and operation leads to light-weight cars, which in turn require light-weight but rugged and dependable hand brakes.

Peacock Staffless Brakes more than meet these requirements.

They occupy minimum floor space. 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. Their power is at least three times as great as any ordinary type of hand brake.

It is such qualifications that make Peacock Staffless Brake especially adapted for the modern, light-weight safety car, both single-and-double-truck.



**The
Peacock
Staffless**

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Bankers and Engineers

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WESTERN & NORTHERN CEDAR
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FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars
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ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we all differ only in magnitude; small orders command out 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 built. That's why so many electric railway men rely absolutely on our name.

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We guarantee
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FROM FIRE**

INSTALL THE

IMPROVED
Pyrene
EXTINGUISHER

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

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



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

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

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

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

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REO conceived the Law of the
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CONVENTION WEEK

Jan. 1st to Dec. 31st



Five short days—October 4th to 8th—have been set aside for the A.E.R.A. Annual Convention and Exhibit in the Public Auditorium at Cleveland.

Since January 1st, however, the manufacturers that you will meet in Cleveland have been holding a *continuous* exhibit and convention in Bangor and San Diego, Chicago, and New Orleans and every other railway operating center.

The auditorium, in this case, is the magazine that you are reading and all other railway journals, together with the letters, catalogs and pamphlets you receive by mail.

You find, in these announcements, illustrations and descriptions of equipment, news of installations, operating data and much else that you will not have time to study during your five days in Cleveland. They form a permanent exhibit on your desk or in your files—a convention that is open to you at all hours daily from the first of Janu-

ary to the last day of December every year.

As you turn from page to page, passing from one advertisement to the next, you will, of course, observe that one page is more attractively presented and more interesting than another. These pages are sure to attract more readers just as some of your regular convention booths attract the largest crowds.

If you go behind the scenes, you will usually find that the most attractive booths have been designed by experts. So have the most attractive advertisements. It is just as important to be well represented in the all-year advertising convention as in any five-day or one-week exhibit. An ever-growing number of equipment manufacturers, therefore, are placing their advertising in our hands and an ever-growing number of railway operators are looking for our lighthouse trade-mark to identify the advertisements we have written.

Doyle, Kitchen & McCormick, Inc.

2 WEST 45th STREET, NEW YORK

An Advertising Agency



Goodyear Balloon Bus Tire
Made with Supertwist

GOODYEAR

Goodyear Balloon Tires for Motorbuses

These nine successful and well-known operators are among the bus owners now using Goodyear Balloon Tires.

Their common experience is that these tires not only provide the last word in smooth and easy riding qualities, but also result in very definite economies.

They save money on upkeep and breakage, effecting material reductions especially in spring breakage.

They develop maximum tractive power in any going, steer easily, and yield unusually long, trouble-free mileage at low tire cost per mile.

Goodyear Balloon Tires for Motorbuses are the final development of Goodyear Pneumatic Bus Tires. In their rugged, active cushioning qualities, they represent the peak achievement of that development which began twenty years ago and has accompanied

every progressive move of motorbus transportation since.

Made with SUPERTWIST, the extra-durable, extra-elastic fabric which Goodyear developed especially for the low-pressure tire, Goodyear Balloon

Tires demonstrate in motorbus service the superior stamina and finer riding qualities which SUPERTWIST alone provides.

If you want to give your patrons not only a very convenient and economical service, but one that also is

superlative from every standpoint of luxurious comfort, equip with Goodyear Balloon Bus Tires.

If you want balloon tires that give you the utmost in trouble-free mileage at low per-mile cost, get Goodyear Balloon Tires, made with SUPERTWIST. They are better balloons, yet they cost you no more.

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Boston Elevated Ry.	. Boston, Mass.
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Detroit Motorbus Co.,	Detroit, Mich:
Kansas City Railway Co. Kansas City, Mo.
Motor Transit Co. Los Angeles, Cal.
Northern Ohio Power & Light Co. Akron, Ohio
Northland Transportation Co. Minneapolis, Minn.
T. M. E. R. & L. Co.	. Milwaukee, Wis.

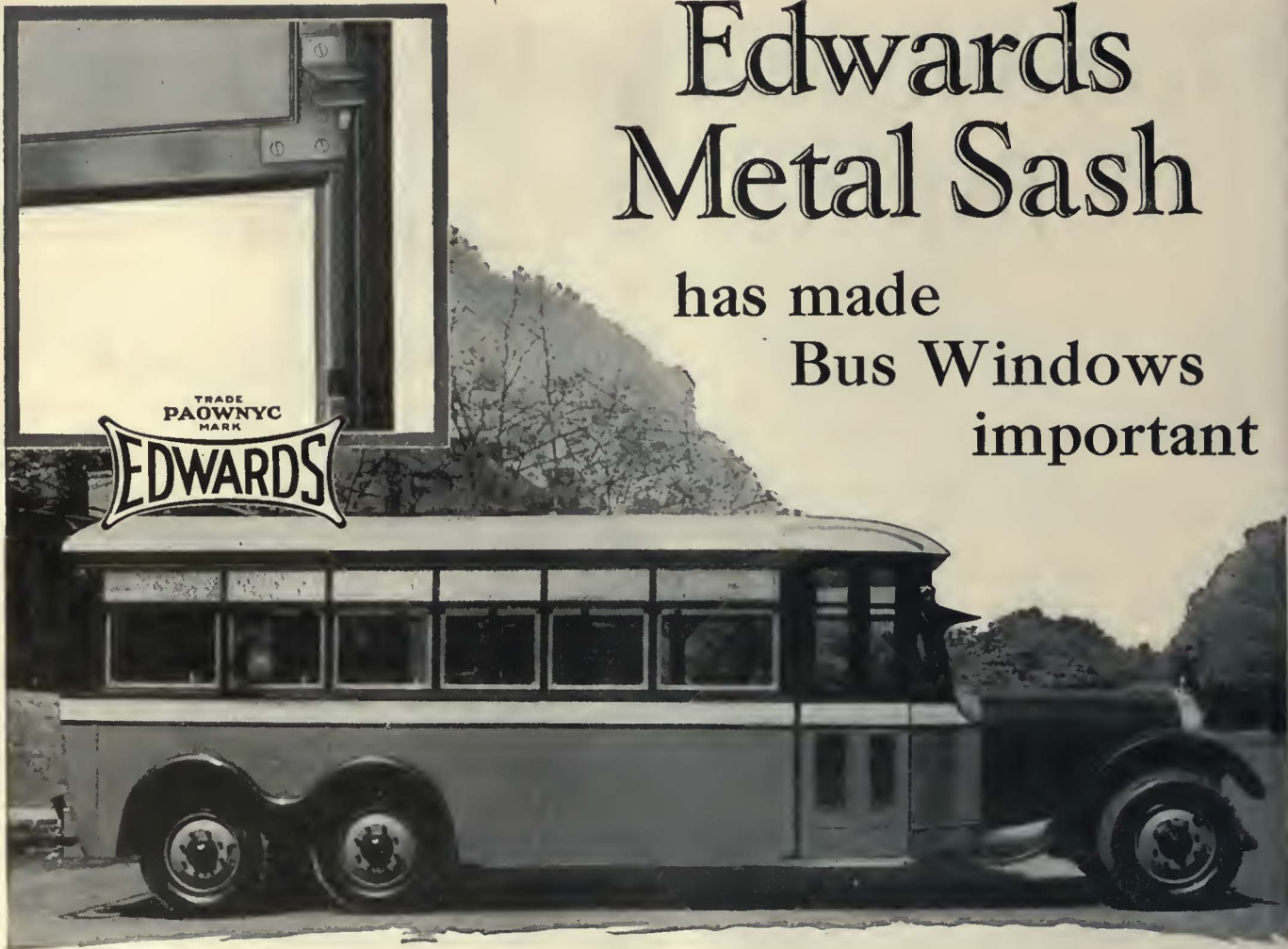
For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

Supertwist

BALLOONS

Edwards Metal Sash

has made
Bus Windows
important



*Bus body by E. J. Thompson Co., Pittsburgh,
on "Six-Wheel" Chassis
using Edwards Metal Sash.*

Edwards Screen Sash
adds to the summer
comfort of passengers.
Edwards Storm Sash
helps in heating in
winter.

One bus body corporation says in its advertising: "Snug protection or ample ventilation is provided by clear vision windows that close tight or can be raised to let cooling breezes in."

The men in this company know the importance of windows. That is why they use Edwards Metal Sash.

"Clear vision windows." Edwards Metal Sash gives the maximum of glass area, with not even a dirt pocket in the corner.

"Close tight." Edwards Metal Sash fits so snugly that cold air, rain, and dust cannot penetrate.

"Can be raised." Edwards Metal Sash operates with utmost ease, in the manner with which all passengers are familiar. They can use it, but they can't get it out of order.

Edwards Metal Sash has made bus windows important because it has made them perfect—in appearance, in operation, and in economy.

Whether you are body builder, chassis builder, or bus operator, you ought to know all about Edwards Metal Sash. You can, without obligating yourself, and without expense, by sending for our complete booklet.

O. M. EDWARDS CO.

SYRACUSE, N.Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto



Traffic Control

The increasing traffic on both City Streets and the Open Road demands the best attention of bus operators everywhere. Public opinion frowns on large cumbersome vehicles that require excessive space on thoroughfares. Bus Operators need the good will of the public. They need to cater to public opinion on this issue. They need to maintain schedules for their patrons, which becomes more of a problem with larger type buses as traffic increases.

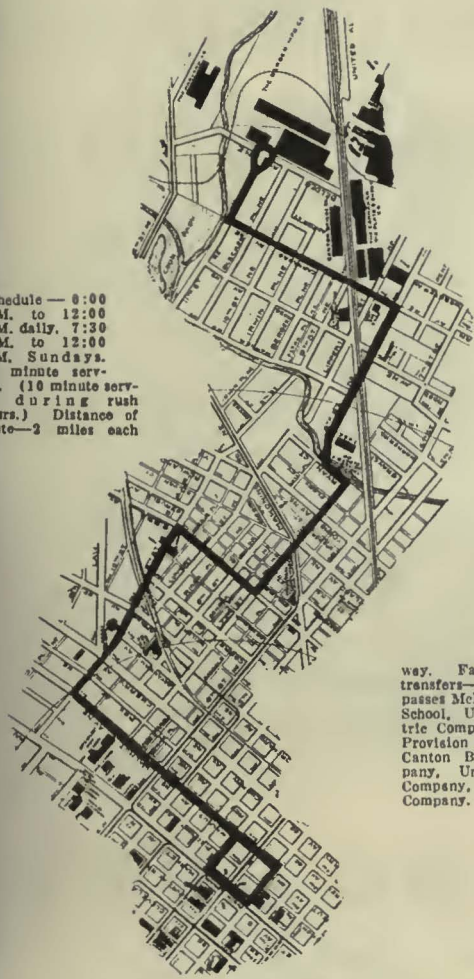
A bus with a powerful six-cylinder motor, with a low center of gravity, with a pick-up and get-away, with attractive and harmonious bodies, light in weight and appealing in sight, with quick-acting brakes (particularly the four-wheel hydraulic brakes), can do much for the operator to help in "Traffic Control."

The Garford Greyhound has these qualities. They have set a higher standard for revenue producing.

GARFORD PIONEERED 4-WHEEL BRAKES ON MOTOR BUSES

The Garford Motor Truck Co.
637 Wapak Road, Lima, Ohio

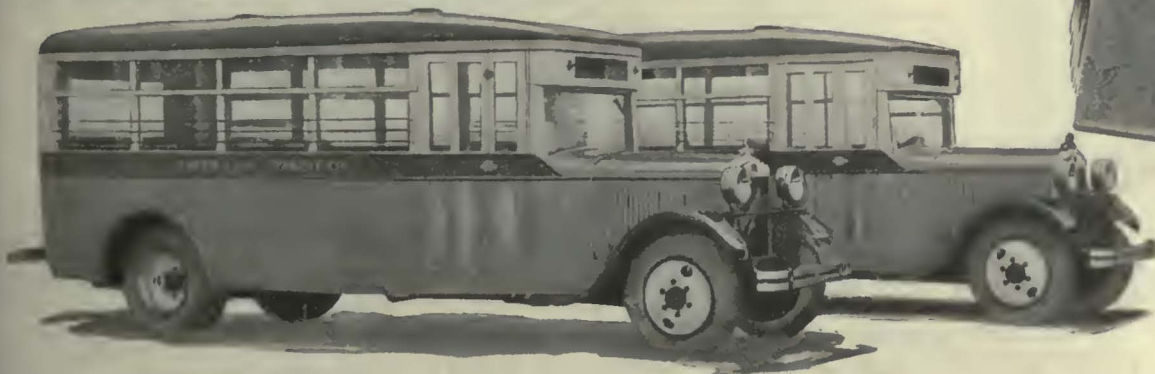
Garford "Quality Built" Buses are described in the booklet here illustrated. You may have a copy for the asking.

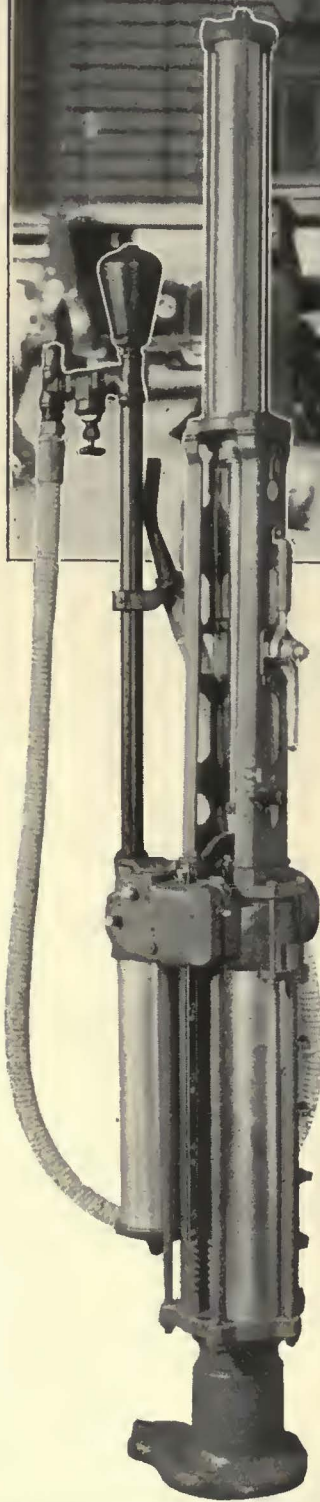


Schedule — 8:00
A.M. to 12:00
P.M. daily. 7:30
A.M. to 12:00
P.M. Sundays.
15 minute service.
(10 minute service during rush hours.) Distance of route—2 miles each

way. Fares — 5c., transfers—1c. Route passes McKinley High School, United Electric Company, Carson Provision Company, Canton Bridge Company, United Alloy Company, Berger Mfg. Company.

ROUTE NO. 1—GREEN LINE TRANSIT COMPANY, CANTON, OHIO.





Why owning pumps is right!

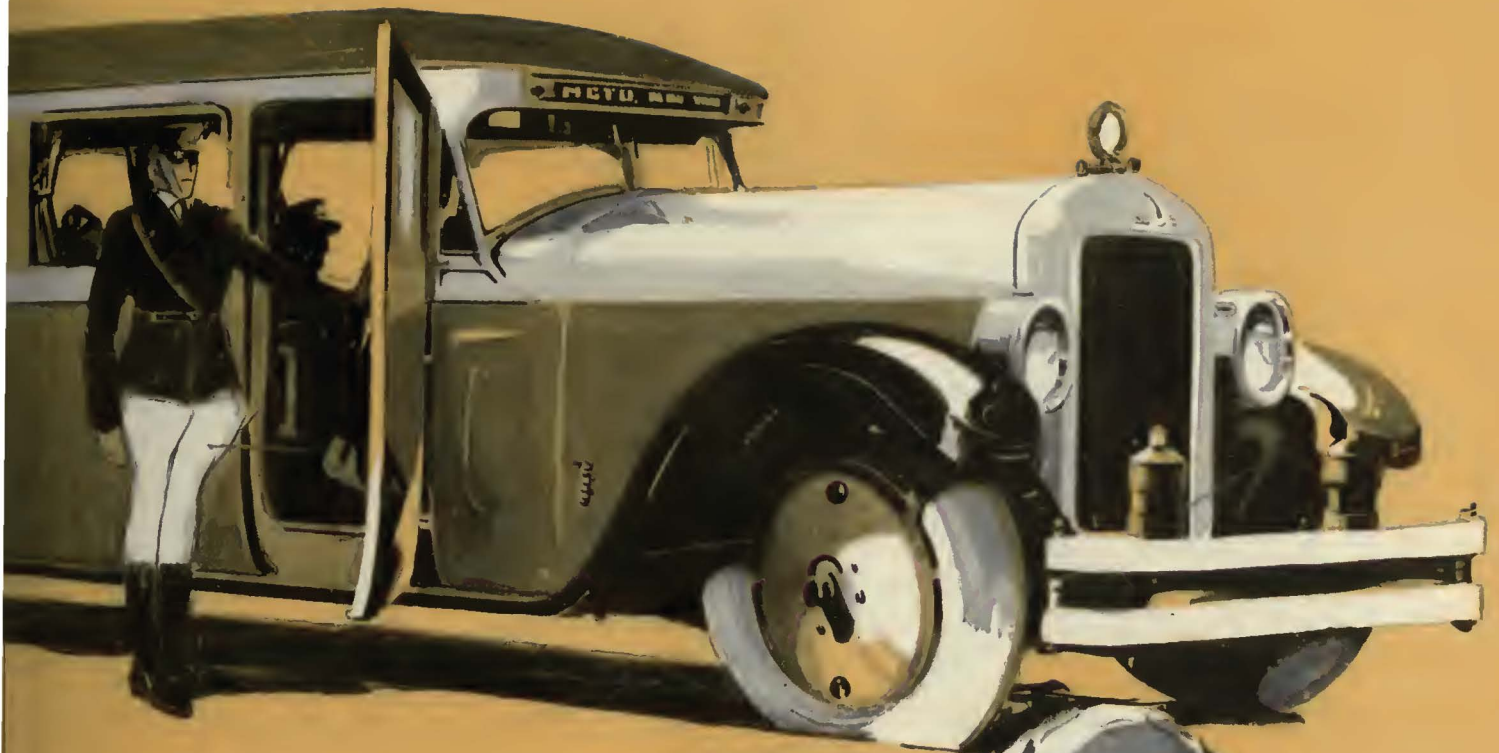
When you own your pumps, and have adequate underground tanks, you buy gas when the market dips. Your fuel will thus cost anywhere from 4c. to 6c. under the ordinary day-to-day price.

By owning your own equipment, you're master of the situation—you can buy as your judgment dictates, and where you please.

Our engineers know which gas and oil equipment will best serve you, as we have made a special study of bus-fueling requirements. This, together with our long experience in the railway and filling station fields, gives our engineers an unusually broad viewpoint.

For complete booklets, address Dept. 51.





*There are a few people
who must ride in buses
but
there are thousands
who must be coaxed!*

The attractive body draws everybody. To the thousands who must be coaxed to ride, Lang Bodies make an irresistible appeal. Every curve of line and every feature of comfort is an invitation.



LANG BODIES

create new passengers



for example -

The staggered seats give an atmosphere of semi-privacy with ample room and clear vision. The rider who needs coaxing yields easily to the suggestion that every luxurious detail has been planned for his or her individual comfort, an impression which Lang Body builders have been developing since the days of fine carriage building.

THE LANG BODY COMPANY
CLEVELAND, OHIO

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





These poles will last twice as long as if they were untreated. That's what preservative treatment does.

Vaccinated telephone poles

—an idea that is paying profits to pole users

VACCINATION prolongs human life and pole life. The injection of a special preservative applied at the ground line adds years to the usefulness of a pole from Graybar Electric.

Treated poles are permanent poles and profitable poles. Once they are in the ground they stay in. This helps not alone in saving forests but also in saving money for pole buyers.

In encouraging pole preservation, Graybar Electric continues the work of the Western Electric Supply Department, to which Graybar is the successor in name and in 56 years of electrical experience.



Graybar

ELECTRICAL SUPPLIES

Successor to *Western Electric* Supply Dept.

Offices in 55 Principal Cities. Executive Offices: 100 East 42nd Street, New York

Fort Snelling - Mendota Bridge across Minnesota River near Minneapolis will contain 76,000 cubic yards of concrete. Length 4119 feet. Height, from normal low water to bridge floor, 120 feet.

Walter H. Wheeler, Designing and Consulting Engineer with the C. A. P. Turner Company Associated, prepared the plans and specifications for this job, and is also supervising the construction.



These Engineers Get Quality Concrete Using Economical Mix

QUALITY control jobs now attract attention not because there are few of them, but because there are so many. The Fort Snelling-Mendota Bridge now being built across the Minnesota River near Minneapolis is one of the outstanding examples.

Those in charge of this job are following this basic principle: Assuming a workable mix, the strength of the concrete is determined by the relation which the volume of mixing water bears to the volume of cement.

Field tests, made regularly during the progress of the work, show that predetermined strengths are being consistently obtained.

In addition, grading and proportioning of aggregates within the range of workability are giving the most economical mix and a fine, uniform texture.

Further information about field control will be gladly sent on request, if you will write the nearest office listed below. Ask for a copy of "Design and Control of Concrete Mixtures." There is no obligation.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

Atlanta
Birmingham
Boston
Chicago
Columbus
Dallas

Denver
Des Moines
Detroit
Indianapolis
Jacksonville
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Lincoln, Nebr.
Los Angeles
Milwaukee
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New Orleans
New York

Oklahoma City
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Philadelphia
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Salt Lake City
San Francisco
Seattle
St. Louis
Vancouver, B. C.
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Follow the "ABC" of Good Paving and You'll get



The vitrified brick pavement, asphalt filled,

- I
absorbs impact at rail joints
- II
water-seals road-bed and ties
- III
allows for contraction and expansion
- IV
resists heaviest traffic
- V
is easily removable
- VI
has practically 100% salvage value

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING CLEVELAND, OHIO

VITRIFIED
Brick
PAVEMENTS

The "ABC" of Good Paving

A Asphalt for *Filler*
B Brick for *Surface*
C Crushed rock, gravel,
crushed slag or
concrete for *Base*

—and the "D" is drainage
adequate and well-planned

INSIST on A, B, C and
D and you have the
ideal pavement for track
areas. Let's start "from
the ground up" and dis-
cuss the reasons why.

Drainage, adequate and
well-planned, comes first be-
cause no material or design
can resist the havoc played by
faulty drainage with its result-
ant shifting of sub-soil in
spring, summer and autumn
and the upward thrust of
freezing in the winter.

Next, an adequate founda-
tion—many times a well com-
pacted, sandy soil, but more
often a sturdy base of concrete,
crushed rock, crushed slag or
gravel, according to relative
costs and convenience of local
sources of supply—overlaid
with a uniform bedding course
of sand of even density, the
whole forming an adequate
road-bed when protected from
direct impact and abrasion by
a top armor of brick.

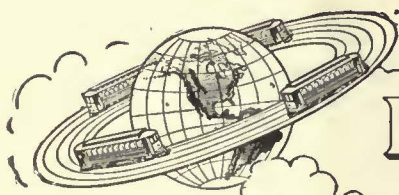
Third, a vitrified brick sur-
face, because it affords the best
traffic surface, smooth, yet
anti-skid, and because its fire-
hardened toughness sturdily
resists wear and tear and holds
upkeep expense to a minimum.

Fourth; asphalt for filler,
because asphalt between the
brick seals the surface against
water from above, protecting
road-bed and ties, provides
the elasticity required to fore-
stall cracking and subsequent
deterioration, due to temper-
ature and moisture stresses,
and makes any section of the
pavement, large or small,
easily removable for track re-
pairs or maintenance with
practically 100% salvage value.

The sum of these four items
is the pavement that gives the
famous six-point service in
electric railway use.

Further data and specific
figures on cost and perform-
ance on request.

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

What Phoenix Electric Refrigeration Will Do ~



This is the first Phoenix Electric Refrigerator Car, converted from a standard freight car by The Northern Ohio Traction Co. It carries over 1,000,000 lbs. of perishable products in a year.

Five Phoenix Electric Refrigerator Cars, built by The Cincinnati Car Co., were put into operation by The Chicago, North Shore & Milwaukee Railroad at the beginning of this season.



A BIG field for profit is being developed by electric railways through the use of Phoenix Electric Refrigerator Cars. So successful are these cars proving that their adoption by all forward looking electric interurban lines is inevitable.

Phoenix Electric Refrigerator Cars are superior to ice refrigerator cars in every way. The disadvantages of ice refrigerator cars that have stood in the way of electric railways' putting on refrigerator car service have been entirely eliminated.

The cost of operation is negligible as the refrigerating machinery takes its power from the line.

There is no overhead expense because it is not necessary to build icing stations and provide a cumbersome organization to care for them.

The machinery is fully automatic in operation, requires no special skill to care for it and does not easily get out of order.

Phoenix Transportation Refrigerating Unit



Indoor Spratower



Phoenix Equipments Easy to Install.

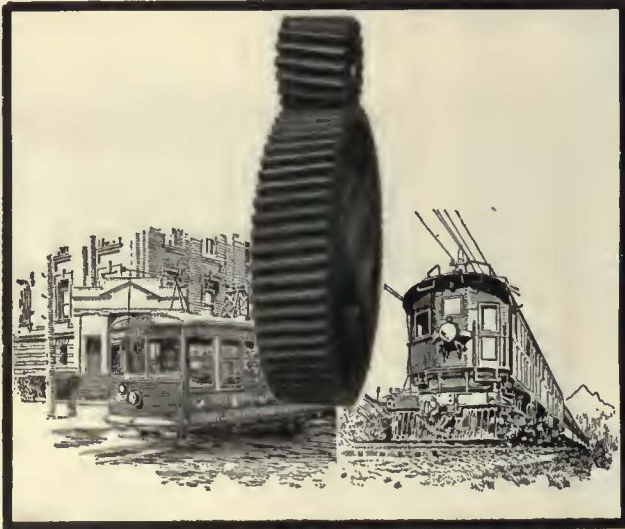
There is nothing difficult or complicated in Phoenix installations. Any standard car can be readily converted into a highly efficient, profit-making electric refrigerator car in your own shops. Our Service Department will co-operate with your mechanical department or with any car builder you may specify in working out the installation.

We shall be glad to give you the fullest particulars.

THE PHOENIX ICE MACHINE CO.
CLEVELAND, OHIO

Nine Times Out of Ten

The quality of Electric Traction Service is in direct proportion to the quality of the equipment employed.



If you are not using Nuttall BP Helical Gears and Pinions, you have a way to a vast improvement in your equipment, and an inevitable improvement in your service.

If you are not using the New Nuttall 20-A trolley base you cannot only improve but can perfect that part of your equipment.

Every improvement in equipment brings a corresponding improvement in service, and every improvement in service shows instantly in more dollars and cents.

Let us send you our literature on the two sure money makers.

R.D. NUTTALL COMPANY
PITTSBURGH  **PENNSYLVANIA**

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

Nuttall

Each of your salesmen should have the 1926 Edition—

Electric Railway DIRECTORY

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

\$296,000,000 will be spent this year for new equipment, material and supplies—can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price \$7.50 for one copy—

10% off for five or more.

Leading Features

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

5-1-26

Directory Department, Electric Railway Journal, Tenth Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

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

.....More complete information concerning contents.

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Company

Street

City State

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Seat and Curtain Materials
There is no substitute for Pantasote

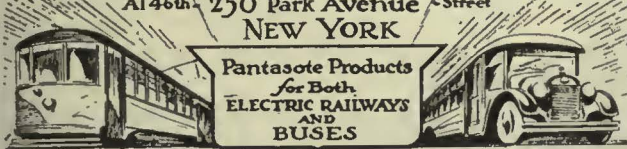
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Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th, 250 Park Avenue Street
NEW YORK



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CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

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

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What can this book tell you about winning your public?

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10 days free and see—

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A Handbook of Publicity

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SAFKAR **STEP**
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DON'T confuse this all-steel unit safety step with any idea of a non-slipping mat or tread. In the "SAFKAR" Step you get permanent, in-built slip-proof-ness that lasts as long as the step—which means that it will outlast the car. The cost? Little, if any, higher than that of less serviceable, less safe, steps—and the first cost is the only cost. Ask for Catalog 4A28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

P-83

Real Cost vs. First Cost

"Tool Steel" gears are guaranteed (very conservatively) to last 1½ times as long as Special Quenched; in service tests they are giving 2 to 3 times as long life.

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"Tool Steel".....\$10.00
Quenched 8.00

Guaranteed Cost of "Tool Steel"

2/3 of \$10.00 = \$6.66 vs.
\$8.00 for Quenched.

Actual Maximum Cost of "Tool Steel"

1/2 of \$10.00 = \$5.00 vs.
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That's why 85% of the Electric Railway Lines buy "Tool Steel" gears and pinions.

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio



TOOL-STEEL QUALITY
GEARS AND PINIONS

The Standard of Quality

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Standard on 60 Railways for

- Track Maintenance
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Use These Labor Savers

- Differential Crane Car
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TISCO MANGANESE STEEL TRACKWORK.

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DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
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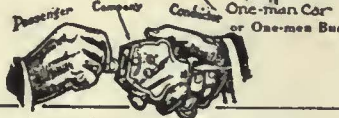
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ROOKE of fare collection— SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



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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.



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*The Hardware makes the line
Hubbard makes the
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Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

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We make a specialty of
**ELECTRIC RAILWAY
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We solicit a test of TULC
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The International Register Co.

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60 Miles of Interurban Railroad

between Cleveland and Ashtabula, Ohio

- 70 lb. Standard 6-in. T Rail.
- 92 mi. "000" Fig. 8 Trolley Wire.
- 150 mi. 250 M Circular Mill Feeder Copper.
- 40—Interurban Cars—40 and 50 Seating Capacity.
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- geared crank Shaper with Table Support, Vise and Counter Shaft.
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- 5—500 K.W. Westinghouse Rotaries—600 Volts D.C., 6 Phase, 60 Cycles, 1200 R.P.M. —A.C., Self Starting (in service 3 years). Transformers, Meters, Etc.
- 100—28-ft. Steel Poles.
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We invite inspection and inquiries

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Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a
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G-9

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30 Birney Safety Cars

Brill Built
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Rotary Converters

- 1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.
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| Birney Cars | 307 Westinghouse and other railway motors | Electric Welder |
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Railway Division

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(Continued on page 49)

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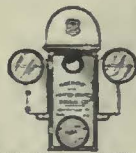
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Ohio Brass Co.
- Sash Fixtures**
St. Louis Car Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
Hale-Kilburn Co.
- Sash Metal Car Window**
Edwards Co., Inc., The O. M.
Hale-Kilburn Co.
- Scrapers, Track (See Cleaners and Scrapers, Track)**
- Screw Drivers, Rubber Insulated**
Electric Service Supplies Co.
- Seating Materials**
Brill Co., The J. G.
Haskelite Mfg. Corp.
Pantacote Co., Inc.
- Seats, Bus**
Brill Co., The J. G.
Hale-Kilburn Co.
- Seats, Car (See also Rattan)**
Brill Co., The J. G.
Hale-Kilburn Co.
- Second Hand Equipment**
Cleveland, Painesville & Eastern R. R. Co.
Electric Equipment Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.
Shades, Vestibule
Brill Co., The J. G.
- Shovels**
Brill Co., The J. G.
Hubbard & Co.
- Shovels, Power**
Brill Co., The J. G.
- Side Bearings (See Bearings, Center and Side)**
- Signals, Car Starting**
Consolidated Car Heating Co.
Electric Service Supplies Co.
Nat'l Pneumatic Co., Inc.
- Signals, Indicating**
Nichols-Lintern Co.
- Signal Systems, Block**
Electric Service Supplies Co.
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.
- Signal Systems, Highway Crossing**
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.
- Slack Adjusters (See Brake Adjusters)**
- Slag**
Carnegie Steel Co.
- Sleet Wheels and Cutters**
Elec. Ry. Equipment Co.
Hubbard & Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.
- Smokestacks, Car**
Nichols-Lintern Co.
- Snow-Plows, Sweepers and Brooms**
Brill Co., The J. G.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
- Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**
- Special Adhesive Papers**
Irvington Varnish & Ins. Co.
- Special Trackwork**
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.
- Spikes**
Amer. Steel & Wire Co.
Illinois Steel Co.
- Splicing Compound**
Westinghouse E. & M. Co.
- Splicing Sleeves (See Clamps and Connectors)**
- Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Brill Co., The J. G.
- Sprinklers, Track and Road**
Brill Co., The J. G.
Cummings Car & Coach Co.
- Stair Steps, Safety**
Irving Iron Works Co.
- Steel and Steel Products**
Carnegie Steel Co.
Illinois Steel Co.
Morton Manufacturing Co.
- Steel Car Doors**
Morton Mfg. Co.
- Steel Flooring**
Morton Mfg. Co.
Steel and Steel Products
Illinois Steel Co.
- Steps, Car**
Brill Co., The J. G.
Irving Iron Works Co.
Morton Mfg. Co.
- Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
- Stop Signals**
Nichols-Lintern Co.
- Storage Batteries (See Batteries, Storage)**
- Storage Tanks**
Bowler & Co., S. F.
- Strain Insulators**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Strand**
American Steel & Wire Co.
Roebling's Sons Co., J. A.
- Street Cars (See Cars, Passenger, Freight, Express)**
- Superheaters**
Babcock & Wilcox Co.
- Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**
- Switch Stands and Fixtures**
Ramapo-Ajax Corp.
- Switches, Selector**
Nichols-Lintern Co.
- Switches and Switchboards**
Consolidated Car Heating Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Switches, Tee Rail**
Ramapo Ajax Corp.
- Switches, Track (See Track Special Work)**
- Tampers, Tie**
Railway Trackwork Co.
- Tapes and Cloths (See Insulating Cloth, Paper and Tape)**
- Tee Rail Special Track Work**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
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Elec. Service Supplies Co.
Graybar Electric Co.
- Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)**
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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
- Ticket Choppers and Destroyers**
Electric Service Supplies Co.
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Carnegie Steel Co.
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International Steel Tie Co.
Ludlum Steel Co.
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Goodyear Tire & Rubber Co.
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Bethlehem Steel Co.
Carnegie Steel Co.
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Railway Trackwork Co.
Ramapo Ajax Corp.
- Track, Special Work**
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Buda Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Trackless Trolley Cars**
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- Transfer Tables**
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- Transformers**
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Graybar Electric Co.
Westinghouse E. & M. Co.
- Transmission Towers & Structures**
American Bridge Co.
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Morton Mfg. Co.
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National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
- Trolley Bases, Retrieving**
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
- Trolley Buses**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
- Trolley Material, Overhead**
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Westinghouse E. & M. Co.
- Trolley Wheel Bushings**
Star Brass Works
- Trolley Wheels and Harns**
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Star Brass Works
- Trolley Wheels (See Wheels, Trolley)**
- Trolley Wire**
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Amer. Steel & Wire Co.
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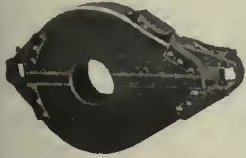
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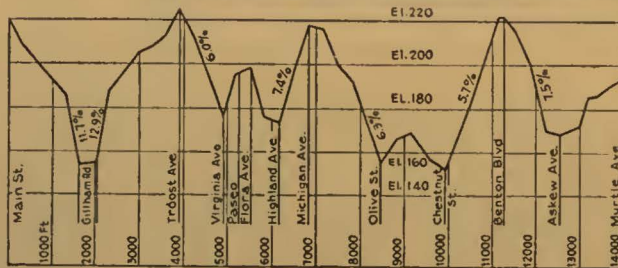
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