

# ELECTRIC RAILWAY JOURNAL

## *Bettering the Service Mileage of Railway Motors*

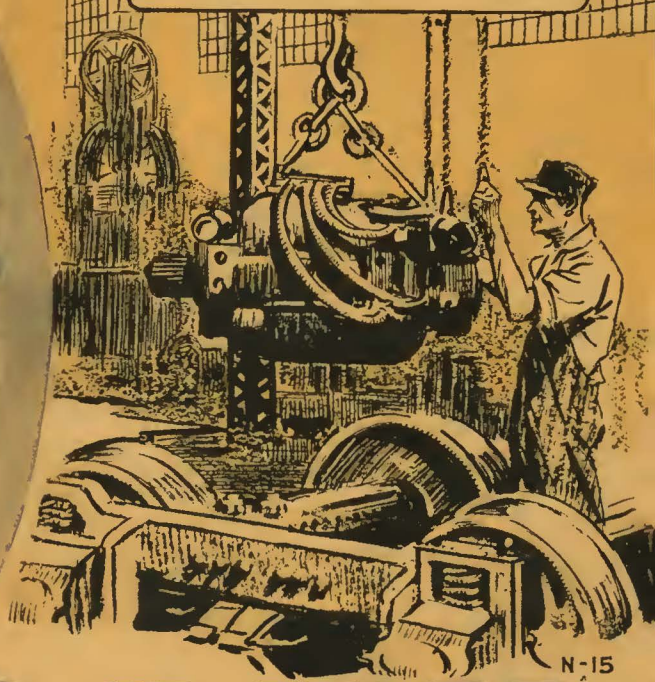
**H**OFFMANN Precision Roller Bearings combine the load-ability, the shock-ability, the speed-ability and the trouble-free simplicity which—in railway terms—mean maximum mileage with minimum maintenance.

Your motors can be Hoffmann equipped—ask your motor builder, or our engineer.

**NORMA-HOFFMANN BEARINGS CORPORATION**

Stamford — Connecticut

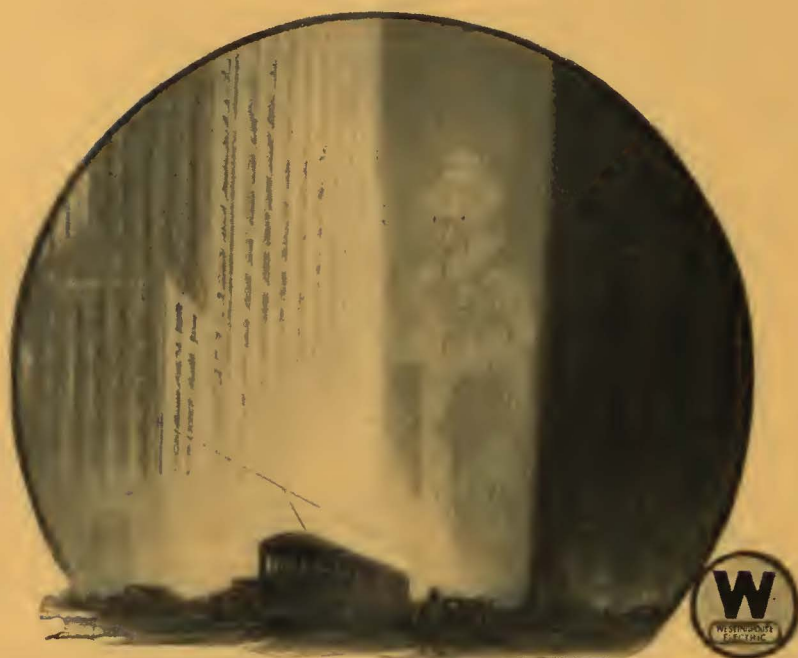
PRECISION BALL, ROLLER AND THRUST BEARINGS



# HOFFMANN

**PRECISION  
ROLLER BEARINGS**





## Again the Theme of the Convention— Equipment

"How can we attract more riders to the trolleys?" was the question at Cleveland—and again came the answer, written in the experiences of scores of successful railways—

**WITH MODERN EQUIPMENT!**

The cars of another year cannot compete with the private automobile of

today; new standards of comfort and service have been set up. Modern cities and modern people demand modern cars. Traffic figures prove that they patronize the modernized railway. Figures prove that people will ride comfortable, modern cars because they provide the cheapest, safest, and fastest mass transportation.

Westinghouse, for over thirty-three years conspicuous in the development of improved methods of mass transportation, offers to the industry and to every railway, large or small, the full benefit of its facilities and research, and the counsel and help of its organization in the solution of all equipment problems.

Consult the Westinghouse Salesman

Westinghouse Electric & Manufacturing Company  
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of  
the United States and Foreign Countries



1926

# Westinghouse

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# Again and again at the Convention—

we had brought home to us the importance of trackwork in the modern program of ride-merchandising.

Smooth, well-maintained track can do as much as comfortable cars to make riding a pleasure.

By reducing maintenance cost it becomes as important a factor of economical operation as the efficiency of modern mechanical equipment.

Moreover, it will go far toward eliminating noise,—an essential step in bidding for public goodwill.

And, judging by the number of prominently successful electric railway operators who were greeted by us at the Convention as old and satisfied customers, *we have the kind of track maintenance equipment that produces just such results.*

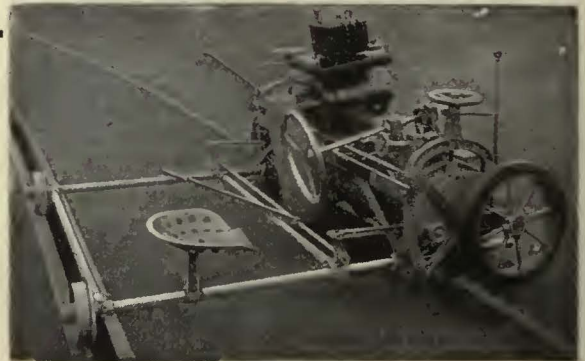
*Let us send you quotations and information on our complete line.*

## **Railway Trackwork Co.**

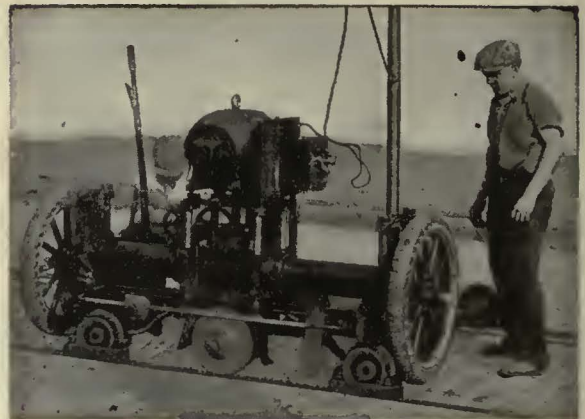
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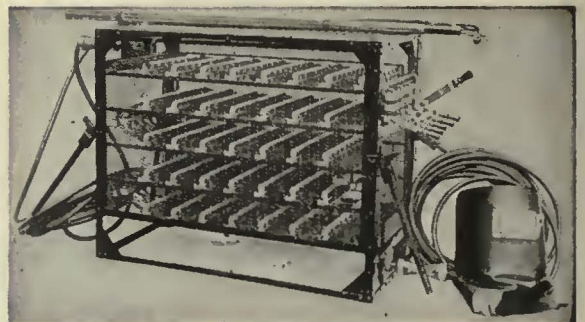
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder

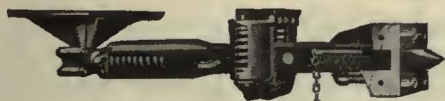


"Ajax" Electric Arc Welder

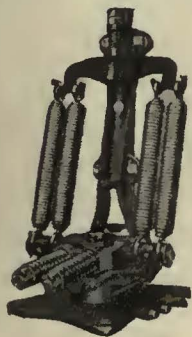




## The "Peter Caldwell"—a Symbol Of Modern Service



Tomlinson Automatic Couplers make all air and electrical connections. Air lines and electric circuits are interlocked by a disconnecting switch, insuring safe operation.



O-B Form 4 Trolley Base, with its long-life bearing and perfectly balanced spring assembly is ideal for both interurban and city service. Its special pedestal contact brush insures ample current capacity for operating a number of heavy cars in trains.



At left, roof-mounted Type SDH O-B Imperial Headlight. At right, O-B Imperial Type ZP Special Headlight.



The SDH Headlight, mounted on the roof of the car, is used for interurban service. The ZP Special Headlight, mounted in the car dash is for city service only.

WITH modern type cars coming into more general use there is marked improvement not alone in more economical operation, but in public relations. Street car patrons look upon the car itself as a symbol of the *quality* of service, and, as the Company's "customer attitude".

The Georgia Railway & Power Company knows how well car riders respond to modern equipment. Dedication of the "Peter Caldwell" car—the first of ten new interurban cars recently put in operation between Marietta, Stone Mountain, and Atlanta, Ga., was in every sense a civic event. Car riders showed that they appreciate modern equipment—that they take pride in the progressiveness of their street railway.

Of interest to street railway officials, particularly master mechanics, is the fact that O-B Tomlinson Couplers, O-B Form 4 Trolley Bases and O-B Imperial Headlights have a part in the operation of these modern interurban cars.

Ohio Brass Company, Mansfield, O.  
Dominion Insulator & Mfg. Co., Limited  
Niagara Falls, Canada  
207C

# Ohio Brass Co.



PORCELAIN  
INSULATORS  
LINE MATERIALS  
RAIL BONDS  
CAR EQUIPMENT  
MINING  
MATERIALS  
VALVES





## Can your cars "hold their own"?

City streets have become so crowded that there is constant competition between the various elements of traffic for the right of way.

If street cars are to meet this condition and hold their own in the general traffic movement they must be as mobile as other conveyances that use the streets.

## WESTINGHOUSE VARIABLE LOAD BRAKES



Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—*Ask for Descriptive Catalogue T-2045.*

An effective means of increasing car mobility is to provide brakes that will permit short stops, and the consequent longer period of peak speed operation and shorter running time between stops. With ordinary brakes, however, the retarding force which is satisfactory for the empty car is less effective when the car is loaded, so that the stopping distance lengthens, and this usually happens just when other vehicles are also contending for the right of way.

The Westinghouse Variable Load Brake was designed to correct this condition. It automatically adjusts the retarding force as the weight varies, so that the stopping distance is constant throughout the range of car loading. This results in accelerated transportation service just when the greatest possible hauling capacity is needed most.

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





## 4 miles with Twin Ties on the P. R. T.

One of the 30 odd installations of Twin Ties now in progress, or scheduled for the present season, illustrated above, is in Philadelphia.

Several separate jobs using either Standard Twin Ties laid on a renewable base, or Renewal Ties being used to build new track over old

concrete base, are now in progress there.

We have prepared a folder describing all details of this work, part of which was done under traffic with quick-setting concrete, which we will be glad to send all interested railway men.

THE INTERNATIONAL STEEL TIE CO.  
Cleveland, Ohio

# Steel Twin Tie Track

Renewable Track      Permanent Foundation





## Safeguarding the fair and fare

Car riders and car revenue both need protection. Efficient transportation service demands that traction companies make their cars safe and make them save. You can make your modern cars **SAFE** by interlocking the control, brakes, and doors. You can make them **SAVE** by thus centralizing operating responsibility in one man whose duties are properly safeguarded and simplified by complete protective and labor-saving devices.

We make the Safety Car Control Equipment which makes the Safety Car.

Safety Car Control Equipment assures that the fair can go safer and the fare go farther.



# **SAFETY CAR DEVICES CO.**

OF ST. LOUIS, MO.

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

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



and now—

# Franklin *Announces* a New Suspension Insulator

New suspension insulators of vastly improved design are now available. Casting aside the ordinary construction and assembly, Franklin is leading the industry by the development of new and better methods—methods which will at once convince you are but common-sense applied to insulator design.

Electrical failure of insulators is due to weakening thermally and mechanically, so that the porcelain no longer insulates. The higher the test strength of the insulator, the longer it will stand the strains of service before reaching the point of ultimate fatigue.

The cement surfaces of the new Franklin Suspension Insulator are covered all over with a coat of expansion compound, giving a resilient joint, and protecting it against thermal strains.

Mechanically, through corrective load application, the standard Franklin Suspension Insulator withstands tests for combined Mechanical and Electrical strength of 22,000 to 23,000 lbs. making it comparable to the ordinary so-called heavy-duty insulator.



*Patent Applied for*

Manufactured by  
FRANKLIN PORCELAIN CO., Norristown, Pa.

## ELECTRIC SERVICE SUPPLIES Co.

*General Sales Agents*

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## Georgia Railway & Power Co. Atlanta Ga.



New Interurban Cars

### Okonite Products

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CABLES  
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CAMBRIC  
CABLES

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TAPES

OKONITE  
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OKOCORD  
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### Okonite- Callender Products

IMPREGNATED  
PAPER  
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SUPER-  
TENSION  
CABLES

SPLICING  
MATERIALS



New City Cars

Wired throughout with  
**OKONITE**

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FACTORIES: PASSAIC, N. J. PATERSON, N. J.  
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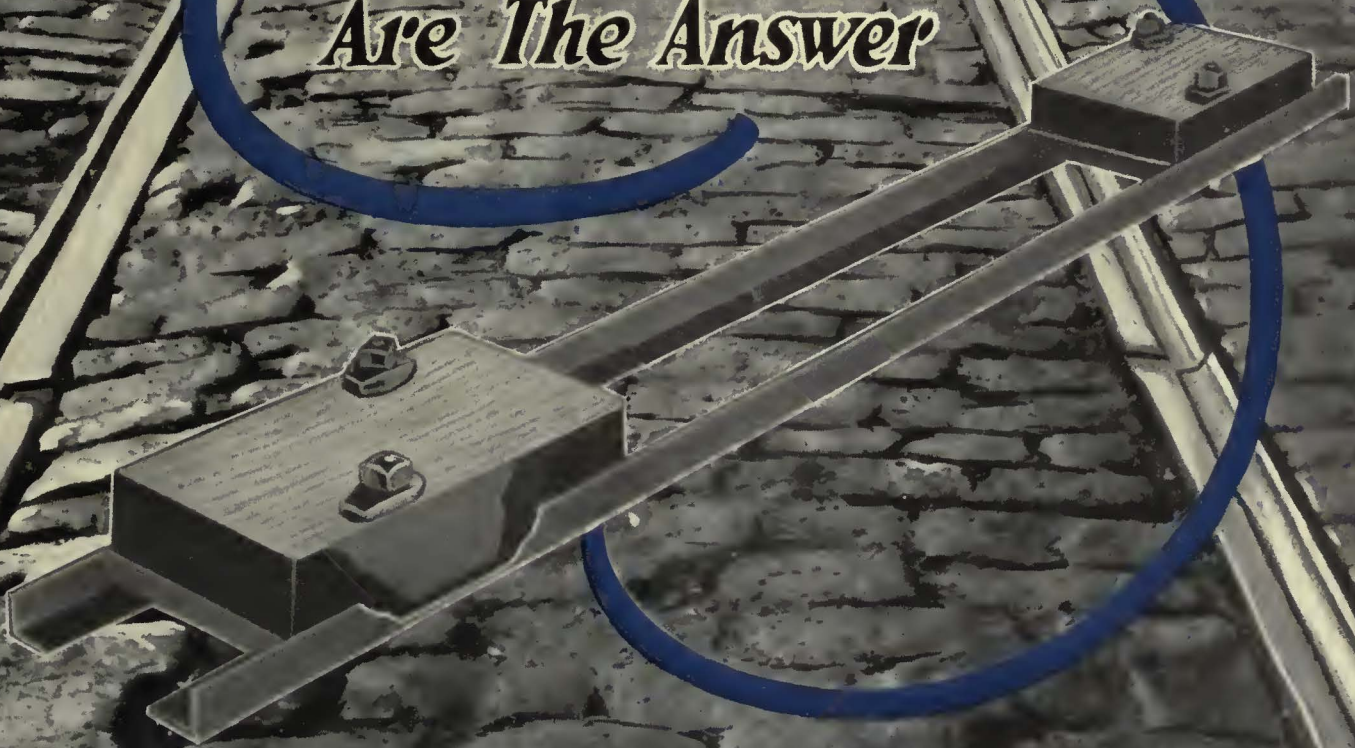






# **Costly Rolling Stock Deserves Better Track Than This**

*Dayton  
Mechanical Ties  
Are The Answer*





# *Track Laid On Dayton Mechanical Ties Is Gentle With Rolling Stock*



## *Track Laid On Dayton Ties 11 Years Ago—In Perfect Condition Today*

Costly, splendid new rolling stock is doomed to rapid destruction if track over which it runs is not kept smooth. Vibration of traffic breaks down ordinary track, and bad track in turn destroys cars. Repairs shoot up alarmingly.

Dayton Mechanical Ties provide an in-built, permanent resilience which absorbs all vibration and shakes. Dayton

Tie track stays in perfect condition with very little maintenance for years—installations made 11 and 12 years ago look good for many years more.

Perfect smoothness, plus resilience makes such track remarkably easy on rolling stock, and unusually quiet.

Let us tell you how Dayton Ties have saved rolling stock for others.

# *The Dayton Mechanical Tie Co.*

**DAYTON, OHIO**



# Milwaukee has 764 Economy Meters

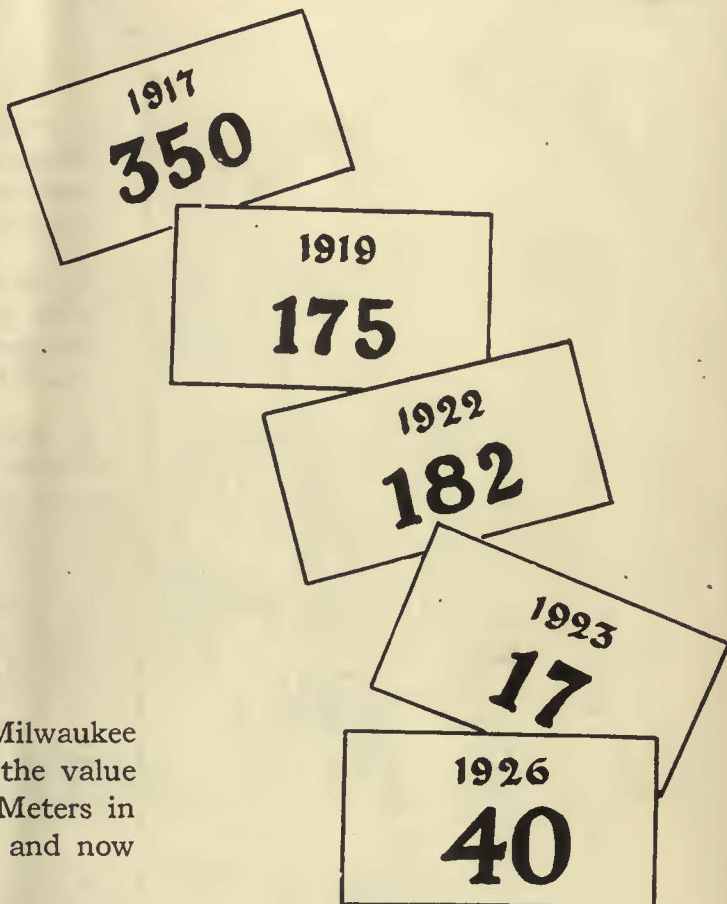


**INSPECTION DIALS**  
The Economy Meter with Car Inspection Dials is readily adaptable to any electric car or locomotive equipment.

**E**XPERIENCE has shown The Milwaukee Electric Railway & Light Company the value of Economy Meters. Starting with 350 Meters in 1917 they have continued to order more and now have 764 in use.

The Economy Meter through its proved ability to induce savings in power consumption and in car house labor has become the standard on more than 200 roads. The savings accomplished are from  $\frac{1}{3}$  to  $\frac{1}{2}$  cent per car mile.

You can buy a complete equipment of Economy Meters at a monthly rental of less than one half the value of the power you will be certain to save. Let us show you an estimate of savings, operating, and rental costs for your conditions.



## Economy Electric Devices Company

37 W. Van Buren St., Chicago

Cable Address: Sangamo, Chicago

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Sangamo Economy Meters    The Air Rectifier

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**METER THE ENERGY—THAT'S WHAT YOU WANT TO SAVE**



# The call is for cars

**1. "Curved Side Construction" wide seats and aisle with ample vehicular clearance.**

**2. Windows set in Cast Aluminum Side Frames—light weight, and non-rattling.**

**3. Superstructure tied to bolsters with high carbon steel bows continuous from side sill to side sill.**

**4. Scientifically Correct Lighting and Ventilation.**

**5. Duplex Air and Magnetic Brakes**

decelerating from 60 mph to stop in less than 800 feet in a period of 14 seconds.

**6. Special intermediate full length door hinges prevent sag.**


**7. Furniture Finish Armco Rust Resisting Side Panels.**

**8. Case-Hardened Alloy Steel wearing parts on trucks.**





# that **STAND OUT**



## BALANCED DESIGN

*is as specific in application  
as it is positive in results—*

Out of the most successful of all conventions comes a NEW conception of the modern car,—a passenger-attractive transportation vehicle that will **STAND OUT** among all its competitors.

Everyone who visited the Cincinnati New Car Exhibit at Cleveland noticed the difference at once. They realized that here at last were cars so thoroughly up-to-date in design and appearance as to make an immediately favorable impression.

Balanced design is no mere engineering term. Its application as the dominant principle of Cincinnati Lightweight New Car construction has resulted in many improvements as specific as they are original.

By boldly breaking with precedent in bringing both design and actual building of Cincinnati Cars under one experienced supervision, it has been possible, accurately to balance each separate detail of construction in its relation to the whole. The completed unit thus expresses in every line and feature, the one purpose for which

it was built,—be that purpose high speed interurban, moderate speed interurban, freight, or modern city service.

But Balanced Design goes further than this. Radical measures were necessary to lift the electric railway car to its rightful place among 20th century transportation agencies. And some of the improvements listed on these pages, which are an important feature of Cincinnati Balanced Design, might be considered radical in the light of older practice.

One thing is certain, however,—each and every one of these improvements has behind it sufficient operating data to prove conclusively its claim as a practical contribution to low-cost, passenger-preferred electric railway service. The formula is fixed and results can be duplicated!

Such data and the experiences of many successful Cincinnati Lightweight New Car operators are kept in our files,—available to any interested electric railway executive on request.

CINCINNATI CAR COMPANY  
CINCINNATI, OHIO

CINCINNATI  
*New*  
CARS



*A step ahead of the modern trend*



# American BROWN BOVERI

## 4. Very

Mercury-arc power rectifiers are completely proof against damage from short circuits on the line, as there is nothing which can burn out in the interval before the circuit breakers trip. Sharp peaks, of momentary duration, such as are customarily incurred in traction operation, are readily handled by the Mercury-Arc Power Rectifier, even up to several hundred percent over normal rating.

*Steel enclosed  
no glass parts*



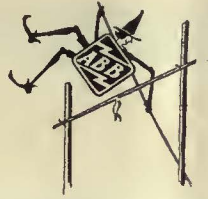
### Principal Products

Mercury-Arc Power Rectifiers  
(steel enclosed)  
Electric Locomotives—for any  
system of current, high or  
low tensions  
Complete equipment for rail-  
way electrification  
Rotary Converters  
Motor Generators  
Diesel-Electric Locomotives

Mining Locomotives  
Switches, Controllers and all  
Auxiliary Equipment  
Automatic Regulators  
Steam Turbo Generators for  
normal or high pressures  
and superheats  
Oil Switches  
Condensers and Auxiliaries

Relays  
Turbo Compressors and Blowers  
Electric Furnaces  
Induction Regulators  
Ships  
Diesel Driven  
Turbine Driven  
Electrical Driven  
Structural Steel Fabrication





# Mercury-Arc Power Rectifiers

## High momentary overload capacity!

### Chief Advantages

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

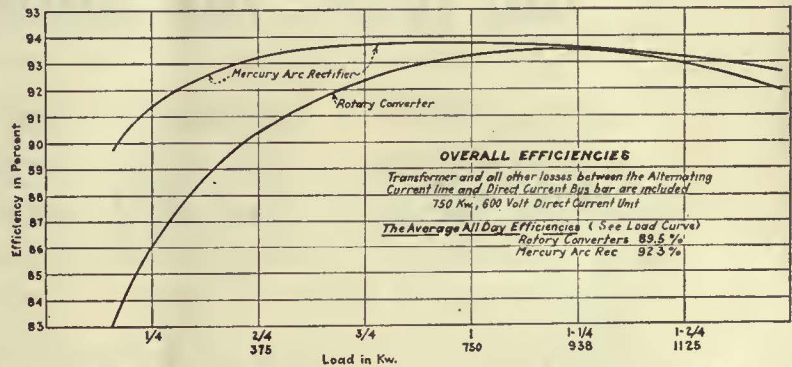
With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V.

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

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

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

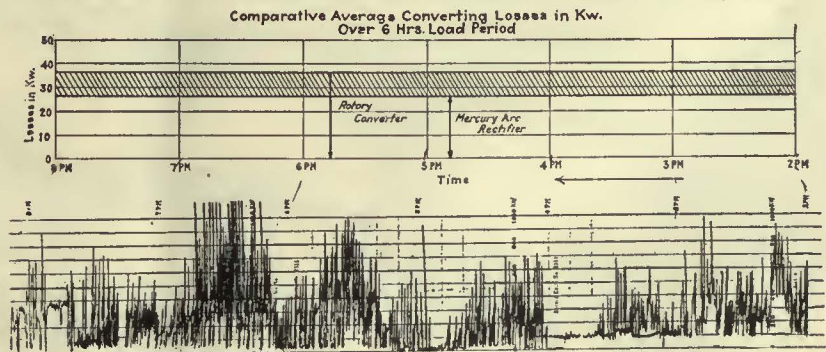
for Rotary Converters..... 89.5%  
for Mercury Arc Rectifiers..... 92.3%



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

the INTEREST ON MORE THAN \$10,000.00.

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



American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y.

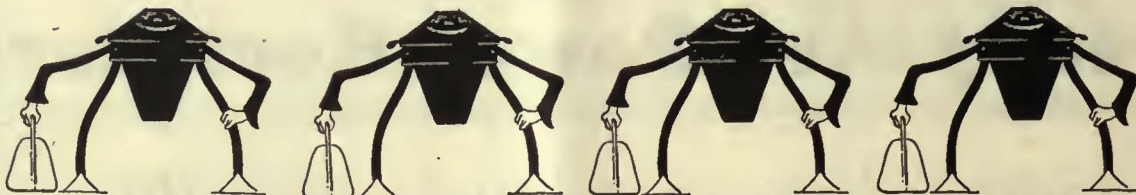
Camden, New Jersey

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



# AMERICAN BROWN BOVERI





## The Convention is over but we're not going home!

No doubt about it, the industry is out for *action*. We ourselves had an *action* exhibit. We showed how simply and quickly Thermit Welding can be done. We demonstrated the advantages of a smooth continuous jointless track and we proved beyond doubt its greater economy in maintenance.

So they who came, listened and went away convinced.

And we're going out right now to help many a forward looking property to a worthy road bed for its new cars.

If by any chance you were not at Cleveland, and could not see the instructive Thermit Welding Exhibit, when the actual work was demonstrated in all its phases, have one of the Thermit engineers come and see you. Everything claimed for the Thermit Weld can be proved to your satisfaction. Installations all over the World give ample actual operating data. We'll gladly "show" you.



**METAL & THERMIT CORPORATION**  
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO



# AS LOGICAL AS THE BALANCING OF SCALES



To obtain the unknown weight of an object, by balancing it with known weights was one of the earliest scientific developments. This principle of equalization of forces has had countless practical applications. It is logical.

In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes the tendency to one-sided wear on journal bearings, pedestals and other truck parts. It affords smoother braking with less heating of brake shoes, and reduces the number of "slid-flat" wheels.

In short—it is the modern and scientific braking system—which is finding increasing favor for heavy traction, and rapid transit service.



**AMERICAN MULTIPLE-UNIT  
CLASP BRAKES**



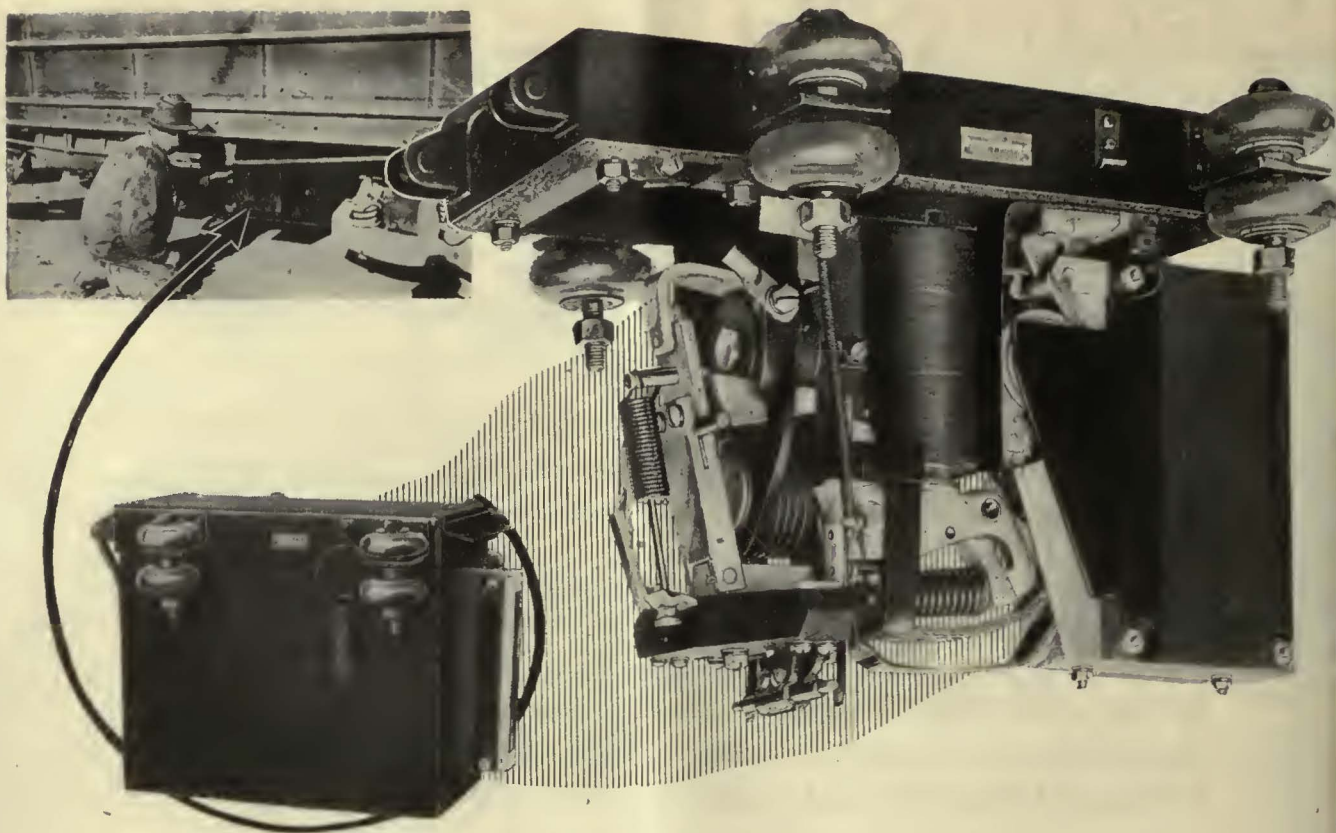
## AMERICAN STEEL FOUNDRIES

NEW YORK

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ST. LOUIS





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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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## A New Day in Local Transportation Dawned in Cleveland

THE 45th annual convention of the American Electric Railway Association has just come to a close in Cleveland. What a convention it has been! In years to come it will stand out as a landmark on the route of progress; as the turning point in an industry's awakening. To say that this convention has exceeded the expectations of the most optimistic is putting the situation mildly. As sometimes happens when the minds of individuals turn toward a common objective, the spirit of the group becomes contagious and sweeps along the doubting Thomases as it rises in a mighty tide of confidence and enthusiasm.

At Cleveland there was more than abstract opinion. There was more than mere enthusiasm. There was concrete evidence not only of confidence and progress, but of the fact that this is only the beginning of a new era in local transportation. All records for an electric railway exhibit were exceeded. The industry rubbed its eyes in amazement to find itself staging an exhibit which, so far as can be determined at this time, exceeds any other similar independent exposition ever held in this country for a single industry. Surely such an event is significant for the industry which Mr. Loree and other false prophets were ready to relegate to the scrap pile!

A total of 271 exhibitors occupied 119,007 sq.ft. of inclosed space and 1,790 lineal feet of track space. There was a total of 41 different car exhibits by 19 companies. Ten companies showed operating maintenance of way equipment. Bus, truck and body manufacturers, totaling 31 companies, occupied 43,283 sq.ft. of space. Including the area of car and operating track maintenance exhibits, the entire space occupied approximated 200,000 sq.ft.—a staggering total. It is particularly significant that the car exhibit was the largest ever held in the history of the industry.

Nor did the size of the exhibit exceed in its significance the proceedings of the convention. A renewed confidence and determination to drive ahead along constructive lines was voiced by leader after leader in the transportation world. Back of the words themselves was evident a spirit and an enthusiasm which was felt by every delegate from low to high position. The impression of the opening of a new era in transportation was strengthened by the addresses of men representing the public's viewpoint. There was general recognition of the need for organized transportation, of the difficulties attending the effort to give convenient and efficient service, and of the extent to which individual right to the use of streets and highways must be curtailed when that becomes necessary in the community interest on the principle of the greatest good to the greatest number.

Thus in all of its phases the Cleveland convention was full of significance. The local transportation industry

has definitely taken the offensive in building its business. It has a determination to win back its prestige in the eyes of the public and the bankers of the country. It is no longer passively awaiting help from an uninterested public. It is moving forward rapidly in a program of self-improvement which offers the only known means of winning public support and good will.

## Engineering Is Made the Servant of Transportation

**D**ISTORTED ideas as to the place of engineering in electric railway operation were conspicuous by their absence at the Cleveland convention. In the past the engineer too often has forgotten the part he should play and has exaggerated the importance of some technical detail until in his eyes it loomed larger than the successful operation of the cars. On the other hand, a tendency has been in evidence sometimes to regard the engineer as a kind of superfluous appendage to the organization, one whose views are interesting, but of no great practical value.

At Cleveland, however, the proceedings of the Engineering Association portrayed the members as technical specialists whose job it is to make better transportation service possible. How to increase the comfort of the passenger, improve the appearance of cars, speed up operation, reduce costs, eliminate noise, and insure reliability of power supply are examples of problems the engineers are tackling today.

Only a few speakers were so obsessed by their own hobbies that they could not see the larger picture. Suggestions that certain power and track troubles could be avoided by running the cars at slower speeds fell on deaf ears. To solve the technical problems that confront the industry, not to evade them, was the attitude of the great majority of the engineers. To make engineering the servant of transportation was shown to be the firm determination of this association. With this high purpose the achievements of the coming year promise to surpass the commendable accomplishments of the twelve months just ended.

## Convention Exhibits Formed a Vast Educational Display

**I**N SIZE, cost and educational value, the exhibits at the Cleveland convention of the American Electric Railway Association surpassed any transportation exhibit ever held. The influence that they will exert on electric railway men who were fortunate enough to view the magnificent display should produce a decided result toward providing faster, safer and more attractive transportation.

The vehicles, rolling stock, equipment and materials shown were for construction and operation, however, rather than maintenance. Shop equipment such as



machine tools, material handling apparatus and labor-saving devices for repair shop usage were few. This deficiency, however, was made up for, somewhat, by the close proximity of the Harvard shops of the Cleveland Railway and large numbers of mechanical-department delegates took advantage of the opportunity to inspect these well-equipped and efficient railway shops.

All classes of electric railway delegates obtained much of interest and value from the very complete car and bus display. The car exhibit was not only the largest ever assembled but it was complete in that cars for all classes of service and work were shown. A large number of operating companies took exhibit space and sent their most attractive cars to Cleveland at their own expense in order that the industry as a whole could profit by the attractive designs. Many other railways loaned cars to various manufacturers for display at the convention.

The importance of buses in rounding out a complete transportation system was admirably illustrated by the 79 bus and chassis units shown. Parlor cars or similar designs with wide window drapes predominated. The city type has grown so luxurious that it is hard to make a clear separation from the deluxe type. The big thing of the bus displays and the biggest of all exhibits was the continuing note of the enlarged passenger automobile and the realization that the rider must be weaned away from his unit of individual transportation.

For the first time in the history of the association a display of line material over tracks was shown. Also street lighting fixtures had a prominent place in the Cleveland exhibits.

The importance of accessories to electric railway transportation was shown by the vast displays devoted to these lines. Every detail needed for construction and repair of buses and cars was displayed and also devices needed for conducting transportation in the most efficient and attractive manner. Among these were included paints, varnishes, lubricants, fare boxes, registers, turnstiles, cables, wheels, shoes, bearings, lighting equipment, as well as signals, ties, rails, frogs and switches. Bus accessories included tires, leathers, seat covering, speedometers, transmissions, brakes and many detail bus parts.

### Advisory Council's Principles Point the Way to Success

**A**CAREFULLY prepared, conservative statement of principles is contained in the address of B. C. Cobb at the meeting held Tuesday night under the auspices of the Advisory Council. While he expressed deep faith in the industry and paid tribute to its courage in the past, he did not stop there.

Mr. Cobb gave a warning that his remarks might be considered pessimistic. But in reality they are not so, for electric railways are needed and will continue to serve the public. He feels that it is idle for the railways to sit back expecting the public to take the initiative. He insists that the facts in the situation must be faced and that there are serious problems to be solved. He advocates frank publicity and courageous recognition of these facts. He holds that electric railway employees as well as their managements must have the interests of the industry at heart to assure success.

Mr. Cobb did not leave his audience in the dark, groping for a way out. He told them what is needed—modern methods and equipment, improved service, sales-

manship, employee interest, frank publicity. He made concrete these general statements in a code of principles—a list of things the companies, the employees and the public must do, which he laid down as the fundamentals of success for the electric railway industry.

Mr. Cobb spoke not from theory but from practice. The Advisory Council has followed closely the experiences of properties which have been applying these principles. Mr. Cobb himself has the general responsibility for many properties on which they are being worked out in practice.

Courage, determination and energy are needed for success. When these are guided and tempered by the sound business judgment laid down in the Advisory Council's principles, success may be reasonably expected.

### Real Progress Made in Solving Corrugation Problem

**O**PTIMISM concerning the eventual solution of the old problem of rail corrugation was evident in the sessions of the engineering association. The final answer has not yet been found, but definite progress undoubtedly has been made.

Corrugation is a problem which has been remarkable for its periodical recurrence during the history of the industry. As soon as some one finds what he believes to be the exact cause of this mysterious malady some one else comes along and upsets these conclusions by finding that neither the cause nor the cure is applicable to the disease as it occurs on his property. Rolled steel and cast wheels, rigid and flexible roadbed, tight track and loose gage, vibration, wheel slippage, cold rolling of the rail metal and chattering brake rigging are a few of the many elements around which theories of cause and mitigation have been built up.

Summing up the causes and remedies suggested by the committee and various speakers contributing to the discussion, it appears probable that all of the apparently conflicting explanations are correct and that they represent simply different phases of a problem containing many variables. If this be a true conclusion, then many of the paradoxes and anomalies of the problem can be understood. Under certain conditions it may easily happen that one factor, such as tight gage, would be so influential that it becomes the proverbial straw that breaks the camel's back. Thus it might appear to be the direct cause of corrugation, whereas in reality it is only one of a number of contributing causes. In other cases a different factor might be predominant and seem to be the active cause, the mitigation of which would bring relief. This theory of many variables is the more credible because in other fields of scientific endeavor similar elusive problems, when solved, have been found to be influenced by a number of factors.

The special committee on rail corrugation is attempting to gather and analyze all the data that it can secure before trying to formulate conclusions as to causes and remedies. Obviously this is the proper procedure. Loose generalizations based on inadequate data and personal opinion are often dangerous. Worth-while advances in medicine, physical sciences and engineering usually have been based on analyses containing adequate data and experimental evidence and drawn with an open-minded attitude. Good reasons exist to hope that the same method will in time solve the perplexing problem of rail corrugation.



## Street Car Progress Reflected in Cleveland Exhibit

**P**LEASING appearance, comfort and general attractiveness stood out in the car exhibit at the convention as the present day objectives in car design. Combined with this there was evident in most of the exhibits a continued development toward one-man operation and light-weight construction. From the general lines and appearance of the various cars displayed to the details of truck and body construction there was much to hold the interest of railway operators in this, the largest street car exhibit in the history of the industry.

Operators, as well as manufacturers, joined in making such a showing possible. Many of the cars were taken out of actual service on properties where they have already demonstrated their value in building traffic and reducing costs. New ideas were legion, and interest in the exhibit ran high. Thousands of electric railway executives manifested by their questions and their attention to these cars the thought being given throughout the industry to the subject of car improvement.

New construction features and the use of new materials were evident as never before in a car exhibit. But marked as were some of the improvements shown, and wide as was the variety of new ideas represented, these may be considered only the beginning. Discussion between operators and builders was rife with possibilities. The exhibit itself was in this respect only symbolic of the plans which are already under way on various properties in the country to bring about even more radical changes in design.

Much interest centers in the construction of trucks. There are under way at the present time several efforts to reduce the amount of unsprung weight incident to carrying the motors directly on the axles. Various forms of bevel or worm gear are being proposed, which would not only accomplish this but would also provide oil-tight housings to improve lubrication and reduce noise.

All in all, the Cleveland exhibit, although it was the greatest ever held by the industry, appears to be just the beginning. The next year will be one of intensive research and accelerated development. Electric railways are genuinely interested not only in new cars but in further developments to increase their attractiveness and improve their performance.

## Carry the Convention Home with You

**W**HEN President George Clifford said "Take the ideas home and put them to work," he gave the one message that can justify the extensive sessions of the Transportation & Traffic Association work. Four valuable reports were presented this year and much pointed discussion followed. All this will be of no avail if operations that may be lacking in some essential details go unchanged as a result of these reports. The subject of traffic congestion and accidents is ever upon the industry. Bus operation is still in its infancy. Papers and reports at the convention represent the most modern thinking on these subjects.

The suggestion of Mr. Clifford is equally applicable to the work of all the associations. Committees have been working, some for a year, but many for much longer periods, and developing important information as a result of research and experiment. There is mate-

rial of value in all of the reports, instantly available. The convention is not over. It should never be over until the material and ideas presented have been exhausted by every operator. No better message can be drawn from the association work this year than to "take the ideas home and put them to work."

## Tragedy at the 45th Convention Must Not Mar the Inspiration of a Great Life

**A**CCOMPANIED by one of life's dramatic tragedies, the setting for which has never before been equaled, the 45th convention will long be remembered. After an active life of 63 years devoted so intently to the promotion of the electric railway industry, John J. Stanley culminated his career by bringing this remarkable convention to Cleveland. At the close of the first day, and at the conclusion of his "president's dinner" to some 60 leaders of the industry and life-long friends, Mr. Stanley passed to the Great Beyond. His death occurred at the very hour, even at the very minute, that marked the pinnacle of his remarkable career. To those who knew him best, it was a fitting setting despite the sadness. He died in harness and among the friends he loved best.

Often the burden of such events bears heavily on those left behind. Realize the effect on Mr. Stanley's lieutenants who did so much to bring this exhibition to a successful conclusion. The work to carry on for the remainder of the brief week was enough to try the hearts of strong men.

Now is the time to think of the greatness of accomplishment and to forget the play of fate that so dramatically linked the passing of this great leader with the recent migration to Cleveland. After all, death is only a natural step in the process of life that can be enhanced by a firm resolve to carry on to loftier heights the ideals created by John Stanley.

## Changes in Program Caused by Mr. Stanley's Death

**T**HE death of Mr. Stanley on Monday evening just at the opening of the convention necessarily affected all plans during the rest of the week, the most important change being the abandonment of the entertainment features. Of course, in cases of this kind, two views are always possible. One would be that the success of the convention and a pleasant time for every one were undoubtedly the two greatest desires of Mr. Stanley for some time prior to his death, and that respect for his memory would best be shown by very few changes in the program.

The other view would be that the convention was being held in Mr. Stanley's home city, so that, in a sense, he was host of the association, and that as he was held in such great respect both by members of the association and by the people of Cleveland, the action taken was appropriate. The latter view was the one taken by the most intimate personal friends of Mr. Stanley who were consulted, as well as by the city authorities, so it is the one which prevailed. The sessions and the exhibits went on as usual except for a few changes in time for the meetings and opening of the exhibit to the public Thursday night, as well as on Wednesday night, in accordance with an expressed wish by Mr. Stanley on the day of his death, that the Cleveland people might see more of the exhibits.



# Entire Industry Shocked by Death of John Stanley

Veteran Leader Passes Away from Heart Failure on First Day of Convention—Delegates Unite in Testifying to Ability and Sterling Character of Cleveland Railway's President

"IN the midst of life we are in death." Seldom have the words of the psalmist been more forcibly brought home than they were in the sudden death last Monday night of John J. Stanley, president of the Cleveland Railway, during the progress of the convention of the American Electric Railway Association in that city. In that call not only his immediate associates mourned, but a whole city suffered a loss well-nigh irreparable.

The gracious host who made possible the Cleveland convention died from heart failure at the Union Club about 9:30 p.m., shortly after the close of a dinner he had given to visiting electric railway executives.

During the dinner, Mr. Stanley was apparently at his best. With some 60 leaders of the industry and life-long friends as his guests at the club, he acted as toastmaster. At 8:55 p.m. he announced that the dinner would adjourn to the auditorium for the president's reception. The guests tarried and were gradually leaving. All but a dozen or so had left and Mr. Stanley was chatting with some of his friends in the lobby of the club when he suddenly called to Paul Wilson, secretary of the Cleveland Railway, who was with him, "Come quickly, Paul, I want a doctor." This was a little after 9 p.m. Dr. Henry Prill, assistant surgeon of the Cleveland Railway, was soon located in the Statler Hotel across the street. But when he arrived five minutes later the genial host of the convention was beyond medical aid.

His best friends said of Mr. Stanley that he died as he had always wished—"in the harness." This 45th convention, for which he worked so hard, was a climax to his career as a pioneer in the industry which he loved so well and to which he had devoted practically his entire business life.

John J. Stanley typified the hard-working, aggressive man who has devoted a whole working lifetime to the upbuilding of an industry. Born on March 5, 1862, he soon made up his mind that the destinies of the trans-



JOHN J. STANLEY

portation business were to be his own. His father had been president of the old Broadway & Newburgh Railway, forerunner of the present Cleveland Railway system. Perhaps that explained John Stanley's choice of a career. At any rate, his own pathway was not strewn with roses.

He entered the railway business at the age of 14 years. His duties were those of "hill boy," in the horse-car days. Although the son of the president of the company, his early days were difficult ones. No great esteem for the railway filled the minds of patrons. But through it all John Stanley came triumphant. He was first promoted to be an inspector and at the age of 29 years was the youngest general manager in the country. This was in 1891.

When the Tayler grant was put into effect sixteen years ago John Stanley was elected president of the Cleveland Railway. Previously he had been vice-president and general manager. The creditable record was his of having been president of a metropolitan railway company longer than any other man in the country.

Mr. Stanley's activities throughout his career have been directed, not only to the furthering of the street railway fortunes, but to the end of general civic growth and betterment. His love of the city in which his life has been lived was great. Opportunities in other sections of the country were frequently offered to him. But he had set out to do a big job there and with single-minded intent, he stuck to his task through adversity and ultimately achieved success. His place was a great one—his memory, and the breadth of his interest in the city of Cleveland and its transportation future will live with Cleveland and with the electric railway industry.

It is very easy to grow laudatory; but words, no matter how forcefully or gracefully used, do not convey the message that is carried in acts. And it was the acts of John J. Stanley that made the man what he was. When a whole city goes into mourning for a man, when flags are at half mast for him, when police and firemen



## Resolution by the American Electric Railway Association

*The committee appointed by the Executive Committee to prepare a memorial on the death of Mr. Stanley submitted the following:*

**A**LMOST at the start of this great convention of the electric railway industry, the man whose enthusiasm, whose executive ability and whose generosity was in large measure responsible for its being, has been stricken by the hand of Death.

John J. Stanley is no more, and the industry, this association as an organization and its members as individuals have suffered an irreparable loss.

A pioneer in the electric operation of street railways, through his long career as an executive, John J. Stanley kept abreast with progress;

a man of human understanding and human sympathies; he maintained with the public he so well served friendly relations worthy of our emulation; a man of keen business knowledge and acumen, he successfully conducted the affairs of the public service corporation of which he was the head; a man of fairness and justice, John J. Stanley had the respect and love of those who served under him. These attributes made him a leader in the industry which this association represents, and gave to his advice and counsel a peculiar value. His service to the association while its president and

as a member of its executive and other committees cannot be overestimated. But it is as a loyal and faithful friend, genial, kindly and self-sacrificing, that all who knew John J. Stanley will best remember him, and these memories of his friendship will forever remain in our hearts.

Our sympathy is extended to the family and personal associates of our dead leader. We realize to the full the extent of their loss and we share with them their sorrow.

Let this memorial be spread upon the association minutes and a copy be sent to the family of John J. Stanley.

pay a citizen in private life the respect the residents of Cleveland did Mr. Stanley, there is something tremendous that moves the public. The Cleveland system shows it as the outward symbol. The public reflected it by their acts of respect to the man who had died.

It is not unusual in these United States for men to rise to power and riches from humble beginnings, but too often men forget their beginnings. This Mr. Stanley never did. As the psalmist said: "He heapeth up riches; and can not tell who shall gather them." Of the

riches Mr. Stanley heaped up for his beloved city all Cleveland will share. He was a refuge for Clevelanders for generations. There was a natural body and a spiritual body to John Stanley, and despite all the turmoil of the past in Cleveland at all times the spiritual took precedence in this man. Long after the present generation that knew Mr. Stanley as railway president and as a civic force shall have passed, the recollection of him as a civic force will endure. His work assures that.

## Tribute from Railway Executives

*At the opening of the session of the American Electric Railway Association on Tuesday morning, resolutions of the executive committee on the death of Mr. Stanley were read and approved. In addition four executives paid individual tribute to Mr. Stanley's memory.*

*From remarks of*

THOMAS N. McCARTER

"Mr. Stanley was to my way of thinking the most successful type of operator that the industry has known, and the result is the wonderful Cleveland Railway system which has passed so many vicissitudes; which is, perhaps, the premier electric railway of the country. Mr. Stanley believed in what was right and he went after it.

"Personally, I feel I have lost an intimate friend. His work will go on. He has a splendid organization here in Cleveland. No man could run a great company without this. The industry will sorely miss him."

*From remarks of*

GEN. GUY E. TRIPP

"A man, to be a successful street railway manager, must be honest minded, he must be sincere and truthful, he must hold steadfastly to principles and that is what John Stanley was and did.

"Cleveland has lost a great asset

because there aren't many citizens in any city like John Stanley; men who are public spirited, men who try to do things for the public good with the least possible selfishness involved in it. Therefore, Cleveland has lost a valuable citizen. It has also lost a very valuable servant, a valuable public servant, because it is obvious that there is no better operating transportation system anywhere than you see here in Cleveland."

*From remarks of*

LUCIUS S. STORRS

"Doubtless there is no man in the electric railway industry of America whose advice and counsel were sought more by those who were confronted in their individual relations, with their own particular problems, or in the possible change in relation from one property to another, than John Stanley. The trail to John's door has been beaten by the feet of many of the men here today. We feel a great loss and those of us in the association feel the loss of advice

and counsel which he always gave with so deep an appreciation of human problems."

*From remarks of*

ARTHUR W. BRADY

"No member of this association could have passed away whose death would have created a greater sense of personal bereavement among so many members of the association as that of the man who passed beyond last night.

"One feature that I think all of us felt, whether we knew John J. Stanley well or whether we knew him only slightly, is that in him the electric railway industry had at the head of one of its most important agencies an individual who was a real man, quiet, unassuming, loyal and a true friend to every man whom he knew, and fair and just to the public that he served, as well as to those who joined with him in giving the service which has created the magnificent railway that exists in the City of Cleveland."



# Willits Herbert Sawyer

*Newly-Elected  
President  
of the  
A.E.R.A.*

EVER since his entry into the electric railway field W. H. Sawyer has been active in the affairs of the American Electric Railway Association and its predecessors. This last year he has been vice-president of the association, chairman of the policy committee and a member of the Coffin award committee and the public speaking committee. In 1925 he was second vice-president of the association, member of the policy committee, chairman of the subjects and meetings committee, member of the committee on constitution and by-laws. The record of his committee and other activities in the interests of the industry is a similar one back through the years. That record indicates the verisimilitude of the man in that it has included work by him on committees dealing with such diversified subjects as fare systems, state and national associations, electrolysis and valuation.

## AN ENGINEER AND OPERATOR OF WIDE EXPERIENCE

His professional career as an engineer and his business career as a manager have also been diversified. He started out after his graduation from the University of Nebraska in 1894 with the degree of B.S. by spending two years with several street railways, but he knew that one of the greatest post-graduate courses in the country was to be had at the plant of the General Electric Company. There he went for more experience, and there he remained for nine years. Next he entered the employ of Ford, Bacon & Davis. There he remained another nine years. So when in 1914 he went with the E. W. Clark & Company Management Corporation as vice-president with headquarters in Columbus, Ohio, he had behind him a record of engineering experience that even the wide holdings of that organi-

zation failed to exhaust. One of the so-called Clark holdings was the East St. Louis & Suburban Railway and affiliated properties, and five years later he was elected president of that group. When these properties passed to the ownership of the North American Company he was continued in his capacity as chief executive. Now that the North American Company has bought into the Illinois Power & Light Corporation, Mr. Sawyer finds himself affiliated with one of the biggest aggregations of capital operating anywhere in the public utility field.

## ADVOCATE OF ORGANIZATION AND TEAMWORK

He is an engineer-manager with a keen appreciation of the value of good public relations. He also has an enviable record in his management of men. Naturally as an engineer he recognizes the value of organization and of team-work, and he gets both, not by arbitrarily demanding them,

but by careful planning and judicious selection of personnel.

This last year Mr. Sawyer had paid to him one of the greatest compliments that has come to any man in a profession akin to his. This was his retention by the government of Australia to inquire into the power supply there for the Victorian government. The story of that achievement by Mr. Sawyer has been told before in the *ELECTRIC RAILWAY JOURNAL*.

A keen mind, broad knowledge and experience are combined with a delightful personality, a generous and sympathetic understanding of human relationships, and a deep seated love and loyalty for his chosen industry. Bill Sawyer, as he is known to his host of friends, is a builder—a man careful in making decisions and fearless in carrying them out. The association and the industry may well look forward with confidence to the coming year with Sawyer at the helm.





# Vision Without Being Visionary

Forty-fifth Annual Convention of the American Electric Railway Association Summarizes Progress Made in Solving Vital Problems that Confront the Industry—Renewed Spirit and Determination Bring Concrete Results



Cleveland City Council Escorted by the Late John Stanley Arrived in State on a Tally-ho to Open the Convention

**R**AILWAY executives, operators, manufacturers and guests thronged into Cleveland, Ohio, this week to attend the 45th annual convention of the American Electric Railway Association, which lasted from Monday, Oct. 4, to Friday, Oct. 8. Final registration figures are not available, but indications at last report were that the total attendance will run well over 10,000, or 25 per cent more than at last year's convention, which was the largest held up to that time.

In many other respects than in mere size was the convention noteworthy. For the first time in four years it was held away from Atlantic City. Greatly increased space for the exhibit was provided through the efforts of the city authorities and the Cleveland Railway. Consequently the display, both in size and in excellence, far exceeded anything that had gone before.

While the untimely death of President John Stanley of the Cleveland Railway, who had done a great deal of the planning and had taken no small part in the actual work of preparing for the convention, made it necessary to cancel the entertainment features, the convention was carried through with only minor changes in the program.

The programs of the American and the affiliated associations were replete with excellent addresses and discussions. The material presented was constructive and the topics covered vital problems of the industry. In this brief résumé only a few of the major points can be taken up. Full reports of the sessions of the American, Engineering and Transportation & Traffic Associations and abstracts of the papers and committee reports are given in this issue, while those on the Accountants' and Claims Associations will be given next week.

Although the convention was not formally opened

until Monday morning many of the members and guests were on hand Sunday. The excellent facilities provided for placing exhibit material had made it possible to arrange the greater share of the displays on Saturday and everything was in place before the opening.

On Monday morning, promptly at 9:30, the 40-piece brass band of the Pittsburgh Railways marched into the arena of the auditorium and assembled on the stage. The City Council came in a tally-ho, under the guidance of Mr. Stanley. After the presentation of the new association flag and a short address of welcome the meeting adjourned to the hall where the sessions were held.

City Manager Hopkins' speech was more than an address of welcome. It was a serious talk on the topic of the morning, "Unified Transportation Service in the Public Interest." "In rendering this service you face difficulties," he declared, "that no other public utility faces, because you must render it in the face of those difficulties from which they are free. You have no control over the elements which affect your service and determine its qualities as they have. So it isn't strange that this service, which is absolutely fundamental to the life of any modern community and rendered with the most difficulty of any public service, is the least appreciated."

Frank R. Coates in his presidential address outlined the progress that has been made by the industry during the past year, much of which is along the lines laid down by Mr. Hopkins. Various phases of the problem were taken up by speakers representing city and inter-urban railway operation and manufacturing interests. All are agreed that good service must be provided and sold to the public. Modern cars as salesmen of the service can do much to attract customers, but they must



be run in such a manner as to improve the transportation offered, was the opinion of the speakers.

Tuesday morning's session was devoted to the topic of street congestion. The high cost being paid for misuse of street facilities, the business of street management and traffic control and provision for the future were discussed by city and company men. Recognition of the city's responsibility for conditions and the essential service rendered by the street railways to the majority of the people was apparent. Widening of existing thoroughfares, separation of grades at intersections, building of subways and elevated roads will not solve the problem. The more room there is provided the more vehicles there will be clamoring for the privilege of using it. The ultimate, according to G. B. Anderson, would be when in the central district all the space is devoted to roadway and none to business.

Tuesday evening's session, which opened with a popular concert, was devoted largely to the report of the Advisory Council, which was presented by B. C. Cobb, its chairman. His view of the situation indicates that the view of the owners is becoming more hopeful; although much work lies ahead.

Management problems occupied the closing session, held on Thursday morning. The work of the committee on management and operation, which has attracted a great deal of attention throughout the industry, was explained by Chairman R. F. Carbutt and Regional Directors J. K. Punderford and W. H. Burke.

Several views of the motor bus and rail problem were given by leaders in the transportation field, such as Lord Ashfield, A. H. Swayne and H. L. Doherty.

A complete change of scene took place when the meeting was turned over to Chairman Edward Dana of the committee on education. The value of better knowledge on the part of employees as demonstrated by Prof. H. H. Norris and the group of foremen recruited from a number of railways will long be remembered by the audience as making a constructive step toward better management.

#### AFFILIATED ASSOCIATIONS DISCUSS TECHNIQUE OF TRANSPORTATION

As usual the members of the affiliated associations discussed vital operating problems. The engineers are proceeding with their work of investigation and standardization. They are, however, taking up these matters with a view to their influence on attracting car riders and forming favorable public opinion. The transportation and traffic men concerned themselves largely with merchandising of transportation and bus operation. The Accountants' Association considered the progress of the year in classification of accounts and of bus accounting, while the claims men took up better physical standards for employees.

A joint session was held by the Claims and T. & T. men on accident prevention and one by the engineers and accountants on engineering accounting and depreciation.

The elections of the various associations resulted in the choice of presidents as follows: American, Frank R. Coates; Accountants, L. E. Lippett; Claims, C. B. Proctor; Engineering, Daniel Durie; Transportation & Traffic, J. V. Sullivan.

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## *President Coolidge*

sends his greetings to the 45th Convention

**D**ELEGATES to the last two midwinter meetings held in Washington remember the active interest taken by President Coolidge at both of those times. During the first session, at which time he was vice-president, he presented an address before the meeting, and at the next midwinter meeting, during his Presidency, he greeted the entire delegation on the White House grounds. This year he thoughtfully sent a message of greeting to the association through Mr. Storrs, its managing director, as follows:

WASHINGTON, D. C., Oct. 4, 1926.

LUCIUS S. STORRS,  
Cleveland, Ohio.

Please extend to your association my best wishes for a profitable meeting. Public service in the truest sense of the word brings the largest measure of success, and I trust that the convention will continue the constructive work in the solution of vital transportation problems which has marked its previous sessions.

CALVIN COOLIDGE.

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# Make the Service Right, then Sell It

First Day's Session of the American Association Was Devoted to a Discussion of the Elements that Make Up Good Service and Methods Used to Bring It Into the Favor of the Public

UNIFIED transportation service in the public interest was the theme of the opening meeting held on Monday morning, Oct. 4. This theme was developed in a number of ways by the various speakers. All were agreed that the first requisite is to have the service of a type that will appeal to the present-day car rider. This calls for modern cars, good headways and reliability, along with courtesy to the rider and fair play to the community as a whole. Even with this, it is also necessary to let the public know that the product is good and to employ the best methods of salesmanship to induce them to become customers.

Of great importance in developing this theme was the address of welcome by City Manager W. R. Hopkins. In welcoming the delegates to Cleveland, he pointed out the essentiality of surface transportation for a great modern city. Only with its aid is it possible for the residents to live at great distances from their work. There are many factors, he said, which are much more difficult in the business of furnishing transportation than in that of giving other utility services, such as the supply of gas or electricity. Modernization of cars is to a certain extent beyond the control of the railway, since there are conditions on the streets and delays due to traffic which are inherent to the business. Then, too, when the purchaser pays 60 or more times a month, he is more likely to feel minor irritations incident to the service than when he settles only once a month, and then usually by check. Transportation is the poorest paid of all the utility services. Any of the others find it easier to make a profit. However, the speaker concluded that the public cannot well be served for a long time by a low quality of transportation, but given the proper service he feels confident that the necessary relief will be obtained.

President Coates in his annual address continued on the same theme. He outlined the real progress that has been made during the past year and the plans that have been prepared for continuing with even better work next year.

## SELLING THE SERVICE

The sale of electric railway service was considered from two angles—city and intercity. Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad and other companies in the Insull group, considered the intercity viewpoint. In Mr. Budd's absence his paper was read by H. A. Johnson, general manager Chicago Rapid Transit Company. On this group of properties the desire to have the men become salesmen has been developed to the point that they are urged to sell anything the company has to sell. That spirit seems to be behind the entire organization. Frequent conferences of the men are held, so that they can interchange their views and become better acquainted with



FRANK R. COATES

the purposes of the companies and what they are doing. A point made by Mr. Budd is that everything done by a public service company has a bearing upon the reception of its product. For this reason he held that everything done by the utility should be very carefully watched so that wrong moves will not be made.

Sales service from the viewpoint of the city railway was considered by Thomas Fitzgerald, vice-president Pittsburgh Railways. While there are differences in detail from the intercity service, the general principles are identical, said the speaker. Men with vision regarding the whole field should analyze all of the facts and from this analysis should select ideas which differ from the ordinary and which can be used to advantage in furthering the interest of the service. An open mind is needed, he averred. Many things which the railway operator considers impracticable may be worked out to the advantage of the company and of the public.

There is no doubt but that political leaders are just as vitally interested in doing what they can to make their cities go forward as are the utility men. They will in general be found reasonable and will be willing to work with the railways in the interest of better service, if they can be shown that the plans proposed really will improve conditions.



Mr. Fitzgerald admitted that in a number of cases public officials and others have made suggestions which were opposed by him and the other railway men. Instead of refusing to make the changes proposed, the railway did its best to try the methods and in many cases they have been found workable and have resulted in better service. The public and those who proposed the changes appreciated the efforts of the railway, so that much good was accomplished from a public relations standpoint.

#### CARS MAKE GOOD SALESMEN

The value of modern equipment in selling the service was emphasized in two able papers, one by Samuel M. Curwen, president the J. G. Brill Company, and the other by Edwin B. Meissner, president and general manager St. Louis Car Company. Both speakers held that the car is the show window of the industry and that unless it is properly dressed the railway will not be able to attract patrons. Old-style cars fail to get the public into the habit of riding. Then, too, the many new devices and improvements that have been made in street cars during the past few years have greatly increased their possibilities for giving service. Exemplifying the value of attractive features and their influence on ride selling, Mr. Meissner



J. W. WELSH AND MRS. WELSH

told of what has been accomplished by the new Grand Rapids cars. Many other roads are now copying the attractive features of these cars and are finding that they are very valuable as business getters. The new cars seem to have a psychological effect all over the system. Other parts of the property are brightened up and the men take more interest in their work. As a result earnings have increased. However, with the 25,000 obsolete cars that still are in service, there is much room for further developments.

#### WICKWIRE INTRODUCES THE KAHUNAVIK

Following these somewhat serious talks on salesmanship, E. F. Wickwire, vice-president Ohio Brass Company, gave an example of salesmanship in one of his inimitable addresses. He characterized the Kahunavik, who, he said, was first aid to the Automotivik, as a person who stands as an obstacle to progress. The Kahunavik is not willing to adopt new ideas and is willing to allow the industry to drift with the current. In somewhat more serious vein, Mr. Wickwire told of a recent trip he made to Grand Rapids, and quoted comments by a number of leading men there showing the great value of the new cars and their results in changing the attitude of the public toward the railway.

## Street Congestion—Let's Reduce It

Enormous Sums of Money Are Wasted Through Inefficient Use of the Streets, According to Speakers at the Tuesday Session of the American Association—Present Conditions Can Be Improved and Future Layouts Can Be Made that Will Give Relief

**B**EFORE proceeding with the regular business of the meeting on Tuesday President Coates said a few words in commemoration of the late John Stanley, after which the entire audience stood in silent tribute. A. W. Brady, T. N. McCarter, Gen. Guy E. Tripp and L. S. Storrs spoke briefly of Mr. Stanley and their regard for him, personally and in a business way.

Tuesday's session was devoted to the subject of transportation of the masses between their homes and places of work. This constitutes a major problem today, in the opinion of the speakers, and it was attacked from a number of different angles.

Col. C. O. Sherrill, City Manager of Cincinnati, Ohio, opened the discussion with a paper on the high cost of congested streets. He held the tremendous price the public is paying for misuse of street facilities has been overlooked by transportation men and the public generally, and should be considered. A parked car takes up space in the public streets worth perhaps \$2,000.

The merchants have learned that all parking keeps business away and builds up competition in outlying districts. It was pointed out that a comparatively few

automobiles, perhaps representing 10 per cent of the possible shoppers by auto, will pre-empt the available parking space so that others will not be able to drive their cars into the heart of the congested district. This means that other auto shoppers will be driven away and will do their purchasing in outlying districts. One solution suggested by Colonel Sherrill is that women shoppers should visit the congested district between 9 a.m. and 4 p.m. so as to escape the rush hours of morning and evening. Abolition of parking, he contended, will do much toward the solution of traffic congestion.

The essential service that is rendered by the street railways will serve by far the greater portion of the public. Since street cars carry so large a share of the purchasing population, they should have right of way over other vehicles. This will give recognition to the rights of the majority and will make easier the work of the transportation company in rendering service. The speaker worked out in considerable detail the ways by means of which the various traffic elements may be coordinated so as to get best results from our present street layouts.



Provision for future transportation needs was discussed by Col. Sidney D. Waldon, president Rapid Transit Commission, Detroit, Mich., and co-operation in transportation and traffic control by Major R. F. Kelker of Chicago. Abstracts of the papers by these two speakers appear elsewhere in this issue.

George Baker Anderson, manager of transportation Los Angeles Railway, believes that better, more scientific and more orderly use of the streets is necessary in order to keep pace with the present-day requirements. It is foolish, he stated, to use the streets for making deliveries of certain things during the day. Delivery of material can in many cases be made at night so that it will not interfere with the use of the streets for the transportation of people during the day.

With regard to the plans for increasing street widths so as to improve the traffic conditions, Mr. Anderson pointed out that it will be easy to reach the *reductio ad*

*absurdum* when the streets are widened so that the downtown district is all street and no room is left for business purposes. He also stated that much good has come in Los Angeles from the restriction of pedestrians. Walkers are now made to cross the streets when the traffic signals are set for them. Jaywalkers have been practically eliminated. This has assisted greatly, he said, in speeding up traffic.

The duty of the railway men is to place the transportation problem before the city authorities, not as a problem of the railway alone, but as a problem of the community. The economics of transportation should be pointed out, he said, so that the authorities will understand that it is wrong to embarrass established agencies of public transportation for the benefit of a comparatively small number of drivers of private automobiles. Only in this way will it be possible to get the best results.

## Conditions for Success Laid Down

B. C. Cobb, Reporting for the Advisory Council, Considers that Co-operation Between the Corporation, Its Employees and the Public Is a Cardinal Principle—Hon. W. Irving Glover Discusses Possibilities of Airplane as a Transportation Method

**S**UCCESS of the electric railway industry requires complete co-operation among the corporation, its employees and the public. This is a fundamental principle underlying the code presented by B. C. Cobb in reporting for the Advisory Council. Mr. Cobb's talk was a straight-from-the-shoulder presentation of conditions as they exist today in the industry, and the methods which should be used to improve them. While progress has been made in the solution of some of the problems and difficulties of great import that were seen last year, many things are yet unsolved and there are still many stony places in our pathways.

Mr. Cobb's report, unlike many addresses made on public occasions, did not mince words. He pointed out frankly and fully the status of the industry and showed that much remains to be accomplished.

Salesmanship is needed in the electric railway business just as much as in any other business, is the opinion of Mr. Cobb. The best salesmanship in this particular instance is a frank statement of the facts about the condition of the industry.

Hon. W. Irving Glover, second assistant postmaster-general, gave the address of the evening. He discussed the possibilities of commercial aviation. His experience in connection



At left, W. H. Sawyer and W. B. Potter. Above, C. S. McCalla, and at right, R. N. Graham, both of the Pennsylvania-Ohio Electric Company, Coffin Prize winner.







LUCIUS S. STORRS

with the air mail service of the post office department placed him in excellent position to discuss this topic. Commercial aviation, he said, will open up its own field of business, rather than replace any existing transportation

agencies. The electric railways need have no fear that any air transportation company will seriously cut into the earnings of their business.

The session under the auspices of the Advisory Council was preceded by a popular concert by the Cleveland Festival Orchestra, led by Walter Logan, with selections by the Orpheus Male Choir, under the direction of Charles D. Dawe.

At the close of the session the award of the Coffin prize was made by President Coates to the Pennsylvania-Ohio Electric Company.

## Good Management Can Solve Industry Problems

Possibilities for Business and Methods of Showing the Public Results of Good Management the Leading Issues—Relations of Motor Bus and Car Considered from Different Viewpoints—Education of Transportation Employees Demonstrated

**P**ROBLEMS of management were considered in considerable detail at the Thursday morning session of the American Association. The session opened with a short talk by R. F. Carbutt, chairman of the committee on management and operation, who outlined the study that has been made by the regional directors and members of his committee in developing methods for better operation. If there is nothing in the material that has been gathered by these men but can be applied to a company, it must be more than 99.44 per cent pure.

Mr. Carbutt then introduced J. K. Punderford and W. H. Burke, regional directors, who outlined briefly what they had done in their respective districts. Mr. Burke stated that his district is practically free from the Kahunavik which Mr. Wickwire told about.

### FREIGHT SERVICE PRESENTS OPPORTUNITY

Possibilities for the development of interurban transportation were discussed by T. A. Kenney, vice-president Hodenpyl, Hardy & Company. Originally the electric railways were built for passenger business, but

with the advent of the motor car, these companies have had to find other ways of obtaining revenue. The results obtained have been very satisfactory in some cases. Mr. Kenney outlined a number of instances where freight business has become the backbone of the service.

Co-ordination of bus, tram and rapid transit lines was discussed in an able paper by the Right Hon. Lord Ashfield. In his absence it was read by J. McKinnon, superintendent of schedules London Underground System. His conclusion is that competition delays real progress and that it has no place under modern conditions.

A. H. Swayne, vice-president General Motors Corporation, feels that the motor vehicle industry has been of great assistance to the railways, as the loss of business has been made up by freight incident to the transportation of motor vehicles and materials for producing them by the railroads. As to whether the motor bus will replace the trolley, he said that the final answer is not yet known and that the picture is neither all black nor all white. We must, however, remember that this is 1926 and not 1900. He feels that the motor bus

E. C. FABER, BARRON COLLIER  
AND LABERT ST. CLAIRB. C. COBB AND  
T. A. KENNEY



principles adopted by the association last winter are generally sound. The bus is a new transportation tool and should be used where it can be used to advantage. Management in working out the problem should have vision without being visionary.

Called on by the president, Henry L. Doherty, president H. L. Doherty & Company, made a stirring talk. He stated that he is becoming more and more of an optimist on the electric railway situation, not on the statistics, but on conditions that exist and which can be capitalized. If we should lose our entire investment, that would be a small matter compared with the loss to the community. It is entirely possible to make the city men realize that it is their problem rather than that of the electric railway man himself. It can be shown, according to Mr. Doherty, that railroad values are a mere bagatelle compared with what others stand to lose.

As an industry, we are in the business of furnishing transportation and always have been. We should take the tools that are available and use them.

#### INDUSTRIAL EDUCATION DEMONSTRATED

A brief brought by Edward Dana, general manager Boston Elevated Railway, discussed education of workers in the electric railway business. Mr. Dana reviewed very briefly the work of the committee on education during the past year. He then introduced H. H. Norris, educational adviser Boston Elevated Railway, who conducted a demonstration of a group conference of foremen. These men had been recruited from a number of electric railways and had received a small amount of instruction from Mr. Norris previous to the conference, which demonstration showed the value of getting men of this type to have a better knowledge of their work and to co-operate better with other departments.

Following the conference of foremen, the award of the *Forbes Magazine* public relations contest was made by Walter Drey. The material submitted in this contest, he said, was of exceedingly high grade. The winner of the first prize, which was a cup, was the Chicago



E. B. MEISSNER

Rapid Transit Company. Second honors went to the Pittsburgh Railways and third honors to the Pennsylvania-Ohio Electric Company. The cup was accepted by Harley A. Johnson, general manager Chicago Rapid Transit Company.

Presentation of the *Electric Traction* speed contest award was made by J. P. Barnes, chairman of the committee. The cup was awarded for the second time to the Galveston-Houston Electric Railway. The reply was made by F. L. Alexander.

G. H. Clifford, southwestern manager Stone & Webster, reported for the resolutions committee. Appropriate resolutions regarding the death of Mr. Stanley and the convention arrangements were adopted.

#### NEW OFFICERS INSTALLED

Mr. Coates next called to the platform the newly elected officers for the ensuing year. These were then installed, after which President Sawyer declared the convention adjourned. The new officers elected are:

President, W. H. Sawyer, president East St. Louis & Suburban Railway.

First vice-president, R. P. Stevens, president Republic Railway & Light Company, New York.

Second vice-president, James P. Barnes, president Louisville Railway.

Third vice-president, Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal.

Fourth vice-president, J. H. Hanna, president Capital Traction Company, Washington, D. C.

Treasurer, Barron Collier, president Barron G. Collier, Inc., New York City.

Operating members of the executive committee to serve for three-year terms ending in 1929: Luke C. Bradley, president Virginia Electric & Power Company, Richmond; C. E. Groesbeck, vice-president Electric Bond & Share Company, New York City.

Manufacturer members to serve for similar terms: Harry L. Brown, secretary the Ohio Brass Company, Mansfield, Ohio; T. W. Casey, vice-president National Pneumatic Company, New York City; E. B. Meissner, president and general manager St. Louis Car Company.



J. H. HANNA AND MRS. HANNA





**Newly-Elected Officers  
of the  
American  
Electric Railway  
Association**

**Vice-Presidents:**

1. R. P. Stevens
2. J. P. Barnes
3. Paul Shoup
4. J. H. Hanna

**Treasurer:**

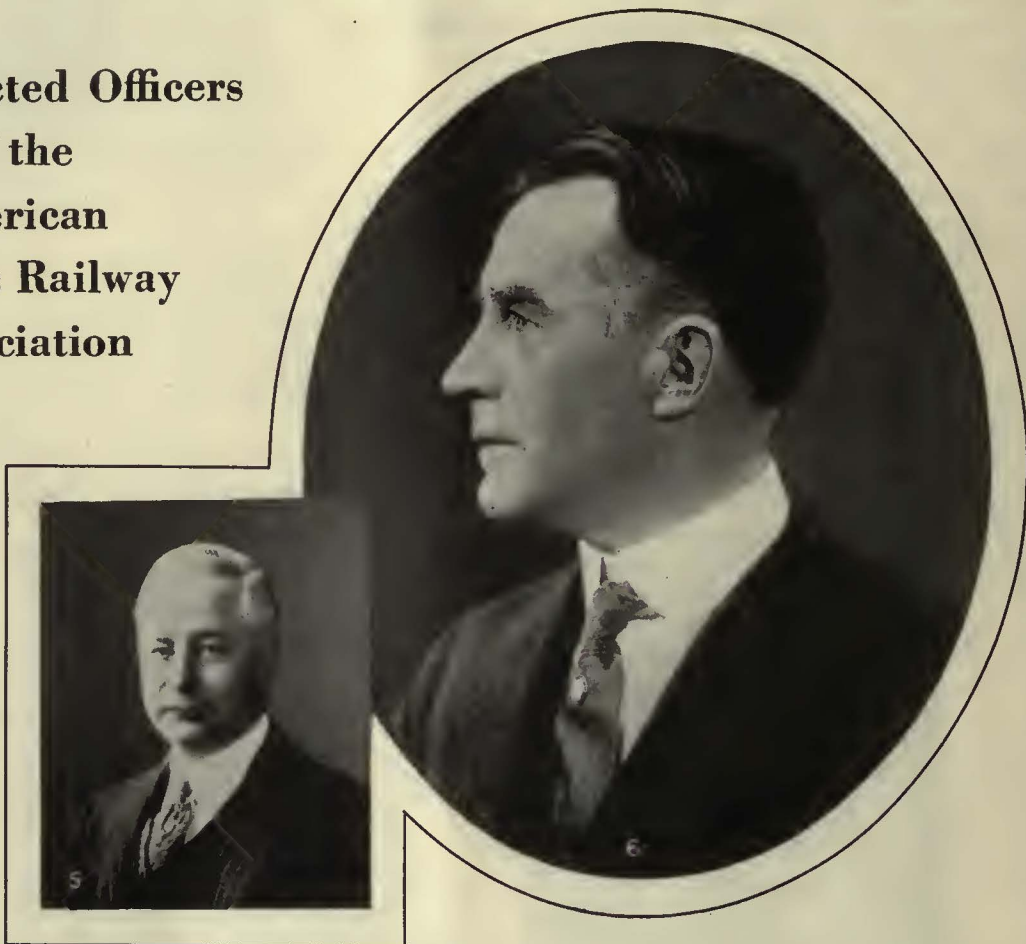
5. Barron Collier

**President:**

6. W. H. Sawyer

**New Members  
Executive Committee:**

7. L. C. Bradley
8. C. E. Groesbeck
9. H. L. Brown
10. T. W. Casey
11. E. B. Meissner





# *Improved Service Based on* **Co-operation** **Among Affiliated Associations**

**Engineers, T.&T. Men, Accountants and Claims  
Men Are Working Together Harmoniously  
So that Their Companies Can Give the Pub-  
lic the Best Possible Transportation Service**

**P**ROCEEDINGS of the affiliated Transportation & Traffic, Engineering, Accountants and Claims Associations indicate a new realization that successful electric railway operation depends upon the united efforts of all departments of the organization. Undoubtedly the most outstanding impression created by the 45th annual convention of the American Electric Railway Association was that members representing different phases of operation realize better than ever before their mutual interdependence. Members of the Engineering Association are interested in ways by which their technical knowledge can be used to improve the quality of transportation service. Claims and transportation men are working together harmoniously to the end that the number of accidents may be reduced. Accountants are looking for ways by which the information they gather can be made most useful to other departments.

Specifically, the engineers are thinking how they can be helpful in selling transportation along the following lines: Improving the appearance of cars, making them more comfortable and convenient for the passenger, increasing the speed of operation, eliminating all unnecessary noise and insuring the reliability of power supply and the continuity of service. Also of great importance in the activities of this association has been the study of means of reducing the cost of operation. Other activities engaged the attention of the members of the Engineering Association to a certain extent, but it was evident that the chief interest lay in those subjects which promised to make electric railway service more popular. In short, if the electric railway engineer has not yet actually become a salesman of transportation, he realizes that he is the designer of machinery for producing a marketable commodity.

Transportation men showed by their attitude at the meetings of the T. & T. Association that they realize clearly the necessity to co-operate not only with other members of their own organization but with the outside world as well. As one speaker said, "It is the railway's job to be not only a good railway but also a good citizen and a good neighbor." At the joint meeting of the Claims and Transportation & Traffic Associations, mention was made of the fact that while a few years ago a transportation man and a claims man of the same company meeting on the street would hardly speak to each other, now it is common practice for them to visit in

each other's offices and confer together nearly every day.

With the Accountants, too, co-operation has become a habit. Great interest centers in the subject of classification of accounts. Every effort is being made to secure uniform classification for railway and bus accounting in the various states. At the same time, efforts are being made to harmonize the many conflicting views concerning the best classification of bus accounts and develop a classification that will be satisfactory to electric railways, steam railroads and other operating agencies.

At least two association presidents remarked that the work of the committee and the meeting of delegates to the convention would be wasted effort unless the ideas were put to work in the operations under the control of the delegates. One president in emphasizing this matter further said there was too much printed matter and not enough discussion.

The material and thought growing out of the year's activities can be generally grouped into two parts. First, the committee reports completed and distributed a few weeks before the October convention are reviewed and abstracted in one section of this issue devoted to the Transportation & Traffic and Engineering Associations. The articles that follow are founded on the meetings held during convention week at Cleveland, and cover the presentation of reports by individual sub-committee chairmen and discussions that followed.

On the one hand the abstracted reports present the combined committee activities, while reported meetings give a cross-section over even a wider field.

There is a growing tendency for committee chairmen to present the reports along broader lines than by simply reading the verbatim report. By this means much information of an individual nature is presented that taken together presents a wealth of operating material.

Committee work has kept well abreast of the times and there is no immediate need for hasty decisions that might prove disastrous. But all problems are gradually focused and developed to a logical conclusion.

An examination of the exhibits, especially that of the 41 cars spread over 2,000 ft. of track, is indicative of results of much committee work. In the growing bus industry the work of the national bodies will prevent to a large measure the unfortunate and uneconomic developments that marked the early history of the electric railway expansion.



# Engineers Consider Ways to Aid in Merchandising Transportation

Rolling Stock Improvement, Reduction of Noise in Car Operation, Prevention of Rail Corrugation and Reliability of Power Supply Aroused Particular Interest at Sessions—More Companies Urged to Follow Association Standards

WHILE part of the problem of merchandising transportation is purely the function of the Transportation & Traffic Association, a very considerable part of it is essentially the work of the Engineering Association. This was brought out clearly in all the sessions of the latter organization. In his presidential address Charles Rufus Harte stated that it is incumbent on the engineers to produce at the lowest possible cost a ride which will be as swift, quiet, comfortable and convenient as that furnished by the private automobile without the disadvantages attached to the latter. The growth and improvement of the automotive vehicle have given the trolley a competitor which may not show the dollars and cents operating efficiency of the latter, but which has captured the favor of the riding public to a considerable extent. That the supposed greater speed, comfort and convenience of the automobile are largely imaginary is little help to the trolley operators whose balance sheets show heavy losses on this account. So long as the public itself refuses to see the injustice of handicapping the trolley with fare regulations and with paving and similar burdens from which its competitor is almost entirely free, this can be remedied only by making the trolley ride sufficiently attractive to get the business regardless of economies.

Two main directions are open, Mr. Harte said. As yet there is nothing which at all closely approaches the trolley car in over-all efficiency for handling mass traffic, but it must be admitted that a considerable proportion of the cars now in service leave much to be desired in the direction of comfort. While there are yet savings to be effected in roadbed and overhead, the field which today offers the greatest opportunity for help to the industry is that of the rolling stock. Moreover, it is a field which cannot be left alone unless the industry is prepared to accept shortly heavy losses through forced abandonment of track and line.

The bus also demands careful consideration. With the number of electric railways using buses practically doubled during the year 1925, it is obvious that the bus

does meet a demand, even though that demand may be an unwise one. On the other hand the doleful returns from much of this operation show equally clearly the need for improvement if it is to be continued. Again it is to our equipment men that we must turn for developments which will give better efficiency in operation.

These major problems carry with them a host of related matters. Noise, disturbing in itself, producing irritation on the part of the public and helping to turn riders to the quieter rubber-tired vehicle, is but a symptom of conditions which make no small amount of trolley riding uncomfortable.

Rail corrugation and noise in car operation go hand in hand, although the real relation is yet to be learned. Ventilation of automatic substations involves not only the losses and interruptions due to faulty behavior but also the noise, fear of which frequently leads to opposition to the economic location for the building. Trolley wire failures in busy locations cause traffic interference and publicity of a kind not to be desired.

Standardization and simplification are helps or hindrances, according to how they are done or administered. Year after year member companies at very con-

siderable expense and inconvenience give the services of men supposedly best qualified to determine what materials, methods and practices will return to the industry as a whole the greatest dividends if generally employed. Year after year the recommendations of these picked men are reported at the convention, receive a more or less perfunctory consideration, if approved are included in the Manual, and are used by a part, but very often only a small part, of the membership. Why is this so? Are they too hastily adopted? Are the differing standards of some of the non-using companies really better? Or is it due to failure on the part of the companies to pay any attention either to the possible economies by their use or to what they really mean to the industry?

When standards or recommendations are issued, Mr. Harte urged that if they cannot be adopted outright,



PAST-PRESIDENTS  
C. H. CLARK AND H. F. FLOWERS



they should at least be given a fair trial. Unless valid reasons can be shown for non-acceptance of standards, they should be adopted and employed by all companies. If this is not done it is a grave question whether the committee activities are worth the cost. Abstracts of the reports of the affiliated associations appear elsewhere in this issue.

## Way and Structures Discussed

Interest at Monday Session Centered on Causes and Prevention of Rail Corrugation, Switch Tongues, Welded Rail Joints, Crossings and Garages

**R**AIL corrugation, its causes and methods of prevention, was the subject of lively discussion at the Monday afternoon meeting of the Engineering Association. The report of the committee, presented by Prof. D. D. Ewing, brought out that there appears to be a relation between vibrations, noise and corrugation. Thus far the committee has collected a considerable amount of valuable data, but not enough to permit reaching definite conclusions.

J. Ormondroyd suggested that metallurgical analyses of corrugated rail would probably produce interesting evidence, and W. W. Wysor, chairman of the special committee, said that it was the intention to undertake such investigations in the near future. In reply to a question by L. C. F. Bellamy, general manager Hong-kong Tramways, A. T. Spencer said that the *In-situ* process of rail treatment delays corrugation. E. L. Lockman stated that the sorbitic treatment and its relation to corrugation is being studied on the Boston Elevated Railway. Mr. Bellamy referred to experience of British tramways, indicating that sorbitic treatment prevents corrugation. Extensive tests made by the London Underground were mentioned by A. V. Mason, deputy general manager and the engineer. He was of the opinion that corrugation is caused by vibration. No trouble has been experienced on this system with rail treated by the *In-situ* process.

In reply to a question by C. A. Smith, Mr. Wysor said that the experience of the committee led to the conclusion that corrugation occurs on all kinds of track, but investigations have not yet been carried sufficiently far to determine on which type of track construction it is most prevalent. Mr. Ormondroyd was of the opinion that it was worse with rigid construction. On the Chicago Surface Lines, according to J. Wolf, all theories concerning its cause have been alternately proved and disproved. R. H. Dalglish stated that experience with rigid track construction in Washington, D. C., indicates that rigidity is not necessarily a cause of corrugation.

In conclusion Professor Ewing said that it was his belief that corrugation is the result of a number of variables and that all of the causes mentioned may contribute to its occurrence. Until the investigations have been carried further, however, it will be impossible to determine which of these causes, or which combination of causes, has the most serious effect.

The meeting was opened by the address of the president, Charles Rufus Harte, who stressed the importance to the industry of adopting standards and adhering to them after adoption. The report of the executive committee and that of the secretary-treasurer were presented by G. C. Hecker.

Changes in the Engineering Manual were suggested by a special committee of which W. R. Dunham, Jr., was chairman. Approval of the recommendations was given by the meeting except in so far as certain specifications of other associations are concerned. On the suggestion of C. A. Alden, this section of the report was referred back for consideration by the incoming committee.

E. M. T. Ryder described the progress made by the special committee studying the design of switch tongues and hard centers for special trackwork. The cost of the suggested designs and the probable extent to which they would be used were discussed at considerable length. Mr. Alden expressed the opinion that they would cost no more than those now in use, and several of those present predicted that under such circumstances they would be widely used.

Work of the special committee on co-operation with the welded rail joint committee was the subject of a brief progress report submitted by W. W. Wysor. This had already been printed and distributed some time prior to the convention. Inasmuch as the way and structures committee is well represented on the welded rail joint committee it was recommended that this subject be discontinued as a special committee assignment.

Experience of the Boston Elevated Railway with welded rail joints was described in a paper by E. L. Lockman. He gave a historical sketch telling what had been done in the past by his company and outlining its present practices. F. B. Walker told of the experience of the Eastern Massachusetts Street Railway, stressing particularly its experience with welded joints in open track. He expressed an optimistic view of the situation and stated as his opinion that the rail joint problem has practically been solved.

A. T. Spencer presented the report of the special committee on surface hardening of rails. Sufficient data have not yet been collected to permit the formation of definite conclusions as to the exact value of this process.

With the completion this year of a design for a steam and electric railway crossing below 45 deg. and to 30 deg., inclusive, the special committee studying this subject believes that the series of recommended designs is complete and recommended that the subject be discontinued. This suggestion was approved. On account of the death during the year of Victor Angerer, chairman of the special committee, the report was presented by E. B. Entwisle, who paid a sincere tribute to Mr. Angerer.

A progress report on arc welding processes for repairs to rails and manganese steel was presented by C. F. Gailor.

Design of buildings for maintenance, storage and operation of buses was the subject of a special committee report presented by John R. McKay. The danger of constructing garages with too large a floor area was stressed. In reply to a question, R. B. Harding said that the fire insurance interests consider 10,000 sq.ft. the maximum desirable floor area for buildings not equipped with sprinklers and 20,000 sq.ft. for those so equipped. W. H. MacAloney and Mr. Harte discussed methods of placing buses in a garage.

Reports upon electric railway carhouses and cars and on wood preservation were presented by H. E. Bachman and A. P. Way, respectively. P. J. Howe of the American Telephone & Telegraph Company emphasized the value of wood preservation as shown by the experi-



ence of large communication companies. H. H. George presented the report of the standing committee on way and structures, indicating the action taken on the findings and recommendations of the various special committees.

It is the recommendation of the committee on way and structures that next year two special committees be organized—one to handle the subject of design of buildings for maintenance, storage and operation of buses and the other to study the subject of design of joint railway and bus terminals. As previously assigned, the subject covers too broad a field for one committee to handle satisfactorily.

## Depreciation Considered

**Subjects Common to Engineering and Accountants' Associations Receive Attention at Joint Session on Tuesday—Noise Reduction Report Developed Lively Discussion**

ONCE each year the Engineering and Accountants' Associations hold a joint session. This year an instructive paper on depreciation and obsolescence was read by Henry G. Riggs, professor of civil engineering of the University of Michigan. It appears in abstract elsewhere in this issue.

In discussion of Professor Riggs' paper, H. F. Brown made the statement that obsolescence should not be charged to present consumers, but the costs arising from this factor should be borne by future users of the service. E. D. Dreyfus, however, advanced the theory that sufficient reserve funds should be built up, depending upon the individual cases, as an insurance against major replacements due to obsolescence in the future. To this Professor Riggs replied that railway operation as a business was subject to drastic changes in operation and design and that he believed that such reserves should be built up.

At the opening of the joint session R. M. Rifenberick, consulting engineer, Toledo, read the joint report of the committee on engineering accounting. Mr. Rifenberick said that in the past there has been a tendency toward too extensive subdivisions of accounts, in an attempt to establish unit costs. It seemed desirable in past years to maintain accounts so that valuations can readily be made. Today this does not appear to be as necessary, and the committee recommends the discontinuance of further subdivisions of accounts as unworkable and too costly to obtain. Accountants have no way of obtaining the necessary information for further subdivision except through the engineers, and engineering departments have not been allowed the necessary funds to provide such detailed data.

After the close of the joint session the engineers continued with reports from their seven sub-committees. The outstanding thought characterizing the meeting was the desire to co-operate in furnishing superior transportation through the adoption of better engineering and maintenance practices. The urge for improvements is here and the engineers are prepared to meet it.

C. W. Squier, associate editor *ELECTRIC RAILWAY JOURNAL*, read the report of H. W. Coddington on engineering symbols, which after discussion was adopted for information, but was not included in the Engineering Manual. Charles Rufus Harte, from the chair,

reported briefly on the progress made by the committee on the Engineering Manual. The report of the heavy electric traction committee was abstracted by Chairman H. F. Brown. A report on equipment was presented by P. V. C. See. H. H. Adams presented the report on unification of car design.

H. S. Williams, in presenting the report of the subcommittee on the reduction of noise in car operation, told of an instrument that has been developed for the measurement of car noise. This instrument was described in this paper Sept. 11, 1926, page 413. Mr. Williams stated that much of the unnecessary noise could be avoided by superior maintenance. Gearing with worn teeth should be discarded. Bearing fits should be kept tight; axle bearings should be individually fitted to obtain the best results.

The report developed a lively discussion, in which H. E. Bean took up the desirability of eliminating track



A. H. ARMSTRONG, JOHN A. BEELER, J. M. BOSENBURY  
AND A. R. MYERS

noises, first by remedying defects due to lack of maintenance and then by reducing noise by perfecting a better type of track with particular reference to paving construction. L. D. Bale called the attention of the committee to the suppression of machinery noise in recent substations constructed by the Cleveland Railway. H. M. Wheeler spoke of some tests made with canvas skirts and shrouds built of wood, but was not enthusiastic as to the results obtained. Prof. D. D. Ewing of Purdue University considered the subject of very great importance and one that should be taken up actively by the association.

H. A. Johnson told the association that the Chicago Rapid Transit Company had spent thousands of dollars trying to reduce noise on the elevated lines. Some of the attempts have been closer spacing of ties and use of 60-ft. rails at some locations. With reference to rattling noises, Mr. Johnson stated that this is generally the result of poor maintenance and can be greatly reduced without the expenditure of much money. Daniel Durie spoke of the work done by his company in reducing noise of various parts of the car unit. He believes that the use of helical gearing has reduced noise of operation.

The meeting was honored by the presence of members of the delegation representing the London Underground group. The session closed with the presentation of the report on wheel mounting and check gages, presented by C. W. Squier.



## Engineers Study Power

Design and Control of Automatic Substations and Their Operation and Maintenance Occupied Thursday Meeting—Advantages of Mercury Arc Rectifiers Brought Out

**B**ETTERMENT of electric railway operation with a view to improving public relations was again the dominating note of the meeting of the Engineering Association. A progress report of the committee to co-operate with the American Society for Municipal Improvement was presented by C. L. Hawkins. Continuation of this work next year was recommended. H. H. Adams offered a resolution of regret on account of the death of John J. Stanley.

Economics of automatic substations was the subject of a committee report presented by Adrian Hughes, Jr. C. A. Butcher discussed the relative merits of the cut-and-try method and the analytical method of determining the most economical number and location of substations. In order to assure reliability of service, he said that the number of substations used probably will be larger than is indicated by a purely mathematical solution of the problem. Praise of the work of this committee was voiced by J. F. Neild. How four independent investigations arrived at practically identical solutions of the problem of substation design and location in Cincinnati was told by F. W. Peters.

A brief report of the committee on purchases and stores was presented by Chairman P. F. McCall. The recommendations were approved.

Power generation and conversion then occupied the attention of the meeting for a considerable time. L. D. Bale presented the general findings of the committee and called upon various members to discuss the phases of the subject to which they had devoted particular attention. W. E. Bryan spoke on supervisory and remote control systems. George I. Wright told of the investigations made by the committee in connection with the use of the mercury arc power rectifier for electric railway service. Ventilation of automatic substations was discussed by F. W. Peters.

### CO-OPERATION NEEDED BETWEEN POWER AND EQUIPMENT DEPARTMENTS

On the suggestion of C. H. Jones, actual experience in the maintenance of automatic substations on the North Shore Line was described by C. Antoniono. A thorough inspection once a month is far more satisfactory than a casual daily inspection, in his opinion. Supervisory control in Baltimore was discussed briefly by Mr. Hughes. Mr. Jones spoke of a new installation of a carrier current supervisory control system on the Chicago, South Shore & South Bend Railroad. The equipment has not been in operation long enough for definite data to be available. Mr. Butcher referred to the loss of power efficiency due to the use of improper gear ratios on electric railway cars. Co-operation between the power, equipment and transportation departments is the solution of such a problem, in the opinion of Mr. Hughes. Mr. Bryan said that during the coming year the committee would study the question of efficiency, not only of the power generation and distribution system, but also in connection with the electrical equipment of cars.

Advantages of mercury arc rectifiers in the matter of quiet operation were brought out by Mr. Wright in the

presentation of his section of the committee report. Mr. Antoniono told of the experience of the North Shore Line with a new mercury arc rectifier installed immediately before the recent Eucharistic Congress. The successful meeting of the severe test imposed at that time furnishes a good indication of its reliability, he said. C. H. Jones urged that railway companies make every effort to give rectifiers a trial. He said, however, that the characteristics of this apparatus are not yet sufficiently well understood to justify the establishment of standard ratings. Mr. Bale differed with this opinion. Foreign experience has been sufficiently extensive to justify the adoption of ratings in this country, he said. Mr. Harte urged that a standard be adopted as soon as possible. That the adoption of ratings would clarify the situation was the opinion of Mr. Peters, even though it might be necessary to change the standards at a later date. W. Neaf confirmed the opinion expressed by Mr. Bale and said that mercury arc rectifier ratings are firmly established in Europe. The chief difference between conditions there and in the United States is in the size of the load, rather than in its character, he said. R. L. Weber urged that ratings be made the subject of study by the committee during the coming year. Mr. Bryan assured the meeting that the committee would give careful attention to this matter.

Power transmission and distribution was the subject of a committee report presented by Mr. Jones. Owing to the lateness of the hour, there was little discussion of this subject.

The report of the committee to co-operate with the United States Department of Commerce on simplification and standardization was presented by R. H. Dalgleish. Mr. Harte presented the report of representatives on the main committee of the American Engineering Standards Committee.

Nominations of officers for the ensuing year were announced by L. C. Datz, chairman of the committee on nominations. The following names were submitted:

For president, Daniel Durie, general superintendent West Penn Railways, Connellsville.

For first vice-president, R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.

For second vice-president, F. H. Miller, vice-president and general manager Louisville Railway.

For third vice-president, W. F. Graves, chief engineer Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis.

For secretary-treasurer, J. W. Welsh, executive secretary American Electric Railway Association.

Executive committee nominations were submitted as follows:

W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore; L. D. Bale, superintendent of power Cleveland Railway; C. H. Jones, general manager Chicago, South Shore & South Bend Railroad, Michigan City, Ind.; P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, Akron.

All were unanimously elected. Speeches were made by the new officers and members of the new executive committee. A past-president's badge was presented by Mr. Durie to R. C. Cram in appreciation of his service in this capacity during the first part of the year. In the absence of Mr. Cram, G. C. Hecker accepted the badge. A similar past-president's badge was presented to Mr. Harte in behalf of his service during the latter part of the year.





DANIEL DURIE

## Newly-Elected President

### DANIEL DURIE

SINCE 1916, when Mr. Durie took up active work in the Engineering Association, he has been quite closely affiliated with the different branches but has majored in the activities of equipment and transportation. A comparatively young man, Mr. Durie is no novice in railway work. His first experience was with the Paterson Railway, now a part of the Public Service Railway of New Jersey. In August, 1901, as a mere lad he went to western Pennsylvania to work for M. R. McAdoo at that time general manager of the Pittsburgh, McKeesport & Connellsville Railway and formerly connected with the New Jersey Company. Thus Mr. Durie took up his new duties with a company that has since developed into one of the most active in the country. This company is the West Penn System. Other than his service with the New Jersey company, Mr. Durie's entire career has been with the West Penn System.

Mr. Durie began as a wireman and assistant superintendent of the power plant at Tarr Station, Pa., on Aug. 22, 1901. His first job was to get some new cars ready for service and look after their maintenance. For a period following, Mr. Durie turned his attention to transportation matters, but the serious need of a man with high-class maintenance qualifications resulted in his return to the mechanical department. He was next made foreman of Iron Bridge carhouse and shops, and in 1904 was transferred to Connellsville, main shops, as repair shop foreman.

In April, 1909, he was made master mechanic of the entire system. From 1909 to 1913 additional properties were taken over and many cars, different in type, and carhouses and shops, varying in size and in the nature of their equipment, were added.

In June, 1915, the resignation of M. A. Coffey, superintendent of transportation, left a vacancy at the head of that department. Mr. Durie's general knowledge of the essentials in the various operating departments resulted in his promotion to general superintendent of railway operation. In addition he was on Oct. 25, 1917, made general superintendent of equipment.

### J. V. SULLIVAN

JOSEPH V. SULLIVAN, assistant to the vice-president and general manager, Chicago Surface Lines, is the new president of the American Electric Railway Transportation & Traffic Association. His activities as a member of the Association's Executive Committee have been extensive. He has been chairman of the committee on rush-hour service, chairman of the committee on definitions, member for four terms and then chairman of the committee on fares and transfers, member of the standards committee, member of the committee on education and on accident prevention, chairman of the committee on subjects. During the past year he acted as first vice-president of the association and member of the committee on bus operation.

Mr. Sullivan was born in Chicago on Nov. 1, 1878. He was graduated from Notre Dame University in 1897 and then spent seven years in newspaper work in Chicago. His railway experience began in 1904, when he became connected with the traction companies operating on the north and west sides of Chicago, the predecessors of the Chicago Railways, as general passenger agent. He served in this capacity for one year and was then promoted to the position of general supervisor, which he held until the operating consolidation of the Chicago Railways and the Chicago City Railway in 1914 to form the Chicago Surface Lines. He then became statistician for the company. In 1920 he was promoted to the position of assistant to the president when he worked with John A. Beeler, who was then making an extended study of traffic conditions, equipment and organization of the Surface Lines. Thereafter he was closely associated with Williston Fish, general manager, in carrying out Mr. Beeler's recommendations and in bringing about operating economies and general improvements in the service. In 1924 he was appointed assistant to the Vice-President and General Manager Guy A. Richardson, a position which he holds today.

Mr. Sullivan has been a frequent contributor to the pages of ELECTRIC RAILWAY JOURNAL.



J. V. SULLIVAN



## of Affiliated Associations

### L. E. LIPPITT

**L**AURENCE E. LIPPITT, manager of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., who heads the American Electric Railway Accountants' Association for the coming year, is one of the youngest electric railway executives in central New York State, being only 37 years old. He began his career as an employee of the Oneida Construction Company, which electrified the West Shore Railroad between Syracuse and Utica, a line now operated by the New York State Railways. This was in 1906.

In September, 1907, he entered the employ of the New York State Railways and served in various positions in the accounting department. His next step up the ladder took place in July, 1913, when he was appointed auditor of the Syracuse & Suburban Railroad under the management of Allen & Peck, Inc. Three years later he became auditor-treasurer of the Auburn & Syracuse Electric Railroad under the management of Peck, Shannahan & Cherry, Inc.

He held this position until July 1, 1926, when he was named general manager of the company to succeed W. J. Harvie, resigned. The Auburn & Syracuse operates between Syracuse and Auburn and also lines in Auburn and to Owasco Lake, where it controls Lakeside Park.

Mr. Lippitt's activities with the Accountants' Association began in 1921, when he was appointed member of the committee on express and freight traffic promotion and costs. In 1923 and 1924 he served as member of the executive committee. In 1925 he was made second vice-president and during 1926 served as first vice-president.



LAURENCE E. LIPPITT



C. B. PROCTOR

### C. B. PROCTOR

**I**F C. B. PROCTOR, the newly-elected president of the American Electric Railway Claims Association, has a slogan it is: "Don't Use Unnecessary Words." And he lives up to it. His letters exemplify brevity with completeness. When he was asked for a statement regarding himself he said to the biographer: "Cut it to the bone; make it short and sweet." The most characteristic fact, perhaps, about Mr. Proctor's office administration is his thoroughness and the brevity of his records.

For more than 34 years Mr. Proctor has been identified with the claims departments of transportation companies. He has been actively identified with the affairs of the American Electric Railway Claims Association practically since the time of its formation. He has served in the capacities of third, second and first vice-president at different times, and in addition has been a member of the executive committee for a number of years.

For the past 21 years Mr. Proctor has been claim agent for the Memphis Street Railway, and since the early part of 1923 his work has included that of being joint claim agent for the Memphis Power & Light Company and the Memphis Street Railway.

He entered claims work in 1892 with the East Tennessee, Virginia & Georgia Railroad at Knoxville. In 1894, when that company consolidated as a part of the Southern Railway System, Mr. Proctor was transferred to Washington, where he remained for about 6 years as an executive in the freight claim department of the Southern Railway.

In 1900 he was made route agent in charge of the freight claim department for the Louisville lines of the Southern Railway, being transferred to Louisville, Ky., the headquarters of his office. He remained there for about 3 years and during the latter part of 1903 was reassigned to Knoxville as route agent for the same road.

On April 1, 1905, Mr. Proctor went to Memphis from Knoxville and took up there the duties of claim agent for the Memphis Street Railway, which had just been reorganized under the administration of the Ford, Bacon & Davis interests. There he has been ever since.



# Transportation and Traffic Men Make Definite Suggestions

Valuable Material Contained in the Four Committee Reports  
that Deserve to Be Put Into Action by All Companies —  
George H. Clifford Presides Over Well-Attended Meetings  
—J. V. Sullivan Was Elected New President

**R**ECOMMENDATIONS by committees that are brought to life only to be presented at the annual convention are of little value unless they are put into practice. Many valuable suggestions, representing hours of effort spent at considerable expense to member companies, are contained in the pages of the four reports representing the work of the Transportation & Traffic Association. Subjects covered were merchandising

in which they are engaged but about the progress that is mapped out by the committees at the time of the annual conventions. It is incumbent upon the delegates, if they believe in the reports, to carry the messages home to the many employees and salesmen of transportation in their own companies. All of the reports are made by men keenly interested in the work accomplished by the various committees this year.

Many of the committee members are men actively engaged in the operation of transportation properties, and these members and many others have taken valuable time to visit the operations of other companies. Their studies and findings represent a cross-section of best operating practices that should play an important part in bringing the transportation utilities to a plane of better service.

Many may disagree with some of the findings of a committee. If they do, now is the time to set these disagreements before the association as a whole so that the differences may be ironed out and the message representing the year's work of the association may be of the greatest value to the industry.

After the president's extemporaneous, yet well-pointed, address the meeting was turned over to the merchandising transportation committee, and its chairman, R. N. Graham, was called upon to preside. Mr. Graham emphasized the fact that the report this year was dogmatic in the extreme. "Must or should is used in all the recommendations," he said, but he explained that the individual opinions of members were submergled in the committee report where they were at variance with those of the majority.

Clinton D. Smith, in presenting the section of the report on special prices of service and rates of fare, declared that the rider who desires a superior service is willing to pay a higher fare if the service is satisfactory. A specific example cited by Mr. Smith was the "Ceramic Flyer" of the Steubenville, East Liverpool & Beaver Valley Traction Company. An example mentioned of special classes of service was the sale of transportation to the American Legion on the part of the Northern Texas Traction Company. In this case, the American Legion issued free transportation tickets which were presented by the Northern Texas Traction Company at the end of the convention and netted nearly \$1,500.

S. E. Emmons presented the section of the committee's report on "Maximum Use of Existing Facilities." This is only another way, Mr. Emmons said, of expressing efficiency of operation. Recently 130 new cars were



PAUL E. WILSON, E. F. WICKWIRE, JERRY STANTON  
AND GEORGE H. CLIFFORD

transportation, divided into six chapters; traffic congestion; accident prevention; and bus operation, which was treated under fifteen general subdivisions.

Both in the formal presentations and the discussions, definite recommendations were made that represent the best practices. The reports are drawn from outstanding companies and the thoughts contained are a veritable text of modern operation.

## MERCHANDISING PLANS WELL DEFINED

"Take the ideas home and put them to work," was the meat of President George H. Clifford's extemporaneous address. Mr. Clifford further asked, "Do we practice what we preach and do we get the proper action in response to the work accomplished by the many committees that make valuable reports each year at the time of the convention?" Other points made by him follow:

Employees of our companies are entitled to know as much as possible, not only about the particular business



added in Baltimore and 111 old single-truck cars were retired. There is no single-truck equipment in Baltimore at present. As a result of these changes, passenger riding has increased one-half of 1 per cent, and while the car-miles have decreased 2.1 per cent, the seat-miles operated have increased 0.9 per cent. A \$100,000 saving in operating expenses was accomplished by concentrating on these methods.

Company interest in civic problems was summarized by J. B. Donley, in saying that a railway company should not only be a good citizen but a good neighbor. The different members of the staff should belong to civic clubs, and the company should pay the dues. They should also enter into the work and discussions of these organizations as a good member might be expected to do. The local safety council should be the particular pride of the railway operating in the community.

The advertising theme permeated many of the talks during the session. A. C. Spurr was sponsor for that section of the report and declared that a brief message several times a week in the daily newspapers was better than a full page used a few times a year. Something definite must be said, but such topics are not difficult to find on the average railway property.

John A. Dewhurst saw in the car exhibit of this year's convention tremendous strides in the modernization of cars that were designed to appeal to the car rider. He referred to recent cars built in Paris and Berlin that appeared to be even broader steps toward the ultimate end of obtaining comfort and easy riding and the elimination of noise. A design along somewhat similar lines as the Paris and Berlin cars has been worked out in this country, but to date no means has been found to construct such a unit and to give it the acid test of operation. It seems inevitable that such a design will need at least a year of test and development before it can be turned out as a finished product, and it is to be hoped that some means will be found by which either this American design can be built or one of the European cars can be brought to the United States for test and study so that the coming year will not be lost to the art of better transportation.

Considerable time was spent in the discussion of the various chapters of the report. Jeff Alexander reported that the riding in Houston is increasing from 5 to 8.5 per cent over last year, and he lays it largely to the improved appearance of the cars.

George Baker Anderson told of the improvement made in Los Angeles in what he called the company's "step-ladder" cars. The low-level light-weight cars now used with wide exits and automatic doors are a big improvement. The report was further discussed by G. S. Wills, C. E. Morgan, C. R. Havinghurst, executive secretary of the Beaver Falls Chamber of Commerce; Harry Mitchell, W. E. Wood and several other delegates who were present.

#### POINTED SHOP TALKS ON PUBLICITY

Following the close of the presentation of the merchandising report, Major J. S. S. Richardson gave a heart to heart talk on the value of advertising. He said: "If you only come to life in advertising once in a while, you'll have a fat chance to make an impression on the public when you want to." The railway or any utility must keep telling its message to the public and not give the impression that it advertises only when it wants something. Major Richardson's impressions are

that many platform men know more about public relations and the handling of the public than the executives of their companies. He thinks as a whole they are a good lot.

Major Richardson told of the activities of many of the state committees on public utility information. A recent survey made by several of these committees of the courses on economics, as given in the grade and high schools of our country, is of particular interest. He said that the text books used were filled with false and misleading data, tending to promote public ownership, which we know too well means political ownership. Good work has been done by technical sub-committees, working under the general direction of these state committees and acting for several utilities in their relationship with the street programs of communities.

Louis Selzer of the *Cleveland Press* presented a paper giving his impression of four years of progress toward a better understanding between public utilities and the public.

Frank Le Roy Blanchard became so enthusiastic over



W. H. SAWYER, R. P. STEVENS and C. R. ELLICOTT

advertising that he left his paper in the envelope and talked straight from the heart on the value of carrying a message continuously to the public. Mr. Blanchard believes there is much work to be done in advertising to draw the public away from the private automobile to the electric railways.

## Joint Session Held with Claims Association

Traffic Congestion Report Based on Hoover Conference—Merits of Traffic Lights Discussed—  
Report on Claims Showed Ever-Growing  
Co-operation Between Transportation and Claims Departments

FROM comments made at the Tuesday afternoon joint session of the Transportation & Traffic and Claims Associations, the report of the Hoover Conference on highway safety appeared to be the most important single development during the year in connection with traffic congestion. Findings of this conference occupied a prominent place in the report of the committee on



traffic congestion presented by A. R. Myers. An abstract of this report is published elsewhere in this issue.

That the recommendations of the committees are incomplete was the contention of Stanley Good, captain of traffic El Paso Police Department. He said that liability insurance for automobilists was urgently needed. Uniform traffic regulations are desirable but hardly feasible, he said. Police officers are preferable to automatic traffic signal control, in his opinion. Burton W. Marsh, traffic engineer Pittsburgh, Pa., said that unless it is put to some useful purpose, the report of the committee is no good. It should be subdivided, he thought, and the local railway men must push the various recommendations. Limitations of the height of buildings is a basic need.

Current discussion of traffic congestion is blind to the future in experimenting for an immediate solution,



S. W. GREENLAND

according to J. Rowland Bibbins, consulting engineer, Washington. An abstract of his paper appears elsewhere.

At the conclusion of the discussion of traffic congestion, G. W. Clifford, president of the T. & T. Association, turned over the chair to J. H. Handlon, president of the Claims Association. Mr. Handlon spoke a few words of greeting and stressed the growing cooperation between transportation and claims men.

Hearty approval of the report of the Hoover conference was given in the report of the joint committee on accident prevention, presented by M. W. Bridges. R. H. Hadsell spoke of the good results obtained through cooperation between the railway and the local police. A note of optimism was struck by H. K. Bennett, co-chairman of the committee. He quoted figures to show the improved accident record of a large group of companies for 1925 as compared with 1924. More attention to the needs of the street railways might have been given by the Hoover conference, in the opinion of G. B. Anderson. He mentioned also the advantage of boulevard stops.

Accident prevention methods in El Paso was the subject of a discussion by Tom Walker. He spoke of the beneficial results obtained by bringing this matter strongly to the attention of the trainmen. More emphasis is needed on this phase of the work, in the opinion of L. H. Butterworth. G. B. Powell said that in Louisville it is the custom of the railway to accept the trainman's word concerning the responsibility for an accident. On a large property this practice is not feasible, in the opinion of A. J. D. Van Brunt. B. C.

Wood described the methods in use on the Pennsylvania-Ohio System. He said it is customary to charge a trainman with three accidents for each failure to make a report as required. Seth Baldwin and Arthur G. Jack discussed other phases of the problem.

## Traffic Men Learn About the Bus

Bus Operations Well Defined as Based on Practices of Many Companies Operating Buses in Conjunction with Rail Lines—Valuable Statistics Developed in Discussions

HOW, where and why to operate buses both in competitive and co-ordinated service was discussed in the report of the committee on bus operation. It is published, in abstract, among the committee reports in this issue. J. B. Stewart, Jr., chairman of the committee, read the general introduction to the report explaining the extensive work carried on by the committee during the past year. The idea incorporated in the report is to place the bus business on a sound basis so that it will not have to go through the trying transition conditions which proved disastrous to many electric railway lines.

Statistics on bus operations were given by Mr. Stewart, indicating the rapid growth in the use of the bus by electric railways. In September, 1925, according to association figures, there were 4,425 operated by 251 railway companies. In September, 1926, there were 6,439 buses, operated by 336 companies. These figures show a gain of 33.8 per cent in the number of companies operating buses and 45 per cent in the number of buses operated. Assuming that each one of these buses carried 300 passengers per day, the 6,469 buses transported 388,000,000 passengers per year. At an assumed gross revenue of \$30 per day, the income from such operation approximates \$77,000,000 per year.

E. D. Dreyfus of the West Penn Railways, Pittsburgh, discussed that portion of the report dealing with rates of fare on interurban buses. It was his opinion that the rate must of necessity be higher than on city buses. He gave as his reason the sparsity of population which would be reflected in low load factors. Long bus lines would not pay unless both terminals are cities having populations in excess of 25,000. As bus operation is normally a more expensive form of transportation than the rail car systems, the public must be educated to pay a fare adequate for the service.

At this point in the discussion, Mr. Coates, president of the American Electric Railway Association, was presented and gave the assembled delegates a brief talk on the successful work which they have accomplished.

That bus service should not be established unless it can pay its own way was the opinion of D. A. Scanlon of the Northern Ohio Power & Light Company, Akron, Ohio. It has been the policy of this company not to establish competing parallel bus service with its rail lines unless such bus service can show a profit from the start.

Original development of the bus business by independents was watched with considerable interest by steam and electric railway operators, said A. Shapiro, assistant manager Washington Rapid Transit Company. However, the use of the bus by the steam and electric railways has been rather backward. In establishing bus



service, the steam and electric railway companies will no doubt enter into competition with each other. This may or may not represent a difficult problem. Mr. Shapiro told of experiences of the Milwaukee Electric Railway & Light Company in operating buses over approximately 900 miles of highway routes in Wisconsin. In this same territory, two steam railroads furnish both passenger and freight service. Up to the present time, however, neither of these companies has entered the motor transportation field. It was Mr. Shapiro's opinion that steam railroads could to advantage enter into agreements with electric railways for furnishing motor transportation in many competitive situations.

In the absence of S. W. Greenland, L. M. Bennett, Cleveland Railway Company, discussed that section of the report dealing with "terms of franchise." According to Mr. Bennett a franchise is a privilege granted by governmental authorities. He said that the street railway industry has an opportunity now to learn from the automobile and the bus industry. At the same time he feared that the bus industry had not taken advantage of the priceless lessons taught by the railway industry. Originally, the street railway fare was 5 cents, for no good reason at all. Early establishment of urban bus operation led to the adoption of a 10-cent fare for the same reason. The nickel of street railway fame was found to be too small for bus operation so the dime was substituted.

Chartered coach and bus operation was described by Adrian Hughes, superintendent of bus transportation, the United Railways & Electric Company of Baltimore. He explained that although his company had entered the bus business in 1915, it was not until the summer of 1925 that it went into this special business of a chartered service. The aim in rendering this service has been to develop the business not competitive with rail lines of the company. The company through purchase of independent operators acquired a charter for sightseeing business for Baltimore from the Gray Lines Association. The business so far has made use of equipment in off-peak hours which otherwise would be inactive. From the time service was inaugurated until Dec. 31, 1925, it showed a profit of \$1,200. In the first six months of 1926 the gross business has resulted in a profit of \$6,200 out of \$74,000 taken in. Of this \$74,000, \$56,000 was derived from chartered business. Everything pertaining to the cost of this service is charged up to its operation.

Three divisions are set up for establishing cost data on this special and charter bus business. These are: the bus or bus year; the bus hour and the bus mile. Records are kept of all items of expense and are set up under these three divisions. From this study it has been possible for this company to establish the true value of bus operation. For the purpose it is necessary to divide the operation into two parts, i.e., competitive and railway. He showed charts to illustrate the allocation of costs and revenue between these two forms of operation. In 1925, the bus business operated by his company showed a deficit of \$37,000. However, the competitive lines, i.e., those operating independently or in competition with the railways, showed a profit of \$20,600. The railway bus lines, supplementing the rail lines, showed a deficit of \$57,400. Hence, the deficit on the whole property was \$36,800.

Better public relations can be developed through the

use of the bus in establishing this service in the territories where it would be both impractical and uneconomical to build rail lines was the gist of the remarks made by C. H. Chapman, manager of the Connecticut Company. The bus fits into the general scheme of transportation as a means of trying out an extension of the parent system. Such service is particularly suited for tapping live communities which desire rail transportation. Mr. Chapman gave other examples illustrating possibilities of the use of the bus in completing a system of urban transportation. It was his opinion that the existence of bus lines will stimulate riding on the system as a whole. He warned the members that he was not subsidized by any bus manufacturer when rendering the opinion that in certain cases it may be economical to discontinue track operations and substitute buses if the company cannot re-finance reconstruction of its roadway.

Two fundamental principles governing successful bus operation were presented by A. T. Warner, assistant to the vice-president in charge of operations, Public Service Railway Company, Newark, N. J., who discussed that



E. M. WALKER

section of the report dealing with "steps to be taken to protect rate base with respect to development expense." One of these was that the company should not carry unsuccessful bus operations on the books for too long a period. The second principle was that a fare should be established at the time bus service is inaugurated which should be high enough to cover cost of such operation. In working out these two principles, his company takes a census of the territory which it proposes to serve with buses. A reasonable riding habit is prescribed from this census and then the rate of fare to cover cost of operation is established from this base.

J. B. Stewart, Jr., was again called upon to read the section of the report on tire mileage contracts. M. L. Harry, chairman of the sub-committee which prepared this chapter, included a brief description of the history which has led the tire manufacturers and operators to enter into such agreements.

Resolutions presented by the resolutions committee of the association included tributes to Mr. Stanley and Mr. Maltbie, two prominent electric railway officials who had died during the past year. J. V. Sullivan, president-elect of the association, was escorted to the platform and the gavel was presented to him by President Clifford. Mr. Sullivan reciprocated by pinning the badge of past-president on Mr. Clifford's coat.



## Retiring Presidents of the American and Affiliated Associations



FRANK R. COATES  
American



CHARLES RUFUS  
HARTE  
Engineers



GEORGE H.  
CLIFFORD  
Traffic &  
Transportation



JOHN J. DUCK  
Accountants



JOHN H. HANDLON  
Claims



# Co-operation by All Transit Agencies Means Progress\*

Transportation a Civic Necessity, and  
to Cripple Its Effectiveness and Power  
Properly to Function Would Hamper  
Seriously the Municipality as a Whole

By Frank R. Coates

President American Electric Railway Association,  
President Community Traction Company, Toledo, Ohio

IN OPENING this, the 45th annual convention of the American Electric Railway Association, I have a feeling of pride in our industry, a pride which I believe is justified. A few short years ago there were those who professed to see the electric lines skidding into innocuous desuetude. Today, in this great auditorium, what do we see? The greatest convention this association ever has had, the greatest assemblage of transportation men, the greatest exhibit of transportation equipment and material. That's going some for an industry that was supposed, five years ago, to be due for the scrap pile.

Real progress in our organization work has been made by the thorough co-operation of the executive committee, the Advisory Council, the managing director, the headquarters staff, under the able guidance of the executive secretary; committee chairmen and committee members.

At the outset of this administration the Advisory Council recommended the discontinuance of the mid-winter meetings, but to have territorial meetings in their place. The first one of these was held in Chicago in February, the second in New York during June. The discussions were behind closed doors, and from the excellent results obtained it is my strong recommendation that these be continued by future administrations.

During the year we have invited the committee chairmen to meet with the executive committee at each of its sessions. We feel that this has brought the committee work closer to the association and has been an aid



FRANK R. COATES

to the chairmen. The continuance of this policy is recommended. Our publicity department has provided a series of eight talks on the electric railway situation, which have been given wide distribution among executives and public information bureaus, with the request that they be made the basis of public talks before business clubs, chambers of commerce, schools and, in fact, before any gathering where our representatives appear.

For the first time our association has been represented on the advisory board of the visitors' committee to the Massachusetts Institute of Technology. It is amazing to learn through this source how much thought and study are being given to the higher education of the student. It is my suggestion that the association appropriately express its appreciation to Dr. Sargent

for having given it the opportunity, through its president, of placing the electric railways' problems before the Institute.

Executives or representatives of your association have appeared before all sectional meetings in the United States this year. It has gratified me especially to attend a number of these meetings personally. From each of them I carried away the thought that these meetings are of a very high standard and that real results are being accomplished. To prevent duplication of effort and to further our work for the common good of the industry there should be some tie-in between the sectional associations and the American Electric Railway Association. Your president mentioned this in an address before the Midwest Electric Railway Association, and it unanimously approved the idea. It is my suggestion to our executive committee

\*Abstract of an address presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



that the president of each sectional association be invited to meet with the committee whenever it is in session. This would bring the organizations into closer contact. It is not the desire or thought to have the American Electric Railway Association dictate in the slightest degree to the sectional organizations, but simply to have a point of contact which will insure more perfect co-operation.

#### LOSS OF RAILS A BLOW THAT WOULD CRIPPLE THE COMMUNITY

There is no evidence at this time nor is there any probability that dense traffic can be handled efficiently other than by electric cars on rails. There is also a place for the bus. But we hear so much nowadays about tearing up electric railway tracks that apparently the proponents of these drastic measures never give any serious consideration to the needs of the future. We have been told in a number of instances that electric railway equipment should be junked and buses substituted. The politicians and leaders of public thought who advocate such a procedure in our larger communities would hand down to posterity a heritage which would so cripple transportation that the very growth and well-being of the community so affected would be dealt a paralyzing blow. Transportation is a civic necessity, and to cripple its effectiveness and power properly to function would be to hamper seriously the municipality as a whole.

Are we as transportation men doing our full duty toward offsetting this mistaken notion? Are we effectively and squarely meeting this issue? It is our duty in the community we serve to keep hammering away at the future necessity for electric tracks to handle mass transportation in our larger cities. If we do not, we are failing in our duty to our companies and to the public at large. We are failing just as wrongfully as those in positions of civic trust who, utterly unmindful of the future dire consequences to the communities they represent, would wreck the foundation of their transportation structure that they may gain some advantage, in their narrow-minded view, for their own political preferment.

#### AMPLE RATE OF FARE ESSENTIAL

It is unfortunate that we must fight these elements for our existence. Whenever there is friction there is waste. Fights and educational campaigns cost money, and yet in the majority of cases the attacker keeps calling for lower fares.

We cannot discuss service without considering it in relation to the fare question. Some people evidently think that everything else has a higher value since the war except city car fares. Every factor which goes to make up transportation service has gone up in price, yet there are a few communities in this country which that the user of the service is fixing the price.

Further, the rate should provide sufficient money properly to care for maintenance and depreciation, and for all obsolescence as well. In the vast majority of cases our American rate is a single fare for each ride. Usage may have established this, but it is not just. Why should the passenger who lives a mile from his place of daily labor pay the same as his fellow worker who lives 3 miles away? The latter is getting something for nothing, something for which the short rider is paying.

Consider the advantage to all property in a community when there is an adequate transportation system. The car rider pays for it. No man is more opposed to any branch of our government carrying on any business than my chief, Henry L. Doherty, but he has repeatedly stated that an adequate common transportation system is so necessary to every community and so essential to its growth and development that the payment of readiness to serve expenses of the transportation system could be justified as a tax on the property of the community. He has also held that the property owner would be better off paying these expenses as a property tax than to risk depreciated land values through retarded growth of the community, or failure to secure appreciation in land values due to natural growth. Under such a plan the car rider would pay only that portion of transportation cost which is based on the distance traveled.

This will undoubtedly impress you as a very cumbersome and unnecessary method of charging. However, it has such elements of equity that in my judgment some such method will ultimately become standard practice.

#### PARKING IS CIVIC WASTE

Our public streets were built originally to accommodate traffic. One would not think so today; most of them are used for automobile storage. Automobile drivers will park their machines blocks from their places of business and walk the remainder of the distance.

This matter is being discussed today from all angles. It is an expensive accommodation for the few to the detriment of the vast majority of the population in any city. The parking problem is not alone the business of the transportation company to combat, but it is a civic problem and should be cared for by the municipality. We should become aggressive in our local organizations to have the parking nuisance abated.

The street railway is a necessity. We were threatened at one time by the jitney. This form of competition held sway for a short while and then died out. Then came the buses. Their competition with the electric railways has reached its peak and is now waning. But in the bus is found something we can use to advantage. While as an individual system the bus cannot compete with the electric car under the same rates, yet co-ordinated with the electric system we have found a place for the bus where it can be used, and used to advantage.

#### MANUFACTURERS HELPING TO STIMULATE MODERNIZATION

The manufacturers of electric railway equipment have done wonderful work in modernization. We ask that their studies and development work be continued, with the twofold object of bringing about modernization and reducing costs. Thus, with the manufacturers working to accomplish the results suggested and the operator studying the situation and carrying out his advanced ideas on the underlying principles of co-ordinated service, rate of return, and meeting the opposition to the electric railway squarely and fairly, we will find the recognition for which we have been striving.

The steam roads are gradually turning toward the electrification of certain parts of their systems; they realize the possibilities and necessity for this form of transportation. And until something is presented other than that which has been offered up to this time as a substitute for the electric car it is in no imminent danger of being supplanted.



# Electric Railway Service Can Be Sold\*

In the Past Most Executives Have Overlooked Latent Power of Employees as a Selling Force—Better Business Campaign of North Shore Line Cited as a Practical Example of Methods that Can Be Used

**By Britton I. Budd**

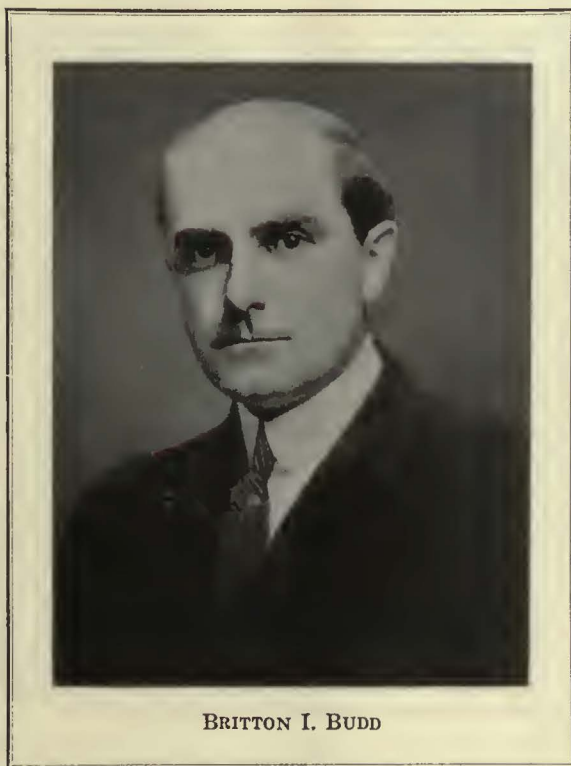
President Chicago North Shore & Milwaukee Railroad  
and Allied Companies

**S**ELLING transportation service is a subject which has been engaging the attention of electric railway executives a great deal in the last few years. The old theory held by many that electric railway service, being a necessity was used only in case of necessity, and therefore did not require any special effort to sell it, has been generally discarded. Today I think we all agree that electric railway service can be sold; that is, that the operating revenues of our companies can be increased by well-directed sales efforts. I think we are agreed, also, that at no time in the history of electric railways has the need for intensive sales efforts been as great as it is now.

Being agreed, therefore, on the main propositions that properly directed sales efforts bring results and that the necessity for such efforts is pressing, the question before us is what are the best methods to employ.

I believe that most electric railway executives in the past have overlooked the potential power of the employees of a company as a selling force. I do not mean simply in the way of giving courteous, efficient service, which means the creating of good will and indirectly increasing business, but as actual sales agents. I wish briefly to sketch an experiment which we are trying.

On the North Shore Line we have an active traffic department made up of men who are experts in the line of selling transportation service. Such a department is a necessity for every company engaged in a line of work similar to ours. The experiment which we are trying out, of having all our employees act as sales agents, does not in any way take the place of our traffic department. On the contrary, it makes the work of that department even more of a necessity, for it follows up those "tips" of new business which the employee salesman cannot close.



BRITTON I. BUDD

The employee sales effort includes every one in the company and even members of their families. For example, the wife of a trainman has been responsible for a very substantial amount of new business and has been an award winner. All services of the railroad have been subdivided and listed as "products" which the company has to sell. The employees are urged to sell anything that the company has to sell, to comb their communities intensively for business and to take advantage of contacts with their grocer, butcher or dry goods man, or their lodge, club or other organizations.

To carry out this work a thorough organization was perfected. The movement was launched at the beginning of the year under the name of the "Better Business Campaign." The interest of every

employee of the company was aroused. Seventeen separate teams, or groups, were organized, each one under a captain who appointed his own aids and subdivided his group into separate smaller units. A spirit of rivalry has been stirred up among the various teams, and individual and group money prizes were offered to the individuals and teams making the best showing.

Our employees' publication, the *Highball*, each month devotes pages of space to news of the campaign. It prints the pictures of the prize winners, feature stories about them and in every way helps to arouse and keep up interest. Group meetings are held almost daily and, in addition, circular letters are mailed from time to time to the home address of every employee. Members of employees' families are interested in the campaign through the employees' publication and the circular letters, so that the effect is cumulative and widespread.

## DIFFICULT TO MEASURE VALUE

It is difficult to estimate the value of this campaign in dollars and cents. Both passenger and freight traffic increased substantially over the corresponding months

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



of the previous year and it may be assumed that a part of the increase is due to the sales activities of the employees. In the first six months of the campaign, 4,954 business "tips" were turned in from employees, and to show how alive they are it may be cited that one piece of prospective business brought as many as five separate "tips" from as many employees.

But the value of a campaign such as I have sketched is not to be measured by the amount of new business which might be traced to it directly. Its chief value lies in the enthusiasm it has aroused among the employees and the effect which that enthusiasm has in the various communities in which the employees live. When a company has a force of 2,000 employees, bubbling over with enthusiasm, talking about the company among their acquaintances and neighbors, such a company has a selling force the value of which is inestimable.

#### PUBLIC ADMIRES LOYAL EMPLOYEES

We know definitely that the campaign has had the effect of personalizing and popularizing the company in the various communities it serves. We know of merchants who have called their employees into conference and spoken to them on the spirit of the employees of the North Shore Line. We know that the campaign has increased the feeling of good will among our customers and that it has been worth while.

An important result of the campaign is the effect it has produced on the morale of the employees. The fact that the North Shore Line is subject to strong competition has been a factor in the success of the campaign.

Competition creates a company spirit. It puts men on their toes and makes them fight. They feel that business going to a competitor is a personal loss to them. They are alert to take advantage of every opportunity to get new business for their company.

#### A TRANSPORTATION SALES CONVENTION

Guided by our experience in the "Better Business Campaign" of the North Shore Line, we are preparing to carry out the same idea, perhaps on somewhat different lines, on the other railway properties with which I am connected. On Sept. 16 and 17 we held an inter-company convention which we termed a "General Transportation Sales Conference." The delegates in attendance were selected by the general managers of the North Shore Line, Chicago, South Shore & South Bend Railroad, Chicago, Aurora & Elgin Railroad, and the Chicago Rapid Transit Company.

We held two full-day sessions, beginning at 9 o'clock in the morning and lasting until 5 o'clock in the afternoon. The delegates were on company time and a full attendance was insisted upon. A program was prepared and definite assignments made in advance. Main papers were limited to twenty minutes and discussion to five minutes. A great deal of valuable information was developed which each delegate was instructed to present in summarized form to the employees in the department which he represented.

All the topics discussed at this convention had to do directly with the selling of transportation service. To give an idea of the scope and nature of the conference, a few of the main subjects may be mentioned:

A general review of electric railroad facilities in the Chicago metropolitan area.

Motor coach facilities in the territory of the companies represented.

Merchandise despatch and l.c.l. facilities and how business may be built up.

Carload freight business, interconnections with steam railroads, through rates, demurrage, etc.

Diner and parlor car business.

Concession business.

Good public relations as business builder.

Paid advertising; its purpose and how to make it effective.

Employee and customer publications; their purpose.

Publicity—what does it mean?

Speaking activities as a selling agency.

How can the "valley" in transportation be raised closer to the "peaks"?

There were in all 24 main papers on the program and each was discussed by from three to five speakers in five-minute discussions.

The main purpose of the convention was to give the representatives of each company a broader vision of the whole transportation problem in the metropolitan area and to point out ways of all working together for mutual benefit. The entire program was just another method of selling transportation service.

#### PRODUCT MUST BE CONSTANTLY IMPROVED

Actuated by the motive that it is necessary to have a constantly improved product, particularly in the merchandising end of it, we are working hard on another phase of the sales end of it even beyond the purely physical problem of providing still better tracks and equipment. We have inaugurated a service improvement program on the North Shore Line which has been in effect for some time, and with success, on the Chicago Rapid Transit Company lines.

First a careful survey was made by experts (1) to determine customer attitude toward the service and (2) employee attitude toward the customer. The employees are called together in small groups for a series of meetings and discuss, under the guidance of a trained director, practices which will lead to betterment of contacts with the customer and eliminate annoyances on the part of users of the service. In other words, they are developing, themselves, standards of practice not only for themselves to follow, but which will be the rule and guide for newcomers in the organization.

#### ADVERTISING—OF COURSE!

I am not going to say much about advertising—either newspaper, poster, billboard, car card, direct-by-mail, or the other forms which may be used effectively if handled by some one skilled in presenting sales arguments to the mass mind. To do that would merely be a reiteration of emphatic statements I have made previously on that subject. The company today, whatever it sells, that does not advertise efficiently will, I believe, soon find plenty of capacity in its old equipment. The competitor who knows how to advertise will have the business.

There are so many ways by which transportation service can be sold that I have not attempted to cover the entire subject, but only to point out two or three methods being tried out on our properties. In the last analysis, everything done by a public utility has a direct or indirect bearing on the selling of its product.

Of course, the best method of selling transportation service is to give your customers all and just a little more than they expect in the way of service. When that is done the selling is made much easier. When it is not done, when the service is open to serious criticism, the best selling methods known will not be entirely successful.



# Winning Public Support

## Is First Step in Selling City Service\*

Every Employee Should Be Saturated with Information Regarding His Property and Should Broadcast It Widely

**By Thomas Fitzgerald**

Vice-President Pittsburgh Railways,  
Pittsburgh, Pa.

**W**ITH public opinion nothing can fail—against public opinion nothing can succeed.” Whether or not this thought expressed by Lincoln is true, it is believed to be an entirely safe idea on which to base a campaign for selling street railway service.

The exact causes and effects of favorable or unfavorable public opinion have not yet been determined. The many obscure and complicated factors which work upon the mass mind make the possibility of a clear and convincing solution of the problem remote indeed. Certainly it does not lie within the ability of a single mind, beset with difficulties, problems and annoyances attendant in the operation of one comparatively insignificant street railway system, to analyze the relation of causes and effects in the fundamentals of this problem and convincingly demonstrate them to so tremendous an industry as the street railway utility. It would seem that the men who are best qualified to analyze and demonstrate the fundamentals underlying our industry are those whose work puts them in touch with the industry as a whole and not with any small part of it.

The officials of the A.E.R.A. and the editors of the journals devoted to the upbuilding of the industry are in an infinitely better position to analyze and demonstrate facts regarding our problems than any small group of men whose activities are localized in a comparatively insignificant part of the whole industry. It seems to be incontrovertible that the answer to the fundamentals underlying our local problems must come from men whose vision embraces the whole field. We as local men should supply them freely with whatever pertinent information we may have for the purpose of bringing out in a scientific way all of the available facts regarding cause and effect.

Incidentally it may be said that one of the most important influences upon the correction of erroneous conclusions and practices should be meetings such as these, where men from different localities can meet and by



THOMAS FITZGERALD

criticism and discussions demonstrate to the man with a mind open to ideas different from his own that there is a great opportunity to broaden his vision and to increase his usefulness to himself, his company, and his community. The moderately successful man, especially he whose success has created the conviction that the solution of his problems has been accomplished, should benefit by these contacts. If he is to be an asset rather than a liability to his property, changing conditions must find his mind open and receptive to suggestions, ideas and practices developed successfully elsewhere and which may be applied with equal success in his own locality.

First, then, it appears that the selling of service requires that every one connected with that service be saturated to the limit of his ability to absorb information, and it seems that the best way to secure and spread information is through free and full interchange of ideas through all available channels. This group, organized for the purpose of discussion and criticism of problems confronting every one of us, presents the most important medium.

### KNOWLEDGE BREEDS UNDERSTANDING

The principal obligation of the railway representative is to see that his facts are stated as facts and his opinions as opinions. Placing the information before a group of councilmen or city officials is not an easy matter and frequently requires all the tact, patience and courage that a man possesses.

It is not enough that one man or one small group of men have knowledge of the facts regarding street railway problems affecting the public of a large community. Strive as hard as they may, a small group can spread very little knowledge in a convincing manner—especially to a large community whose people feel that their close physical contact with the street railway service qualifies them to judge the “facts” presented by the printed page better than a small group. This is par-

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



ticularly true if that small group is suspected of making little contact with the facts of the service. It seems almost an impossibility to bring the public to realize the value of street railway service unless the whole railway group or a large portion thereof bends every effort to dispense authentic information so that the public may come to an adequate understanding of the problem. The only restriction to be made upon the practical application of this theory should be that facts ought to be stated as *facts* and opinions stated as *opinions*.

#### FREE DISCUSSION ADVOCATED

On the basis of this theory, with its one restriction, the officers and employees on one property have been invited by the management to discuss any of the company's affairs with any one. Two years of this policy have not presented a single incident embarrassing to the management, and it is believed that discussion of its affairs along this line has benefited public relations and will continue to do so without embarrassing results.

The trainmen, who make the greatest and most effective contact between the railway management and the public, offer the greatest single opportunity for the improvement of public relations. Whatever methods may be necessary to secure their interested effort to render good service and inform the public properly should be adopted. In one case representatives of the trainmen to the number of 80 or 100 and an equal number of street railway officials meet at frequent intervals for the discussion and criticism of operating practices.

#### GIVE NEWSPAPERS COMPLETE FACTS

Placing newspapers in possession of the complete facts regarding matters in which the public is interested offers a valuable field for efforts to inform. Their possession of all the facts quite often makes it possible to arrive at an amicable arrangement in matters of controversial nature without incurring premature animosities generated by public discussion based on inadequate information.

A concrete example of this policy with the newspapers was the amicable signing of a labor contract, during the discussion of which the newspaper men were informed by both sides and the situation completely explained to them. Where formerly there had been bad feeling and misunderstanding, in this case the newspaper men were convinced that the public interest was being served by allowing the two parties to proceed with negotiations without undue publicity. The final accomplishment was looked upon as the best solution to both parties under the conditions, and the newspapers proceeded to compliment both sides on the arrangement made.

#### CIVIC BODIES INTERESTED

Information should flow not only through the railway's personnel and news columns but through all forms of advertising—newspapers, posters on streets, posters on and in cars and billboards—any decent method of bringing before the public the facts regarding the street railway problems should be used.

It has been assumed that the attitude of the street railway men is that of a real public servant making every effort to accommodate his views to the desires of the representatives of the public and of the public

itself. It would seem highly desirable that a city street railway man should look upon the public officials of his community as being representative of public opinion and to try in every possible way to comply with the suggestions and instructions issued by them. It is surprising how few detrimental suggestions are made or insisted upon by influential political representatives of the people. Suggestions, when complied with, carry with them a certain responsibility for the suggestor. It is pleasing at times to see the response of a suggestor to the idea that a sincere attempt will be made to carry out his suggestion successfully, assuming that he will take full responsibility.

#### LOCAL REGULATION MAY SOMETIMES HELP

In one case, at least, local regulation has been tremendously beneficial to a local street railway. In this case the character of the men composing the regulatory body is of the highest type—all sincerely interested in serving the public to the best of their ability. While there have been numerous disagreements and decisions adverse to the opinions of the street railway's management, still there has been none which impaired the rights of the stockholders, management or employees or in any way adversely affected the ability of the railway system to serve. A general survey will show that public good will gained by a local regulatory body has in this case rendered completely insignificant any differences of opinion regarding minor matters. While there have been no secret meetings of this board, publicity on controversial matters which might lead to misunderstandings has been avoided and, in all cases so far, the company has been able to accept the board's decisions.

With the sunlight of understanding illuminating street railway companies' practices, bad methods cannot survive, and the extent to which this understanding and free flow of information is accomplished, to that extent the details of operating and selling methods approach perfection.

#### LONG-HAUL RATES RESTRICT RIDING

One important feature in selling city street railway service is to recognize that it is fundamentally a short-haul service. When we try to sell long hauls we are opposing the natural functions of the facility, and to sell short-haul service at a long-haul rate seems to be the height of foolishness.

In most of our large cities empty cars may be seen on the streets and in the carhouses at the off-peak hours of the day. To sell those empty seats on the road for any small amount of money would increase the net return. There are people walking along the streets or staying at home during off-peak hours who would be glad to pay a small sum for the large amount of service which city railways are producing and wasting.

The speaker believes that the weekly pass offers the best present possibility for progress along this line. But until we have found some way of selling at a profitable price this off-peak by-product, there seems to be no justification for any one assuming to advise a group of electric railway men on the subject of selling.

Increasingly favorable public opinion, in spite of our failure, indicates the generosity of the public toward ineffective public servants. If we can find some way to become really effective public servants, who can predict the rewards which may be ours?



# Street Management Needed in American Cities\*

By G. B. Anderson

Manager of Transportation  
Los Angeles Railway

**S**TREETS have generally been created, owned and maintained by the state. Their purpose has largely been an economic one. In their use little control has been exercised until recently because their use was available on a basis of equality to every one; that is to say, economically the use of the streets was "free goods," like the air and other unlimited privileges enjoyed by mankind.

When the invention of the automobile made an individual vehicle available for every American family, effecting a revolution in methods of individual transportation, a different economic principle automatically superseded that of "free goods." This is the principle of economic value derived from scarcity. An exemplification of this principle is to be seen in the gradual change in the economic status of many natural resources. At first the land, water resources and like derivations of a rich and unclaimed world were to be had for the asking. As population increased, scarcity, relative to use, changed the economic aspect of these resources, and a more careful political disposition of the use of this wealth had to be set up. In the same way the streets will have to be subjected to a political disposition and control which is new and at present almost unthought of.

Success to some degree has attended the efforts to secure, through the partial enlightenment of the public, what we now realize are for the most part palliative, temporizing measures only, but we seem about to enter upon a day when such measures will have lost their virtue, and when the complaisance of the public, largely still ignorant of the fact that it is the worst sufferer, must be disturbed. That disturbance inevitably will follow realization that the public is paying the penalty.

In these days speed in transportation is a highly valuable element of production. Rapid transit is a labor-saving and time-saving institution. It has be-



GEORGE BAKER ANDERSON

**Speed in Transportation Is a Highly Valuable Element of Production—Properly Organized Control May Add Time with a Value of \$2,000,000,000 Annually — Street Railway Managements Should Take Initiative in Placing Traffic Situation Before Their Public**

come an economic necessity. Conservative Old World critics are amazed at and critical of the high speed at which most of us work and travel and think, but America's great lead in prosperity, the wonder of twentieth century civilization, is due very largely to the fact that by reason of such speed we hoe more rows of corn in a day and transport workers more miles in an hour than do the people of any other nation on earth.

The minutes thus saved each day to the average American, multiplied by the total population engaged in productive industry, run into a value of many millions of dollars annually, giving us the edge over other nations. If students of the problem have not been exaggeratedly enthusiastic in their estimates and conclusions, the additional minutes that might be thus capitalized under a properly ordered system of control over existing unnecessary impediments to the movement of urban traffic would have a cash value of not far from two billion dollars annually.

In May of this year President Coates assured the transportation and communications group of the Chamber of Commerce of the United States of the desire of the electric railways to co-operate with that

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



body in bringing about a solution of the problem of street congestion that will promote the orderly progress of commerce and industry, as well as to insure the safety of the public and prevent the enormous waste of life, money and time that is being recorded each year. He said that he was urging the electric railway people to regard themselves not simply as electric railway experts but as transportation experts, so well acquainted with the transportation needs of their communities that they can say just what transportation the community should have. Their duty, he declared, is to give the community the best possible transportation advice.

It is that plea for orderly progress that I am seconding. It is a plea for full recognition of not only the opportunity that presents itself but the obligation under which, being responsible for the safe, speedy and economical movement of the mass of people, we rest. To use a colloquial expression, we are all "sold" on the postulate that the prime cause of delay to traffic is congestion, and that the prime cause of congestion is the abuse of the privilege of the streets by vehicles used for the convenience or pleasure of private individuals, or minor special interests, as distinguished from their actual necessities.

#### MUST EXPEDITE "NECESSITY" TRAFFIC

Private enterprise in America has made unparalleled advances because of the executive genius that has been applied to it. The cause of our failure to exhibit a similar productivity in the operation of the public streets and highways lies in the comparative newness of the necessity, the widespread lack of understanding of the seriousness of the economic aspects of the problem and the control of regulation by transient public officials who are but incidentally concerned or interested, instead of by executives of thorough training and experience.

Urban highways have become one of the greatest productive agencies employed by the people. Their uses are sometimes conflicting, and some uses are more important than others. Recognition of this fact has resulted in the use by students of the qualifying terms "necessity traffic" and "non-necessity traffic." Those uses which are for the good of the community at large are classified as "necessity traffic" and are of highest economic value. Some uses are in the nature of special privilege from which gain accrues to individuals or groups at the expense of others, or of the community as a whole.

The paramount problem involved in mass transportation today lies in the tremendous increase of automobile traffic and the resultant congestion of the streets. It being manifestly unwise, undesirable and impossible to legislate the automobile off the streets, the question resolves itself into one of equity and economics. Any plan to be successful must be based on sound economic principles, with interference to public "necessity" traffic reduced to the minimum.

The first necessity of a community is that it must earn its living. The safeguarding of life and property is purely incidental to living. The workers as a mass, therefore, must receive first consideration as to the time of day when the necessity for their movement is greatest.

The functions of the city as a market center, with the consequent movement of buyers and sellers, must next be considered.

The movement of the wares of commerce is, of course,

as necessary as the movement of the workers and of the buyers and sellers, but in general these movements are less rigidly confined to the time factor. Here is a vast field for reform. Many such movements could be made at night without serious inconvenience or loss, and to the great advantage of daylight movements which could not be assigned to the night period. The greater freedom of movement of commercial wares at night in many cities would in itself produce very large economies.

Closer control ultimately must be set up, with authority to insure the most economical use of the streets for the greatest good to the community. If such control, implying the arbitrary allotment of time and space, is to be classified as modern business, it must not be unscientific local political control, subject to the whims of changing administrations, which has resulted in the strewing of wrecks along the highways of transportation progress.

What apparently should be the next step is not advocacy of immensely costly extensions of street facilities, but rather a more intensive use of those we now possess, with possibly some minor additions of room and short cuts. By adopting such a program we will avoid the destruction of millions of dollars' worth of business structures, escape huge increases in our tax bills and thereby enormously increase the prospects of a continued well-being and prosperity.

Nor will the widening of existing thoroughfares, separation of grades at intersections, building of subways and elevated roads solve the problem. The more room there is provided the more vehicles will there be clamoring for the privilege of using it. The ultimate, in central business districts of the average city, would be a *reductio ad absurdum*—all roadway, no private business property.

That a political control is necessary under existing conditions seems obvious. The streets are public property whose use is not now governed by sound economic considerations. The state only has adequate authority to control for the public welfare. The reasonably satisfactory development arising from the establishment of the Interstate Commerce Commission and the state railroad commissions and public service commissions is an augury of the results that may be expected from these proposals. A controlling body should be composed of factors beyond the reach of individual or composite interests.

#### METROPOLITAN TRANSIT COMMISSIONS NEEDED

This political body may be designated as a "Metropolitan Transit Commission," to be appointed, preferably, by the state Governor. This origin, somewhat removed from local influence, combined with long terms of office and salaries commensurate with the economic importance of the problems involved, would do much to place the city streets in their true position as the most valuable material asset of the community.

Such a commission should have power to provide for an allocation of the use of the streets for the greatest economic welfare of the city as a wealth-producing unit, for the streets are community capital; that is, tools of production.

As an administrative body the commission should employ two main types of subordinates. The adequate functioning of the work planned would have to be based on full information in detail as to traffic conditions and



requirements. Such knowledge is not to be secured by a tabulation of opinions, but by exact engineering fact-finding.

Likewise the enforcement work should be in the hands of the commission. Under police administration this work has had an almost exclusively punitive aspect. I believe that a better control can be maintained, both as to order and safety, if the educational work is emphasized. Street car companies have very greatly reduced the liability of their conveyances as a cause of serious accidents by making their trainmen responsible under an adequate system of safety rules. By the same analogy the scientific use of the streets secured by modern schedules on the electric railways might be extended to free-wheel vehicles.

The committee on traffic congestion this year presents numerous recommendations which in my judgment should be incorporated in a plan for action on the part

of street railway managements. Most of us have probably been a trifle too diffident, or perhaps meticulous, to urge upon the constituted authorities adoption of curative or at least alleviative projects which our own analysis and experience have shown to be desirable, even necessary, if urban transportation is to be saved from descent into a chaotic condition. In view of the fact that quasi-public and some regulative bodies with little more back of them than a moral force, or power to lead public sentiment, are generally disposed to be guided to a great extent by the recommendations of street railway operators in matters pertaining to relief from congestion, it seems not illogical to assume that constitutional legislative and executive authorities might be similarly willing to lend attentive ears to programs advanced by the industry as a whole, representing as it does the best thought of experts with ample facilities for gathering and analyzing the facts.

## Interest in Modern Equipment Opens New Possibilities\*

By S. M. Curwen

President J. G. Brill Corporation

IN MY mind there is no subject which requires greater attention at this convention than the character of the rolling stock with which you will continue to provide that necessary commodity, public transportation. There is no doubt in my mind, and I don't believe there can be any in yours, but that every passing day produces further assurance of the permanency of our industry, and that no vehicle has been developed up to the present time which can equal the electric car in handling large crowds quickly, particularly in densely populated cities.

It therefore seems apparent that while parking restrictions and necessary regulation directed toward the private automobile and the motor bus will contribute their share toward improved conditions, the extent of the electric car's future utility will depend particularly upon the efficiency with which it renders service in keeping with the higher standard which the American people apparently are now requiring. Although the automobile has disadvantages as well as advantages, the public is edu-



SAMUEL M. CURWEN

cated to its higher standard of transportation comfort and convenience, and presents a problem for our electric railways to meet if this large and growing part of the public is to be rewon as patrons.

Great strides forward have been made by our electric railways in the adoption of improved power plant equipment, with which you are all generally familiar, and it is needless for me to say that throughout the country there are many instances where the possibilities for reduction in operating cost and increased patronage by the use of improved types of rolling stock are being recognized.

In discussing this subject of modern equipment, or possibly I should say more efficient equipment, for after all that is what it really signifies, let me remind you that practically every industry of importance

throughout the world is striving to take advantage of the economies and increased efficiency resulting from the application of new devices or developments in design of equipment. By the introduction of new auxiliary devices and other improvements in motive power equipment the steam railroads have not only been able to handle longer trains faster, but according to public information based on the records of the past three

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



years the Class I roads showed a saving equal to 20 per cent of their present rate of fuel consumption. For the first six months of this year this represented almost 10,000,000 net tons of coal and more than 198,000,000 gallons of fuel oil. It is evident, therefore, that the steam railroads appreciate the advantages in economy and service accomplished through modern equipment performance.

Last year, during our convention in Atlantic City, Mr. McGraw called together a number of executives to reveal the astounding information that approximately 28,000 cars more than twenty years old were then in operation on the electric railways of the United States. While it was recognized that this condition was generally the result of increased operating costs and inadequate fares, the extent of deferred equipment replacements was a subject of much concern. It was felt, and has since been conclusively proved, that the continued operation of such equipment, whether it has seen twenty years service more or less, depending upon its type and condition, is economically unsound. Excessive operating costs absorb essential profits, thus resulting in unsatisfactory service and lack of appeal to the traveling public.

In order to overcome this drawback to the industry and to promote efficiency in car equipment, there was appointed a committee on essential features of modern cars to make an exhaustive study of existing conditions, and to recommend certain types of cars for both city and interurban service. The report of this committee has since been submitted and published in the technical press. While it is voluminous, it represents an exhaustive effort on the part of the committee and is deserving of the earnest consideration of every one interested in the welfare of the electric railway industry. Copies of this report, in book form, I understand, are available at the association's headquarters. Summarizing this report briefly, it has two important parts:

First, it recognizes the lack of reasonable unification in car design and the existence of needless variations in dimensions, weights and general arrangements. It recommends certain designs of cars for the different classes of service, and asks railway companies and manufacturers to agree upon them in the interest of efficiency and economy.

#### SUBSTANTIAL SAVINGS POSSIBLE

The advantages resulting from adherence to these uniform designs are, of course, quite apparent. In addition to savings through larger quantity purchases of raw materials, made possible by the uniformity in dimensions, reduced engineering expense, quantity production and elimination of numerous jigs, dies, etc., will result in lower selling price, quicker delivery, lower maintenance cost and the interchangeability of cars among various properties.

It is also important to note that the nearer equip-

ment conforms to uniform designs the more acceptable it is for car trust purposes, thus making it more convenient for every company to take advantage of the more economically operated and attractive types of modern rolling stock.

Secondly, this report includes a number of outstanding illustrations of the results achieved within the past few years with light-weight modern cars, giving actual operating costs in comparison with the heavier obsolete equipment displaced. While these figures show returns on invested capital ranging from 13 to 65 per cent, I believe that with equipment built according to the uniform designs recommended, the results would have been even better.

The committee does not touch upon the subject of single-truck cars other than to state that, while the trend for the past few years has been toward double-truck equipment, builders are all prepared to furnish the Birney car wherever required and that nothing could be gained by attempting to select any additional types of single-truck cars for general use. As you know, the Birney safety car is the outstanding illustration of the possibilities of standard equipment. You have often heard of its economical accomplishments, and no doubt many of you enjoyed its economical operation.

#### TENDENCY TOWARD GREATER COMFORT

Since our convention last year purchasers of modern types of cars have shown a tendency toward deep spring upholstered seats, rubber tile floor covering, elaborate interior finish and other attractive features with which to stimulate their transportation business. Of course, the primary purpose of these innovations is to increase revenue passengers, and apparently the many instances in which they have been adopted is certainly evidence of the confidence of the railway officials that improved service conditions are important factors in increasing passenger travel.

While the committee on essential features of modern cars recommend certain designs and uniform dimensions, it does not restrict the manufacturer in construction details, but rather offers an incentive for increased activity toward progressive developments. The designs upon which operators and manufacturers are asked to agree are only the beginning. Progress is sure to be made. Further designs will be offered, all, of course, adhering to the lines of uniformity in fundamental dimensions in the interest of efficiency and economy. In closing, therefore, let me say that I do not believe there will be a manufacturer who will not welcome an adherence to uniform designs of cars not only for the opportunity which will be afforded for a more systematic process of manufacturing, but particularly for the advantages which these modern types of rolling stock will provide and the stimulating effect which these advantages will have upon the electric railway industry.

**T**HE most progressive men in our industry are recognizing more and more that there is one outstanding fact which applies to every line of business and which our industry cannot escape, that no publicity and sales effort can be really successful unless the product

itself is somewhere near right, especially when compared to the article with which it has to compete. And they are asking themselves: "Is our product what it really should be?" "Is our business an exception to this outstanding merchandising principle?"

—B. C. COBB



# Transportation Service Presents Difficult Problem\*

By W. R. Hopkins

City Manager, Cleveland, Ohio

I PRESUME I needn't tell you the fact that of all the public services, that branch to which you have devoted yourselves is by far the most difficult, the least appreciated and the poorest paid. Barring water alone, which is usually furnished by the city, surface transportation is the most fundamental requirement in the development of any modern city. There have been great cities without gas, without electricity, without telephones, but a great city, as we know great cities, would be absolutely impossible without surface transportation, not only on a large scale but at prices which permit its use constantly and daily by all of the population.

Therefore, the contribution of those concerns which furnish what we now call "mass transportation" is the fundamental, the initial and the most absolutely essential of all contributions to the development of the modern city. It has already made possible that one thing, permitting people to live at great distances from their work. As a matter of fact, it is with the development of the modern electric car that we began the development of modern American cities.

In rendering this service you face difficulties that no other public utility faces, because you must render it in the face of those difficulties from which they are free. You have no control over the elements which affect your service and determine its qualities as they have.

For example, the electric light company, the water company, the telephone company, the gas company, can carry their service directly to the consumer and can furnish it to him in his house, in his office, in his factory, without the interference of any other factor whatever. They have control of the ultimate delivery of their goods.

In your case, the user of your facility must come to you. In coming to you he must face whatever inconvenience is involved in a contest with the weather and with traffic, and when he gets somewhere near your vehicle he either must run to catch it or he must stand and wait for it to come to him. In the case of the street car, before he can get from the curb to your vehicle, he must run the risk of accident from traffic. In getting on your car he runs a further risk of accident, which is evidenced by the great sums which you pay annually for car-door and car-stop accidents.

In getting into the car and within the car itself he must encounter inconveniences from his fellow passengers, over whom you have no control at all, and sometimes from your employees, over whom your control is necessarily remote.

While he is waiting for your car he begrudges every minute that he spends in so doing. He postpones till the last possible moment starting for it, and from the time he starts until the time he leaves he is thinking only of the thing he wants to do and can't do until you have carried him to his destination.

So, all the time you have him on your hands he is impatient and almost an unwilling customer. Before he gets into your car he must hand over his fare first of all, and then, too, he must pay you 50 or 60 times a month. He buys his water, his gas, electricity, his telephone service, and he pays once a month at his convenience, and then mostly by check. In other words, you, at every turn, must not only reckon with and suffer from all sorts of factors and elements over which you have no control, but when you have done your utmost your passenger doesn't get the freedom from annoyance that other lines of business permit.

## FUNDAMENTAL SERVICE LEAST APPRECIATED

So it isn't strange that this service, which is absolutely fundamental to the life of any modern community and rendered with the most difficulty of any public service, is the least appreciated. How many people seriously give any consideration to all the difficulties under which, of necessity, you render the service? Of course, the other thing naturally follows, that by and large this is the poorest paid of all public services. People pay for gas and for electricity and telephone service at rates which make all of those businesses uniformly profitable, and with very few exceptions all of the concerns in those lines of business find it entirely easy to pay large returns, larger than you have been paying.

It seems to me that this convention and this kind of thing represents precisely the thing that you need to do. The American people are not an ungenerous or mean people. By and large, unless they are provoked, or irritated or don't understand the situation, they mean to pay everybody a fair return for what he gives them. Any difficulties that may be encountered by public utility corporations are not due to any fundamental lack of generosity or fairness on the part of the American people. This great convention will give people a new notion of the extent to which this class of public service corporations are doing everything that is humanly possible to give the people the best possible service under the most favorable conditions and under the most favorable terms. In that work we are all interested because, after all, the public cannot be well served for long by underpaid service. The master who doesn't pay fairly for what he gets doesn't very long get the best that is to be had.

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



# Advisory Council Outlines Fundamentals of Success

Progress of Past Year Reviewed—Some Conditions Have Improved, but Much Remains to Be Done — Success Lies Largely with the Companies and Their Employees

Presented by

**B. C. Cobb**

Chairman Advisory Council American Electric Railway Association  
Vice-President Hodenpyl, Hardy & Company, New York City

**J**UST one year ago this great organization, or rather representatives of this great industry—the electric railway industry—met in conference at Atlantic City. It was a great convention and our hearts were full of hope that the problems and difficulties that had been confronting and bothering us for eight years and more were beginning to be solved and put behind us. It is pleasing to report that since that time some effective work has been done and some progress has been made. There still are many problems yet unsolved and there are many stony places in the pathways we must follow. We are not, however, discouraged, for we can see some light ahead, but we would be dishonest and unworthy of our trust did we not frankly say that in order to solve our problems and smooth out our pathways we must have the earnest help and the continuous support of all of the people who use our service.

Our most difficult problem, in this age of automobiles, is the selling of our service to the people who need it, to the communities in which we operate. By this I mean getting the people to ride and the authorities to understand that a transportation company cannot succeed unless it earns a reasonable return on the value of the property used and useful in the business, after paying operating expenses, taxes, and the setting aside of rainy day reserves. Few electric railway companies are now doing such things, and yet the country is growing and is more prosperous than ever in its history. Such a condition is paradoxical and it does not seem as if it could continue.

In 1925 we boasted of carrying 16,000,000,000 passengers on our rail lines and buses, and we were looking forward to increasing this number in goodly measure



B. C. COBB

during 1926. How have our hopes and prayers been answered? Not entirely to our liking. True, there has been some slight increase in the total number of passengers carried, but such increase has been almost entirely confined to the large cities. In the smaller cities the transportation companies have had hard sledding, for in those towns the ratio of private automobiles owned to the total population is much greater than in the larger cities, and this means, of course, greater automobile use per capita.

What are we going to do about it? My answer is, everything possible to sell our service, whether it be by rail or otherwise. Selling our service does not mean, however, simply buying new equipment and then sitting back and waiting for developments. It means much more than that—

it means lively and continuous action all along the line; it means constant effort on the part of every officer and every employee to impress upon the people and their authorities the importance to them of public transportation; it means courtesy and attentive service, whether it be on a transportation vehicle, in the office, or elsewhere; it means telling truthfully our story in whatever way may seem best so that the people and those who represent them will understand our problems and therefore become ready and willing to help us. If they help us they will be only helping themselves. Surely, nothing could be fairer than that. It does not mean wearing a band of crepe on one's arm or carrying a sob handkerchief in one's hand. When that time comes, if it ever does, there will be only one thing left to do; that is, bury the corpse, no matter how painful the process may be.

In last year's report it was stated that automobile



registration had grown from 450,000 in 1912 to 17,500,000 in 1924. It may be well now to say that this registration was approximately 20,000,000 at the end of the year 1925, and that probably December, 1926, will show the figure at upward of 22,500,000—just about one automobile to every five persons in the country. What 1927 will do remains to be seen. No doubt 25,000,000 automobiles will be the registration figure, and I hope it is, for we do not want our motor industry to suffer. Such a thing is unthinkable. It has become, perhaps, our greatest industry, and to have it hurt or be unsuccessful would be little short of a calamity.

We do, however, want the operation of all motor transportation more thoughtfully and rigidly regulated and controlled. No greater evil exists, and there is no more flagrant violation of the rules of the road than the present parking habit. Unregulated parking of

vehicles is reprehensible in the extreme and sooner or later the authorities, the merchants and the people themselves are going to insist that business thoroughfares be kept free for travel at all times and during all hours of the day. Such regulation will, of course, help the transportation companies, and they surely need such help. It will not only do this but it will also help the shopkeeper, the pedestrian, and the automobile owner himself, who will gradually begin to learn that it makes for thrift and economy to use his automobile in a saner way.

Transportation by motor bus continues to grow. Much of such operation in the long run must prove unprofitable, and a great deal of it makes only for harm, because it is in many instances an unnecessary duplication of service. The regulation of such form of transportation by public authorities has only just begun, and while most of the states have enacted regulatory laws

## *Fundamental Principles* established by the ADVISORY COUNCIL for the Guidance of the Industry

**I**T IS AN INCONTRIBUTABLE FACT that convenient, safe and dependable public transportation is absolutely essential, and that the success of such service requires complete co-operation between a corporation, its employees and the public; also that the revenue obtained from operation must be ample to meet all items of cost and permit payment of such a return upon the reasonable value of the plant as will induce the flow of new capital necessary for expansion and development. To accomplish this:

### *The companies must*

1. Obtain the friendly co-operation of the public.
2. Establish a sound financial structure.
3. Adopt modern methods and equipment and sell their service in every legitimate way.
4. Give the best service possible with their income, and let the public know it through advertising.
5. Recognize that the private automobile is a competitor, and offer such class of service as will attract private car owners.
6. Control and co-ordinate with their railway systems bus operations throughout their territories and conduct an active campaign, openly and aboveboard, against the parking evil.
7. Have their executives always accessible to their employees and the public. Welcome suggestions made in the interest of the service, grant reasonable requests, and have a genuine interest in the welfare and progress of the communities in which they operate.
8. Above all else, give the fullest publicity to earnings and demonstrate to the public that if it wants electric railway service it must actively—and not passively—support it.

### *The employees must*

Realize that their interests and those of the company are the same, and make every effort to be useful public servants in an honest endeavor to make friends for themselves and their company.

### *The public must*

1. Favor a just system of regulation and consent to rates of fare that will make its transportation agent a solvent industry.

2. Understand that the best service at the lowest cost can only be obtained in a community through the operation of all public transportation by one efficient organization.

3. Realize that antiquated and burdensome taxes are reflected in the rates of fare; that the present system makes the railways act as tax collectors for the communities and states, and that the public itself will benefit by aiding in bringing about a more equitable taxation system by which the industry, in common with all others, will not be taxed beyond its ability to pay.

4. Realize that 75 per cent of the people use the public transportation service in their daily occupations, and insist that their authorities enact and enforce such effective traffic control that the public vehicles may have a relatively unobstructed use of the streets.

It seems to your council that the things fundamental to the success of the electric railway industry are substantially as outlined. There are, of course, a host of other things less fundamental which some may think should have been included in the list. Obviously, the prime essential for the success of the electric railways, as it is of any other business, is adequate revenue. Where it is secured practically all other things are possible, and it will then become easy to provide the best of service, with fine equipment excellently maintained, and do many other things that go to make a company popular. It is of prime importance that the management and the men should be in accord—that is to say, it is important that the entire organization should be working on a harmonious basis. The companies should give most careful consideration to the report of the 1925 Advisory Committee on Electric Railway Finance and to its recommendations.

The good will and active friendship of the public served is the greatest single asset an electric railway company can have. One of the most important elements in winning such good will is *courtesy*. This means courtesy all along the line from the president of the company down.



governing intrastate operation, nothing has been done as yet in the way of regulating buses and trucks carrying on interstate business. Undoubtedly, the Congress at its next session will take remedial action to cover this situation.

Most of the electric railways throughout the country have co-ordinated bus service to a greater or lesser extent with their rail service, and to the very great advantage of their patrons. The tendency, however, in this particular branch of our business is to overdo, i.e., give more service than the conditions warrant, and usually at a lower rate of fare than that which is compensatory. This is to be regretted, for it cannot long continue without harmful effect to the companies serving and likewise to the people served. Wink at it if you like, but the fact remains that unless cities are served by one co-ordinated, properly regulated, responsible, and financially able transportation unit, they will not get the service they are entitled to.

The axiom that he who would render service must have earning power is just as true today as ever. What we need is patronage and compensatory rates of fare. The fixed fare always was a mistake, and the 5-cent fare fixed by franchise agreements, ordinances or other contracts has been all but ruinous to many companies and seriously damaging to the communities they served. It is gratifying indeed at the present time to note the willingness of the public to pay more just rates. The average cash fare in cities of 25,000 or more was 7.70 cents on Sept. 1 last. The tendency of fares has been upward for some months, and I look for further acquiescence on the part of the public toward rates of fare that not only will meet the costs of rendering service but which will also provide for a return on the value of the property devoted to the public interest. In all our medium-sized cities, and in most of our large ones, I believe a 10-cent cash fare to be necessary. I do not mean to advance a hard and fast rule that 10 cents should be the rate of fare everywhere; I do mean, however, that the railway companies, for their own good and for the good of the public, should never again tie themselves to a fixed fare. Fares should be increased when the costs of providing service increase; and they should be decreased when the cost of rendering service decreases; but never below the point where they will meet all expenses and provide a return on the value of the property used in the business.

#### TRANSIT CONDITIONS IN NEW YORK CITY

You have read a great deal in the newspapers about transit conditions in New York City. It is a situation created entirely by politics. The metropolis of the country, which ought to have the best transportation in the land, has perhaps the worst. Human beings are herded together like cattle on the subway platforms, and crowded into the cars like sardines in a box. In no other place in the world would the people stand for such conditions. The authorities alone are responsible, and this means the politicians, who are not only cheating the railway companies but also cheating the people out of the service they are properly entitled to. There has been much talk lately, some of it propaganda and much of it irresponsible, about the abandonment of surface lines in New York City and their replacement by buses. I cannot imagine that such a thing will ever come about and if it does the people will rue the day, for their streets will become more congested than ever. In two of the most important automobile manufacturing centers

in the country the automobile manufacturers themselves have only recently strenuously opposed the abandonment of rail service.

I think most all city railway systems, that is to say railway systems in cities of any size, will be successful notwithstanding their many present difficulties. I think also that some of the interurban railways will be successful, and on some of them at the present time tremendous sums of money are being spent in the way of development and improvement. Many of them, however, should not have been built at all, and if they do not succeed and are sent to the scrap pile they will be only paying the penalty for past lack of wisdom.

#### DON'T CONCEAL UNPLEASANT FACTS

Surely it would be a great mistake for the industry, through its officers and leading representatives, to tell anything other than the facts with reference to our progress. It would be misleading to say to the public that the railways are fast getting into better shape, for such is not the general condition. We have accomplished some gains, but at a price. We are rendering co-ordinated service, but we are not making the profits to which we are entitled. Far better for us to state the facts to the public, depending on the fairmindedness of the people to render us the help which we ask almost solely for the public good. If we do this, and continue along such lines, we will not only get help from the people but also help from the bankers through whom we must to a large extent finance.

We need salesmanship in the electric railway business just as much as it is needed in any other business, and to my way of thinking, as I have just stated, the best salesmanship in this particular instance is a frank statement of the facts about the condition of the industry.

Some people may think these remarks are pessimistic. If they are analyzed, however, they will not be so considered, for the underlying thought—in fact, the plain statement made—is that the people need electric railways and that electric railways will continue to serve them. If the people want to keep them, however, they must be awake, and this means foster and support them, giving them always a square deal and demanding only such in return.

Previously reference was made to what the employees of a company can do in a helpful way to promote the interests of the company by which they are employed, and this brings to mind the very human thought that the employees, the management, and the public should be tied together by closer bonds.

#### FUNDAMENTAL PRINCIPLES OF SUCCESS

Your council has tried to keep in close touch with the many troublesome problems of the business, and has established a set of principles which it thinks are fundamental in making the industry successful. These principles are being broadcasted throughout the land. They are given in an accompanying panel.

These principles we place before you as the *fundamentals of success* in your industry. Let me urge upon you not to regard them as so many words put together for the sake of saying something to which everybody agrees; instead, let me urge that you take them seriously, that you make them your code for the conduct of your affairs, that you use them for all your dealings with the public and your employees. If they, or any other set of principles, are to be effective, they must have lively animation as well as pronunciation.



# The Kahunavik

## First Aid to the Automotivik\*

In One of His Inimitable Speeches the Chairman of the Committee on Co-operation with Manufacturers Tells of Need for Enthusiasm and New Thinking if the Industry Is to Progress

By E. F. Wickwire

Vice-President Ohio Brass Company

**Y**OUR committee on co-operation with manufacturers works in close harmony with the association's general publicity committee, through the director of publicity, Mr. St. Clair. An outline of the activities of the committee during the past year is covered in a separate published report. While this combined effort has been productive of good results, yet we believe the association could advance the interests of the industry a great deal more rapidly if it had the whole-hearted co-operation of every manufacturer and every railway operator.

It is hard to estimate the detrimental effect of those who have so little faith and enthusiasm for the future of their business that they say to themselves, "Oh! what's the use," and fail to respond. Some one has suggested that we coin a name for that type—like the butler who called the Duke "Your Lordship" and the Admiral "Your Flagship." Until a better one is suggested, your committee suggests "Kahunavik." But send in your suggestions—we're going to give a prize for the best name. I suppose somebody will suggest that we call the fellow who *is* co-operating "Lux," because he doesn't shrink from his duty. For the benefit of those who may be long on electric currents and short on current events, it might be well to explain that the name Kahunavik is derived from a tribe in Hawaii which believes in the power of a native priest, known as the Kahuna, to pray them to death. When he aims his prayers at one of the tribe, the poor victim just curls up and dies, without a struggle.

There seems to be a similarity between these misguided Hawaiians and those in our own industry who have accepted, without argument, the statement of that rabid advocate of "Ride on Rubber," the "Automotivik," who has been shouting: "The electric railway is doomed. Motorized transportation is the only thing."

The Automotivik has pointed his finger at us and read the death sentence. The Kahunaviks seem to have



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closed their eyes to the facts and they have quit struggling. They need some of the fighting spirit possessed by a friend of mine who has always wanted twins. He has come within one of it eight times, and refuses to be discouraged.

The unfailing symptom of a chronic Kahunavik is his ability to find objections to everything constructive. For instance, there have been some objections that the publicity material sent out from headquarters does not exactly apply to certain specific local conditions. This general publicity material is intended to supplement rather than take the place of your local publicity work, and the idea is to use extracts which do apply, rather than accepting or rejecting the material as a whole.

A short slogan will often make a greater impression on the public than reams of literature. With this thought in mind, of quickly catching the public's eye, a hosiery manufacturer put out this slogan:

*"Happiness Hose—for Contented Calves."*

And the Grand Lodge of Graduated Grass Widows is attracting new members with this motto:

*"What Good Is Alimony on a Cold Night?"*

We are planning to try out a few slogans—some of them in question form, which we might call "Trolley-Queries." Here is the first attempt:

ISN'T A TROLLEY TRIP WORTH MORE  
THAN A HAT TIP?

Our idea is to try "wooing" the public in the good old-fashioned way—by "popping the question" to them. Maybe we'll catch their eye quicker if we call these questions "Trolley-pops."

Lately I have heard more than one thinking railway man express the belief that if our industry is going to hold its own, to say nothing of going forward, we

\*Abstract of a paper presented at the Annual Convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



must inject into it more of the same fundamental merchandising principles that have been successfully applied by other businesses. That the trade we are trying to sell will respond, in more or less degree, to the same treatment that we do when we buy something—whether it happens to be an automobile, an office desk or a gas stove.

The only modern thing I can think of that sells well because it looks ancient is new liquor in old bottles—and there again the bootlegger knows the sales value of appearance and carefully sprinkles dust on the bottle.

Other lines of business are cashing in on the appeal of appearance. We are trying to sell the same public as these other merchandisers and we are asking the platform men to be transportation salesmen and take more pride in their calling. It is true that we have given them improved equipment to a certain extent, but many railway men are commencing to be convinced that, as compared to other lines, we have not gone far enough by a long shot.

The most progressive men in our industry are recognizing more and more that there is one outstanding fact which applies to every line of business and which our industry cannot escape, *that no publicity and sales effort can be really successful unless the product itself is somewhere near right*, especially when compared to the article with which it has to compete. And they are asking themselves these questions: "Is our product what it really should be?" "Is our business an exception to this outstanding merchandising principle—the appeal of appearance—upon which people in other lines are so keenly concentrating their effort nowadays?"

Like the restaurant man, railway operators are realizing more than ever that while they can satisfy themselves on the solution of technical problems, the success or failure of their merchandising methods is in the hands of the public. Even the humble hot dog merchants of America have been doing some research work along these lines. They seem to be making money in spite of the fact that all the component parts of the delicacy—rolls, tights and horse meat—have gone up in cost. Nevertheless, it is claimed that there are more hot dog stands than trolley cars and more hot dogs sold than trolley rides—and mostly at higher prices. Yet is there really more value in a 4-in. hot dog than in a 4-mile trolley ride? That's another "Trolley-pop."

Everywhere we turn we see striking examples of how this fundamental principle of selling has been applied by other lines of business which appeal to the same class of trade. Movies, for instance, used to charge 5 cents, and the old movie houses were just about as comfortable and attractive as a 1910 model street car—and lots of people used to go to the movies to look under the seats for gum. More attractive theaters don't make the pictures any better, but they do make it easier to sleep through a poor one and more pleasure to watch a good one.

All of these illustrations tend to demonstrate that the most successful business nowadays recognizes that it must study its patrons and adapt its appeal to the way the public *does* react rather than to the way it *should* think and act. By constantly analyzing the reactions and requirements of their patrons the progressive merchants have been able to keep pace with changing tastes and they are continually seeking and finding ways and means to appeal to people's spending instincts. Progressive railway operators are expressing the belief

that our industry should put forth strenuous efforts to make more rapid strides along these same lines.

One of the outstanding obstacles has been the fact that so many unscrupulous office-seekers have fooled the public by pledging themselves to "save the poor 'peepul' from financial suffering" at the rate of a penny a ride reduction in street car fares. Yet that type of politician doesn't hesitate about spending money freely to ride into office. He sheds "crocodile" tears at the appalling thought of the "plain peepul" paying a penny's increase for car fare, but the same fellow, after election, finds no difficulty in disposing of thousands, and even millions, of the people's money—without shedding anything but a few drops of ink.

#### LESSONS FROM GRAND RAPIDS

Like most of you, no doubt, I had heard some favorable comment regarding the new and unusual equipment placed in service in Grand Rapids. Recently I was in northern Michigan on a hunting trip (can y' imagine me hunting—anything but golf balls?). Coming back through Grand Rapids, I took advantage of the opportunity to look around and see for myself what impression the new equipment was making. While I was there I picked up some of the many letters that have been coming in to the company. There is only time to quote briefly from a few.

The Mayor of Grand Rapids makes some complimentary comments and finishes with this statement:

Street cars undoubtedly offer the safest place in our streets. We know where they go—they can only run on their own rails. . . . We all ought to patronize the electric rail coaches and show our appreciation of the good work the street railway company is doing.

A State Senator writes:

The most comfortable ride I ever had was on the new electric rail coaches. . . . The charter should be amended and the railway company not compelled to pave between the rails. Why should the street railway pay for paving between the tracks for me to run my auto on?

The Chamber of Commerce president says:

It was a pleasant surprise to me to see the leather seats and air cushions and enjoy their comfort. . . . With these new coaches in service, there is a tendency for people to leave their autos at home and ride these comfortable coaches to and from their work.

You'll notice that he particularly mentions the leather seats, about which some fear has been expressed that the upkeep will be higher. This doesn't seem to worry them, especially if it's caused by increased wear and tear. They never have heard of any railway getting into financial difficulties from excessive seat abrasion.

Before reading the next and last one, I'd like to ask you a question, in all frankness. How many of you can imagine old and prominent families feeling complimented by having new street cars, of traditional design, named after their forefathers? Here's a letter which shows how much public sentiment changes for the better when car design changes for the better:

We appreciate very much the honor bestowed upon us in naming one of your cars after our grandfather, William T. Powers. And in loving memory of our mother, his daughter, and as his grandchildren, we wish to thank you, and assure you that it will be a constant reminder of his cherished memory.

And it's signed by the whole family of grandchildren. Naming the new cars after old settlers has made quite a hit. But we must keep this fact in mind: it is not



simply that the cars are new, but that their design is new—and better. They found that it wouldn't cost much more, but it was worth a whole lot more to get cars which possessed such desirable features as quietness, quicker acceleration, exceptionally low step and an inviting interior with a clean, bright floor covering and comfortable leather seats. Finally, the biggest thing they did was to give the new car a clean-cut, low-hung, streamline, flowing effect with an artistic finish. They embodied the appeal of appearance on which the automobile manufacturer has concentrated so strongly for years—and the feature which has been his biggest selling asset.

Summarizing the situation, for some years past, our

industry has had a hard struggle to preserve itself. And on the whole it has put up a good fight against heavy odds. But it has been largely a defensive fight. No matter how good a defensive fight we make, we can't win by simply defending our goal; we must adopt offensive tactics and score some points for our side. If we don't carry on the battle along these lines, that time may come when we'll fold up and disappear—like a folding bed slipping back into a dark closet after a hard night.

It is not a simple task to convince the public and its officials that we are on the right track. But just because we can't see our way clear to the ultimate goal will keep no one but a Kahunavik from starting out in the right direction.

## The Car—Show Window of the Industry\*

The Railway Should Make a Good Display of Its Goods if It Would Attract Customers—  
Selling Principles Are the Same as Those of Any Other Merchant, as Results on  
Many Successful Railways Running Attractive New Cars Have Proved

By E. B. Meissner

President St. Louis Car Company

VIEWED solely from the standpoint of publicity, the displaying of merchandise has come to be recognized as the most valuable advertising, the greatest sales-producing medium, in the entire world of commerce. High salaried writers of advertising, who are artists in the handling of the printed word, may spend weeks upon the preparation of descriptive copy. The finest of printing may be used in publications, in which the page rate ranges into the thousands, but none of these descriptive phrases, none of these expensive layouts, has the sales power, the ability to open the purse of the prospect, that an actual display of the product itself possesses, providing, of course, the product or commodity for sale has quality and merit.

But just what is a good window display? Is it one that is so powerful in its attention-attracting qualities that it almost reaches out and stops those who pass? Is it one which attracts because of its beauty, its atmosphere or its scenic effects? The test of a window display is whether or not it sells. If it does, it is a good show window, regardless of whether it is artistic or crude,



E. B. MEISSNER

cheap or expensive, beautiful or otherwise.

Not long ago in the New York press mention was made of an incident relevant here with reference to a show window on lower Fifth Avenue in New York. The location was a very small shop, with an out-of-proportionately large show window in which the merchant displayed his wares in an attractive manner. The daily receipts in this small store averaged \$125. By accident the plate glass in the window was broken, necessitating boarding it up for two days until a new piece of glass could be installed. During these two days in which this show window was boarded up awaiting replacement of the broken glass the receipts inside the store dropped to \$20 per day, and to prove the theory of the power of show window display it is related that

when the glass was replaced and the former show window display was again in sight the receipts inside this small store immediately climbed back to the normal \$125 per day.

### ALL SELLING BASED ON SAME PRINCIPLES

In the minds of some of you who are listening to or reading this paper there may come the query as to what all this has to do with the electric railway industry.

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



Some might even say to themselves or others that this sounds like a department store staff meeting. But let me emphasize the fact that fundamentally the selling of merchandise, or service, or any other commodity must be accomplished in the same basic manner. To succeed you cannot wait for customers, or passengers, if you please, by reason of their own inertia to flow your way. You must sell your service to them by attracting their attention to it. In other words, you must display your service in a show case. By so doing, if what you have to offer has quality and merit, you attract attention, you arouse interest, you stimulate desire, and induce action in the form of creating business.

One of Shakespeare's characters in his play "As You Like It" says: "All the world's a stage, and all the men and women merely players." By that same token may I not say that your own city is your show window and the cars you operate are your display? Your show window, your city, is provided for you by others, and is being improved for you in most localities from time to time. Your display—your cars—are in attraction, design, safety, speed and comfort whatever you make them, which prompts the question whether you have kept your display in condition to attract trade. Fashions, if I may so term the style of cars, in electric railway equipment, as in clothes and other products, have changed. The up-to-date management keeps its cars in attractively painted condition—clean, light and airy, with safety appliances installed in them, with comfortable seats for passengers, and well maintained and quiet, thus merchandising their service, and by doing so increasing their net earnings and obtaining successful operation.

#### MODERN EQUIPMENT IS SELLING SERVICE

Brooklyn, Grand Rapids, Johnstown, Memphis, Chicago, Milwaukee, Illinois Traction, and others, were leaders in this program, with the result that by reason of their courage and foresight they have won the confidence and co-operation of their public and are now carrying many more passengers, naturally materially and favorably affecting their balance sheet. In some localities it is a well-known fact that by reason of "dressing up their show window"—modernizing and attractively finishing their cars—results which were discouragingly in the red were in a short time changed to black, due solely to this enterprising departure.

It has not been but in recent years that the electric street and interurban operator has been made to recognize that his business is fundamentally no different from any other commercial enterprise, and when he became aware of this condition he devised ways and means to stimulate his business. Those operators who were "on the job," so to speak, and took immediate action toward "dressing up their show window" promptly benefited thereby, and their leadership, experience and success should be a lesson to those who

are more conservative and who have not yet experienced the improvement awaiting them by commercializing their business.

#### TODAY'S PUBLIC SHUNS DINGY SURROUNDINGS

Cobweb days are over. Not so long ago banks were proud of the old, dingy, antique appearance of their banking rooms, having in mind, perhaps, the fact that this age-worn condition would convey to their patrons their stability by reason of having been in business for so many years. Look around your town today. Are the quarters of any of your progressive banking institutions musty? No, indeed. They are massively built, attractively decorated, spotlessly clean, and some even have comfortable rest rooms equipped with upholstered furniture, telephone service and other items of comfort.

The condition referred to in the foregoing is not applicable alone to city lines. On the contrary, it has been and should be more so applied to interurban roads. Propaganda had it, not so far back, that it would not be long until electric interurbans would be on the shelf. Some conservatives in our industry were impressed by this evil pessimism, but others, more courageous and far-sighted, took action, and decided to match their ability and experience against that of those who were trying to becloud and shadow and wreck their life's work. So what did they do? These outstanding operators improved their service, added lighter and more comfortable, faster and attractively painted cars, shortened up headways, cleaned up their right-of-way, painted their poles, freshened up their waiting stations, schooled their employees in serving the public with courtesy and promptness; again to find that this policy won out. Not only did they remain in business, but, to the surprise of some, their earnings increased beyond their own expectations, after but a short time of this new operating era.

#### MODERN EQUIPMENT ESSENTIAL

To sum up and review the situation briefly, let me urge you to fall in line with progress. Authentic reports of the American Electric Railway Association tell us that there are many thousand cars in service which are not a credit to their operators, certainly not a credit to the industry, and naturally not an asset, but a liability. To those to whose property this condition applies, I would say resolve now to plan improvement in the form of dressing up your show window. If for financial reasons you cannot immediately add brand-new equipment, at least clean up and modernize to some degree your present loss-creating cars. Ask those operators who have experienced this success what they did and how they did it. You will find them anxious to help you achieve the same end. You will find also that the car builder is ready to serve in any capacity possible with minimum effort on your part to place you in position to own and operate new, up-to-date, profit-earning equipment.

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Summarizing the situation, for some years past, our industry has had a hard struggle to preserve itself. And on the whole it has put up a good fight against heavy odds. But it has been largely a defensive fight. No matter how good a defensive fight we make, we can't win by simply defending our goal; we must adopt offensive tactics and score some points for our side.

—E. F. WICKWIRE

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# City and Company Co-operation Essential\*

Experience in Chicago Shows that Much Can Be Gained by a Mutual Understanding of Traffic Control Problems—As the Benefits Accrue to All Concerned, Conflicts of Authority Will Only Retard Development

By R. F. Kelker, Jr.

Kelker, DeLeuw & Company, Consulting Engineers  
Chicago, Ill.

CHICAGO'S traction history presents an unusual opportunity of observing the good and bad effects produced by changes in the character of co-operation between public officials, business interests and the management of its various transportation companies. A brief review of it demonstrates that intelligent and sympathetic co-operation is one of the most important factors affecting the public relations throughout a great industry.

In 1907, after a number of years of negotiation, twenty-year grants were made to the two major companies now comprising the Chicago Surface Lines. At the time of acceptance the condition of the tracks and paving in the greater part of the city was deplorable and the equipment was inadequate. The immediate effect of these ordinances was the completion of a vast program of reconstruction and extension, a period of six years during which sound co-operation was the keynote of public and corporate relations. Then followed a period after the unification ordinance of 1913 when co-operation disappeared. It is of interest to note that during this period of nearly ten years no interest, other than casual, was shown by the business men of Chicago. While the conflict was on it was practically impossible to bring about any major improvements in service or in traffic conditions. In a measure the company was entirely in a state of defense up to the last change in our city officials in April, 1923. The present Mayor, in the early part of his administration, announced his policy as being one of willingness to co-operate in order to provide the transportation and traffic improvements that the people who elected him desired, and he further stated that he expected to utilize every means in his power to that end. Steps were immediately taken by the Law Department of the city to clear up the pending litigation, which had given so much trouble and had proved so costly both to the city and the Chicago Surface Lines.

Near the close of 1923, at a conference between the



R. F. KELKER, JR.

Mayor and the management of the Chicago Surface Lines, it was decided to prepare plans for rerouting of street cars in the downtown district in order to relieve as far as possible the then intolerable traffic situation. After a number of conferences between the city's representatives and the company's officials a joint plan was finally adopted in 1924 which brought about marked improvement and is in effect today. In the joint plan the traffic problem was put on an equality with the transportation problem; there was complete co-operation between the city and the company, and this co-operation was so effective that the commission, upon the testimony of one witness (presented by the city), set aside its former order and adopted the new plan as recommended, without change.

The improvements in transportation and traffic conditions were apparent to even the most casual observer and the commission has not been called upon to make any changes that would impair the plan. The rerouting plan enabled the company to give more and better service without increasing operating costs, it benefited the car riders, motorists and pedestrians and its adoption was made possible only by co-operation on the part of all parties concerned.

In the latter part of 1923 the Chief of Police had seriously considered the prohibition of the left-hand turn for vehicles in the central business district, but found that such a regulation would be impracticable unless left-hand turns by street cars were also eliminated. The practical elimination of left-hand turns by street cars brought about by the rerouting plan paved the way for a police order which was immediately issued by the Chief of Police prohibiting any vehicle from making a left-hand turn at 30 street intersections in the area bounded by Wabash Avenue, Van Buren Street, Franklin Street and Lake Street. These two changes, the complete rerouting of street cars and the prohibition of left-hand turns by vehicles, immediately facilitated all traffic movements in the downtown area

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



and the speed of street cars was increased more than 25 per cent. The benefits to all concerned were so marked that keen interest on the part of business men was awakened and since that time the Association of Commerce has joined in the co-operative work of the city and the company.

In the latter part of 1924 the city took up for consideration the use of traffic signals in the central business district. The street traffic committee of the Association of Commerce became interested and volunteered to make an investigation as to the possible advantages and disadvantages of traffic signals. The studies, made with the co-operation of the Chicago Surface Lines, developed the need for a system of signals so controlled that a progressive movement of traffic throughout the area could be had. The City Council made a liberal appropriation for traffic signals. After a thorough investigation signals far more substantial than any theretofore manufactured were designed. There was a complete agreement on the necessity of obtaining a control of the most flexible character in order to meet the varying requirements at each intersection. Therefore, a switchboard was designed to permit of a variation in the amount of time given to the red and green portions of the signal cycle at one intersection independent of such time given at any other intersection. The signals were placed in operation in February, 1926. Since then there has been a material increase in the speed of all street traffic, and this in turn has been reflected in an increase in the carrying capacity of the streets themselves.\*

These improvements in traffic conditions in the downtown district during the past two years, notwithstanding the substantial increase in the number of motor vehicles registered, is a remarkable achievement made possible through the complete co-operation of the city administration, the business interests and the management of the Chicago Surface Lines. As a single illustration of the improved service the street railway company was enabled to give, it can be stated that the running time of cars passing through the business district on the heaviest traffic artery, State Street, was cut in two. The same spirit of co-operation has been applied with success toward the establishment of loading zones and the retention of the skip-stop plan of operation throughout the city.

The latest effort in co-operative work is the city-wide traffic survey now being conducted by the street traffic committee of the Association of Commerce. The committee, believing that much good could be accomplished by a broad survey and the making of a uniform traffic code, requested the city to undertake the work. It was found that the city was unable to finance the proposed program, and in response to a request of the

Mayor the Association of Commerce offered to defray the entire cost. This work is now nearly completed under the direction of an enlarged committee, on which both the city and the Chicago Surface Lines are well represented.

The accomplishments which I have taken your time to outline were made possible by a complete change from the policy of warfare that had existed for so many years, during which no one was benefited. Similar results can be achieved in any city where a real and sincere desire to serve the public is a dominant and governing factor in the policy of public officials, business men and the management of the transportation lines.

The difficulty of obtaining co-operation between public and operating officials is due largely to the failure of one group to understand the limitations and responsibilities of the other. The furnishing of transportation service is an art. Transportation itself is but a tool with which the management endeavors to provide a convenient and satisfactory service. Necessarily the street railway management is busily engaged in routine operating matters, and consequently its perspective in the matter of improving service may be more or less limited. Therefore the investigations and recommendations on the part of the city officials should prove helpful, although not always practicable. On the other hand, it is rare that managers realize the plight of the public official who is continually besieged with requests for service improvements. The management must always consider the financial inhibitions to service improvement. The public official, as a general rule, considers only the needs of the public and not the financial limitations. As a result these two interests frequently clash.

If management can be made to understand the relations of public officials to their constituents and if public officials and business men will consider the financial responsibility and technical operating problems that surround the management of transportation lines, then these several interests can co-operate fully, with the result that the people served by the management, and the city as a whole, will receive the maximum benefit based upon the combined thought of the three groups, which unfortunately do not work in accord in a great many instances. The whole matter can be expressed in the single word "service." When the management gives the best service it possibly can and when public officials and business men endeavor to aid good management in providing that service, then we have a state of complete co-operation where the good of all is considered and where satisfactory service is rendered to the public.

Let me recall to you in closing the remark of the late Charles P. Steinmetz on this subject: "Co-operation is not a sentiment; it is an economic necessity."

\*See ELECTRIC RAILWAY JOURNAL for March 27, 1926, page 536.

If management can be made to understand the relations of public officials to their constituents and if public officials and business men will consider the financial responsibility and technical operating problems that surround the management of transportation lines, then these several interests can co-operate fully. . . . The whole matter can be ex-

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—MAJOR R. F. KELKER, JR.



# We Are in the Transportation Business<sup>\*</sup>

Loss of the Railway Investment Would Be a Mere Bagatelle Compared with Loss to the Community if Service Fails—The Public Can Be Made to Understand the Need for Proper Treatment of the Utility that Furnishes It

By Henry L. Doherty

President Henry L. Doherty & Company, New York

I AM more and more of an optimist on the street railway situation; not, however, on the statistics that have been shown and some of the facts that have caused some of the other people to be optimistic, but on the conditions that exist and what we ourselves should be able to accomplish. It is perfectly idle for us to be the only ones, when it is necessary, to be compelled to walk the floor as to the matter of the transportation problem.

No matter if we in some cases were to lose our entire investment, that would be a small matter compared with what the loss would be to the community as a whole where a thing of that sort occurs. I have tried to make that thing clear for a number of years. Perhaps I haven't been as industrious about it as I should have been; but I do know that it is possible—and I think a great many other people share the belief with me now—to make the public understand that it is their problem and it is perfectly idle for them to stand back and simply assume that we have that whole problem to wrestle with. You may say, "he is just talking stuff and we have heard him talk that way for a long time," but nevertheless it is talk that nobody has attempted to contradict. Even the enemies of the street railway situation have not attempted to contradict it, and just as long as no other fellow contradicts it I am going to keep on talking this way. I hold that every city must have a common transportation system. Without that, it means such an enormous loss and such an enormous retardation of the development and welfare of that city that any injury we suffer is nothing compared with the injury that is suffered by the city.

If the city is going to have its common transportation system, that system must be self-supporting, it must have credit, and it must have not a mere passing credit that just enables it to skin through, as it were. It must



H. L. DOHERTY

have a credit sufficient not only to meet the growth of that city but to anticipate and help with the growth of that city.

If anybody tries to answer you by saying, "We haven't had satisfactory transportation conditions in this city for a good many years, but we have continued to grow," you can say, "All right, if you are satisfied with that kind of an argument. We can point to places where they happened to discover oil and without any facilities they created a town over night. What they did was done in spite of conditions they had to meet, and no sane man can maintain that the greatest results in any city can possibly take place unless you have a proper and adequate common transportation system." I don't think any man can successfully combat that argument.

The value of the railroad property can be taken and spread over your entire city. You can show that the inevitable decrease in property is bound to be due to the growth of the population and you can show that your railroad values, which in some cases have been threatened with destruction, are a mere bagatelle in comparison with what the other people are bound to lose, provided that transportation is being offered to the public at a proper rate.

Transportation is not at all the matter of money we get as interest or dividends. Given a proper density of riding, and not a condition that is merely temporary and cannot long prevail, the entire interest and dividends that the street railway company has to collect would not be more than three-quarters of a cent on every paid passenger. Three-quarters of a cent is not the problem in giving transportation at a cost that is satisfactory. They would never notice the difference.

Just the lack of giving the transportation system a proper amount of return to maintain its credit has meant the difference between a satisfactory condition beneficial to everybody and a chaotic condition unfavorable to the company—hard on it and unfavorable to the city as a whole.

<sup>\*</sup>Abstract of a discussion at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



I agree fully with the last speaker, Mr. Swayne, in some of the things he said. I think one of the biggest mistakes we men who were originally in the street railway business made was this—and it has been true of other branches of public service and will be true of other branches of public service: Just so long as any of us remain in public service we must remember that in every case we are giving a service. We mustn't assume, which is the mistake some of us made, that we are in the street railway business. We never were. We were in the business of transporting passengers. The public wants transportation—not necessarily street railways, not necessarily street cars. Whenever we are serving the public we must remember that many of the things we think of as being our business are simply our tools, and if better tools come it is up to us to use them and not let other people make competitive things out of these tools we should be the first to adopt and we should have the greatest facility to put into the public use.

I am trying, and there are other men doing the same thing, to make every man in the street railway business, and especially those who have the ability to get the matter before the people, to write and secure the reading of what they do write to carry the thought to the whole of the American people; that they are the ones who are primarily interested in seeing that there is a proper common transportation system in every one of their cities; that they are the ones who will suffer if they don't have it, and that the worst kind of a short-sighted policy would be to support anybody who puts an obstacle in the way of creating such a proper transportation system, and that they not only must not support those who oppose it but they must support those who are trying to give it. And they must even go further than that. If nobody is ready and willing and trying to give it to the public, they must go out and create conditions so that they will get it, because it is something they have to have.

## Congested Streets Are Costly

By Clarence O. Sherrill

City Manager, Cincinnati, Ohio

**V**ERY real is the revolution in our methods of living caused by the advent of the motor car. It is hardly equaled by the changes caused by some of the world's great upheavals. Out of this motor car revolution have grown a host of problems not yet solved. One of the most serious of these is the problem of the congestion of streets by traffic. Because this development has been so tremendously rapid, the physical means necessary to take care of it have not kept pace with the motor vehicle.

Rapid means of transportation have immeasurably increased the joys of life by allowing people more and more to live in the open spaces far from the congested business centers where daily they go to work. It allows the farmers' families to visit neighbors many miles away, and the changes of scene it allows do more to broaden men's minds than any other one feature of modern life. But the motor car has not been an unmixed blessing by any means. I sometimes even feel that it is questionable if the sum total of human happiness is not less rather than greater as a result of the hurry and rush of the motor car and the evils it has brought with it.

The point has now arrived when the traffic problem must be recognized as second to none in the realm of city administration. It will tax the skill of the best



C. O. SHERRILL

minds of our traffic engineers to solve this problem. The very first step is to have complete information on vehicular and pedestrian traffic movement, density and character. The problem cannot be considered as solved by making so many restrictions as to force pedestrians or essential vehicles to stay out of business areas. There are many advantages in having ready access to the heart of the city for all vehicles, but the really important, vital thing is to get the mass of workers and shoppers to the stores, factories and offices in the shortest possible time, for every minute of wasted time is an increased cost to each individual.

This indicates the necessity of giving precedence to vehicles in the streets in the order of their capacity for moving the greatest number of riders in the least possible

time and using the least possible space in doing so. This order is: First, street cars; second, motor buses; third, taxicabs; fourth, private motor cars. Of course, the proper place must be assigned in this priority to trucks making essential deliveries in the business districts.

All forms of vehicular traffic are useful only for the purpose of getting the riders to a point sufficiently near their destination to allow them quickly to arrive on foot along the sidewalks. It will therefore be evident that



the order of restrictions to be placed on the movement of vehicles in the streets is the reverse of the above, namely: First, private motor cars; second, taxicabs; third, buses; fourth, street cars. Everything possible must be done to facilitate the movement of street cars and buses on account of the large numbers of riders they carry to the shopping districts, with a minimum of space occupied per passenger. A recent check of vehicular traffic on one of the principal thoroughfares of New York indicates that the average private automobile or taxicab carries 1.7 persons, exclusive of chauffeur. The roadway space occupied by an automobile is about 100 sq.ft., so that each passenger takes up approximately 50 sq.ft. of the city street. A street car of average size occupies approximately 320 sq.ft., seating 40 passengers and carrying more than 80 when filled. The space required, therefore, for each passenger seated is about 8 sq.ft., or, when the car is filled, about 4 sq.ft. The roadway space required for each person transported by private motor car is therefore from six to twelve times as much as is required to carry him by street car.

#### PRIVATE CAR WASTEFUL OF STREET SPACE

This is not all of the story, however, for not only does the private motor car occupy roadway space while it is carrying passengers into and out of the congested area, but also when it is parked without passengers for a longer or shorter period of time while its owner is in his office, theater, store or restaurant.

This points to the crux of the traffic situation, the parking evil. On every street where traffic is dense lines of parked cars can be seen along each curb. The available space for traffic on these streets is therefore reduced by two full traffic lanes, which is usually from one-third to one-half of the street's capacity. From the above, it appears obvious that there is only one real and absolute solution of the problem of traffic congestion, and that is the enforcement of necessary laws forbidding the parking of private motor cars in congested areas. This would at once make all streets fully effective, except where interference would occur due to loading and unloading of trucks, which could be so regulated as to have this work done during the hours when traffic is not dense. Not only would this law automatically release two full lanes of traffic in each street, but indirectly it would be of equally great importance in discouraging the movement into the restricted areas of large numbers of motor cars now driven in and parked there unnecessarily. In some cases during periods of greatest density of traffic it may even be necessary to forbid stopping of cars as well as parking, because a car stopped momentarily at intervals along each square destroys the lane of traffic adjacent to the curb. A motorist seeing ahead of him a motor car stopped will not risk being caught behind it, so he at once works over into the second lane. (Note:—The term "parking" in this paper means to stop longer than necessary to load or unload passengers or freight.)

#### PARKING SERVES FEW AT EXPENSE OF MANY

When we consider the exceedingly small number of cars that can be parked in the congested area of any city, it will be apparent that certain motor car owners are a specially privileged class to be allowed to occupy so large a percentage of the street area with such a very small percentage of the motor cars. In Cincinnati

the congested district has been estimated to provide parking space at the curbs for approximately 3,000 motor cars. There are registered in the city approximately 100,000 motor cars, and in the metropolitan area directly tributary not less than 150,000. Parking privilege, therefore, is granted to from 2 to 3 per cent of the car owners at the expense of the rest of the 97 or 98 per cent, or some 5,000 persons are given this privilege at the expense of some 400,000 residents who suffer from traffic congestion.

All studies by traffic experts now point to the same conclusion; that is, that the only solution of the problem of traffic congestion is the complete prohibition of parking within the congested district. In June of this year Chicago, on the occasion of the Eucharistic Congress, found it necessary to forbid all parking in the congested areas of the city. With this regulation it was found possible to handle without difficulty the tremendous crowds attending that event.

In connection with the survey of Chicago traffic conditions it was found that only about 8 per cent of the shoppers going to the downtown district use their own motor cars. A similar survey in Cleveland recently showed that 65 per cent of the shoppers travel on street cars, about 10 per cent on motor buses, 20 per cent in private motor cars and 5 per cent on foot. Two years ago a similar survey showed that 46 per cent came in motor cars, as compared with 20 per cent at the present time.

#### STREETS FOR MOVING TRAFFIC—NOT STORAGE

The streets are intended for and must be used more fully than ever before for traffic, reasonably rapid traffic, but, above everything, safe traffic, and this means that as traffic demands grow more acute the use of streets for other purposes must be more and more restricted. The first step in this direction is the elimination of interference with the free movement of vehicular traffic by various obstructions, of which parked cars are the principal offenders. Land in the heart of large American cities ranges from \$10 to \$100 per square foot. At a low average of, say, \$30 per square foot a parked car takes up about \$3,000 worth of space. In other words, each of the thousands of parked cars that you see in the congested area of Cleveland is costing the citizens as a whole, say, \$150 a year to give a few hundred citizens preferential treatment, as against the 700,000 or 800,000 residents who are deprived of the proper use of this space for traffic purposes.

Retail merchants and other commercial interests were formerly a unit in opposition to restricted parking, but they are now fortunately beginning to realize that this parking benefits such a small number of individual shoppers as to be negligible in furnishing business to the stores. I feel sure that the time is approaching when parking will be entirely eliminated from the congested area of our principal cities on request of the retail merchants themselves. Owners of cars will leave them at home and ride in street cars and buses or will drive their cars to a convenient parking place outside of the congested district and from there walk, take a taxi, bus or street car to their places of business. I even feel that I can go further yet and see in the not far distant future a time when no cars driven by owners will be allowed to stop in the congested area, all streets then being devoted solely to street cars, buses, taxicabs (under strict restrictions) and pedestrians.



I can also see the time not far distant when taxis will be forbidden to park in the streets in the congested areas and will be required to operate exclusively from garages on call, having telephone stations on the sidewalk from which they can be reached on a moment's notice. The evil of taxi cruising has become so serious in every large city as to justify the use of the most stringent means to break up this practice. The only justification for special privilege for any kinds of vehicles is on the ground of public welfare and necessity; that is, the greatest good to the greatest number, and this principle applies alike to all the various classes, namely, buses, street cars, taxis and private motor cars.

There is another essential use of the streets that must be controlled as to time and method, and that is the loading and unloading of freight from trucks. In the absence of adequate alleys for back-door loading, this must obviously be done in runways off the street or from the street proper, but must be ultimately so arranged in time and method as not to interfere with the free movement of traffic during busy hours. Trucks must be provided with means for side loading and most of their work will have to be done before 8 a.m. and after 6 p.m.

There are a host of constructive measures that are being tried out in all cities in the attempt to solve traffic congestion, such as the widening of streets, the cutting of new streets through beautiful forest and park areas or expensively developed building areas, bridging over intersections to give two levels of roadway. These measures, no matter how heroic, do not solve the problem, for they do not attack the real cause of traffic congestion, which, as said above, is the private motor car—riding habit. On account of the dammed up, unaccommodated mass of vehicular traffic only waiting for street space in which to pour, the very moment a new boulevard is opened up for relief, it is at once jammed with a flow of traffic that, like a raging torrent, bank full, races along its way. An authority on New York traffic says: "No one who has devoted any study to the traffic situation can doubt that within 30 days after opening a new thoroughfare parallel to Fifth Avenue the congestion would be as great as it is today."

#### MERCHANTS NEED INFORMATION

The Department of Commerce has made an extensive survey of "Vehicular Traffic Congestion and Retail Business," in the course of which more than 1,500 opinions were secured from retail merchants as to the nature and extent of interference due to traffic congestion.

There was no disagreement as to real interference and real congestion, but one might say there were as many methods of relief proposed as the number of opinions given on the best way to get rid of the hindrance.

The survey of this study gives the following four principal causes of the traffic problem in the order named: Faulty traffic regulations, lack of parking facilities, narrow streets and the street cars. The above-mentioned study was based entirely on the views of a single class, namely, retail merchants, as would be indicated by the four causes of interference which are named above.

As an illustration of this limited viewpoint, three of the larger retail merchants in Cincinnati recently made a proposal that "no parking" be eliminated and one-hour parking be allowed in the vicinity of their stores, but insisted strenuously that the curbs immediately in front of their doors be kept open at all times for the convenience of their shoppers. It was then pointed out to them that if this same rule were applied to all merchants alike, space being taken out in front of the doors at the entrance of each establishment, also for fire plugs, taxicab stands, bus stops, etc., there would be practically no space left for parking of cars at all. This phase of the question evidently had not occurred to them before, for there has been no further complaint on their part on account of elimination of parking in the vicinity of their stores.

#### STREET CARS USE STREET SPACE EFFICIENTLY

In reference to congestion caused by street cars, it is true that street cars are a great obstruction to the free movement of traffic as compared with motor cars, but when the number of passengers carried per square foot of space is considered, the street car can hardly be considered as a serious offender.

There are many elements that go to make up the objectionable features caused by traffic congestion. Among them are the danger or hazard element to motorists and pedestrians, the loss of time in riding, the inconvenience to which the individual shopper is subjected, the anxiety caused by the delays and crowded conditions. These inconveniences result in diverting business, loss of business, increased cost of merchandise and oftentimes even a diversion of large numbers of shoppers to local neighborhood shopping areas.

Public service can be rendered by your association in helping to solve this problem and in educating the public as to the evils of unrestricted parking and the benefits of "no parking" in congested areas.

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OUR most difficult problem, in this age of automobiles, is the selling of our service to the people who need it, to the communities in which we operate. By this I mean getting the people to ride and the authorities to understand that a transportation company cannot succeed unless it earns a reasonable return on the value of the property used and useful in the business, after paying operating expenses, taxes and the setting aside of rainy day reserves. Few electric railway companies are now doing such things, yet the country is growing and is more prosperous than ever in its history. Such a condition is paradoxical and it does not seem as if it could continue.

—B. C. COBB.

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# Intercity Business Possibilities\*

Freight Service Can Be Developed by Many Electric Railways to Produce a Profit—  
Correct Equipment and Facilities Are Needed if Best Results Are to Be  
Secured—Passenger Business Also Can Be Increased

By T. A. Kenney

Vice-President Hodenpyl, Hardy & Company, New York City

I DON'T quite understand what was meant by the title of this address, "Intercity Business Possibilities," but I would like to say a few words about the interurban transportation business as conducted by electric railway companies. Obviously my remarks will have to do with profitable operation of such systems. My remarks also presuppose that there is an economic necessity or justification for the interurban transportation business.

Originally electric railroads, and that constituted the transportation systems of the electric companies, were constructed for the carrying of passengers alone. Later on, with changing economic conditions brought about by more general use of the automobile, these railway companies cast about to find ways and means to take up the slack in the local transportation business. First of all—and I am speaking now with reference to conditions in the vicinity of Cleveland—efforts were made to engage in the electric express business. Business of that character has been carried on for a great many years by several of the electric railway companies whose roads come into the city of Cleveland.

You can readily imagine that the competition in the electric express business is very keen. Following those efforts, which were more or less successful, several of the companies started in the freight business and that has been rapidly extended so that today a very large, and I say without hesitation, profitable freight business is now being conducted by not only the electric railroads that center in Cleveland but the connecting electric railroads that extend into the states of Michigan, Indiana and Kentucky.

## FREIGHT PRESENTS NEW PROBLEMS

Starting in this new form of transportation business many problems were presented. At first some of the



T. A. KENNEY

companies were unwilling to speculate by investing large sums of money in new equipment. Old passenger cars were remodeled for freight service. Existing buildings not designed for handling freight were made use of. Later on, as the business grew, new equipment was purchased. Here quite a problem was presented as to the type and size of car—a car that would fit all of the conditions with respect to the business offered in the several states I have just listed.

Fortunately the Central Electric Railway Association has among its members a number of very progressive managers. Some one conceived the idea of standardizing a freight car that could be used on the electric lines and that might be accepted and exchanged by some of the steam railroads. Such a car

has been designed and placed in use.

These electric railroads are prepared to accept and are accepting freight of all kinds. One of the latest developments, engaged in by one or two companies, is the matter of handling cold storage materials. This required the designing and building of a refrigerating car. It was not an easy financing problem for many of these electric railway companies to purchase new equipment. It is only fair to say that the car manufacturers have rendered a great service by offering very favorable terms as to payment.

Purchase of the freight cars did not in itself build up the freight business. In order to accomplish that it was necessary to establish freight soliciting departments so that cars could be loaded to and from destination. Much success has been accomplished by the establishment of those soliciting departments.

Five years ago the gross earnings of the freight departments of the various electric railroads in the vicinity of Cleveland did not exceed \$100,000, and for the year 1926 the gross earnings of those same roads from this freight business will aggregate something approximating \$3,000,000. I mention those figures only for the purpose of showing that there is a real demand for the

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



freight service that can be given by electric railroads. There are instances where, between large cities in the vicinity of Cleveland and other cities in Michigan and Indiana, ten and fifteen days are required for the delivery of an ordinary freight car on the steam roads. In both cases to which I refer delivery can be made by electric railroads within 48 hours.

These same electric railroads, in addition to engaging in the freight business, have also had recourse to new ways and means of building up their passenger trans-

portation business. To that end, although it may appear as being in direct competition with their own railroads, buses of modern type have been made use of.

The electric freight business will shortly be extended from Cleveland so that freight can be accepted and delivered in the region as far west as Chicago and other points in Illinois and somewhat later as far east as Albany, N. Y. What the possibilities for the future are when those connections are made, you can speculate as well as I.

# Local Transportation Demands Have Changed\*

Convenience of Personal Car Has Modified Desires of the People with Respect to Public Services—Electric Railways Still Render the Best Mass Transportation, but People Living Away from the Car Lines Want Service Brought Closer to Their Doors

By Alfred H. Swayne

Vice-President General Motors Corporation

**W**ILL the motor bus replace the trolley car? That is the question most of us constantly either hear asked or discuss among ourselves. Pages and pages of news items quoting from the remarks of those engaged in operating both forms of passenger transportation, ranging from traffic and transportation experts to college professors and others, have been written on this subject. Newspaper editorials on the subject are almost as frequent as those on prohibition, but to many the question still remains unanswered.

Without attempting to give you the final answer, I would call your attention to certain things that appear to be important as indication of both what is happening in the local transportation field, and what we may expect from the natural progress of evolution.

In 1662 there were only six stage coaches in all England. In 1798 the mail left London for Shrewsbury—162 miles—and took 27 hours for the run. Then the railways came. The first was opened to the public in



A. H. SWAYNE

1830 between Liverpool and Manchester. Of the 30 coaches that had plied between the two towns all save a single one went off the road soon afterward. And now the motor bus—a highway vehicle—is in competition with the railway that 100 years ago eliminated highway transportation by coach. Evolution again wins out, but evolution is no respecter of persons, opinions or facilities.

Now let us review some of the significant facts. An editorial in the *New York Evening Post* of Aug. 27, entitled, "Buses and Trolleys as Transit Rivals," stated in part:

In the rosy imagination of certain observers the bus is on the point of pushing the surface rail car off the map. Impressed by the rapid invasion of the bus, both local and inter-city, they see it sweeping its way to early and complete triumph. Such a vision, however, is possible only by overlooking a few stubborn facts. In the forefront of these facts is the rather significant detail that more than 1,000,000,000 passengers were carried by the trolley or other surface rail lines in this city [New York] last year. What this means can be appreciated when it is added that these 1,000,000,000 passengers were almost two-thirds of the entire number of passengers carried by all the rapid transit lines. Two persons in every three who made use of our rapid transit

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facilities took a trolley. Talk of scrapping so immense a public carrier overnight is obviously inane. The trolley may be doomed, but it is going to follow the example of Charles II and be an unconscionable time dying. The step for the immediate future is not the wholesale substitution of buses for trolleys but co-ordination of the two kinds of transportation.

Regarding the ability of motor buses to handle mass transportation, a few pertinent facts that must be considered as conclusive evidence on the subject are that:

In 1924 all tramways in Metropolitan London carried 968,000,000 passengers as compared to 1,484,000,000 carried by motor buses; in 1925 the tramways carried 978,000,000 and the buses 1,671,000,000, or an increase of 12.6 per cent, whereas the tramways increased only 1.1 per cent, a clear indication that over there the people like bus transportation. A still greater increase in bus transportation is shown by a study of the passenger travel statistics covering the period 1913 to 1925, when the total volume of traffic increased 63 per cent. Comparing tramway and bus for this period, it shows that tramway passengers increased only 21 per cent as compared to 127 per cent for the motor bus. At the Wembley Exposition the London General Omnibus Company on Whitmonday, 1924, moved 178 buses per hour in and out of the Forecourt Station, hauling 143,000 riders between early morning and midnight.

The lesson I learn from studying these figures is, first, that the motor bus is capable of moving masses of people, and secondly, that we cannot afford to ignore what others are accomplishing with the same tools we must use in solving problems in transportation that basically are quite alike. Circumstances alter cases, and each must be studied by itself, *but* in the light of experience and with the determination to use each facility, electric car and motor bus to the extreme limits of their respective inherent possibilities, not simply to the extent we wish to use them. The final answer is not yet known to anyone. We may all have decided opinions, but thus far haven't the experience to prove if we are correct. The answer is neither all black nor all white, it is shades of color and the wise man will view it so.

That your members are making a concerted effort to apply the bus to their transportation requirements is easily proved by the facts at hand. Three hundred electric railways now operate more than 6,000 motor buses over 12,000 miles of routes. Akron—the old chestnut where buses failed, etc.—now has express buses operated by the local railway. It is reported that out of \$300,000,000 being spent this year by the electric railways of the country, \$23,000,000 is for motor bus equipment and facilities.

The convenience of personal transportation has changed the desires of the people with respect to public transportation. Local transportation demands have changed; as we expect to get hot and cold water when we turn the respective taps in our bathrooms, so the riding public expect to find transportation facilities "on tap" when they happen to want to ride.

Generally speaking, electric railways still render the

best service in mass transportation, but people living off the car lines want service brought closer to their doors than it is possible for rail lines to give. Others prefer to ride on rubber, and are willing to pay for it. The wise local transportation man will carefully survey his field and give the people the service they want. Of course, he will not attempt to satisfy whims and give a service which will not pay a fair profit.

I believe that local transportation will soon settle down on a basis of fair earnings for good service. Electric railway companies that are directed by men with vision and courage will probably control the transportation facilities, rail and bus, of their respective communities. If they won't see the light, and continue to view motor bus transportation as a passing fancy, then the business will be divided among them and others who are willing to give the service the people demand.

Not only must the transit facilities meet a necessity, they must fill a convenience in every sense of the word. This is 1926, not 1900. As a people we are more exacting, and I believe we are willing to pay the price for this kind of transportation when assured of value received.

Here I would call attention to the fact that the electric railways are frequently not only concerned with the transportation of passengers by motor bus, but have also found a place for the motor truck in the transportation of freight. An excellent example of where this is being done in a scientific manner—a truly co-ordinated rail and road transport service—is from Boston to Worcester and Springfield. Containers loaded with freight at the merchant's door are moved by motor truck and electric railway flat car to the door of the consignee. The advantages to all concerned of this class of service are very apparent. Where electric railways handle freight the motor truck can in many instances be used to great advantage and, therefore, its usefulness should be studied.

Your association has laid down certain principles regarding the motor bus and, generally speaking, they appear to be sound. Automotive men with whom I am associated believe that a proper and scientific co-ordination of electric railway and motor bus is the only solution for our local transportation problems. This new transportation tool, the bus, must be used wherever it can be done to advantage and without prejudice. Fighting the march of progress, gentlemen; trying to throttle bus transportation through drastic regulation or other means is useless, and I believe already relegated to the Dark Ages, and I think you believe so too. Both the electric railway and automotive industries now have men in command who have already shown a broad spirit of co-operation in working together for the solution of problems common to both sides. Let us continue to follow this policy, remembering that we can have vision without being visionary and that the public must be served with transportation "on tap" and that a co-ordinated rail and bus service is essential to accomplish the desired result.

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**L**OCAL transportation will soon settle down on a basis of fair earnings for good service. Electric railway companies that are directed by men with vision and courage will probably control the transportation facilities, rail and bus, of their respective communities.

—A. H. SWAYNE.

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# Providing for Future Transportation\*

Intelligent City and Suburban Planning Includes a System of Thoroughfares—Super-Highways as Used in Detroit and Surrounding Territories Are Discussed—The Speaker Believes Every Town and Village Should Provide for Future Traffic Growth

By Col. Sidney D. Waldon

President Rapid Transit Commission, Detroit, Mich.

**U**LTIMATE capacity of any route depends on the width of right-of-way; that is to say, on the distance from the building line on one side to that on the other. This right-of-way width is what determines how much space can be devoted to roadway and sidewalks as well as what is available for rapid transit use. The greater the width of right-of-way the greater is the potential capacity of the route for surface and rapid transit traffic and the greater is the possible development of the territory traversed and served.

Originally regarded as an expensive luxury, the automobile has increased the owner's ability to earn and that of his family to enjoy life. It was inevitable, consequently, that once sensing these advantages, civilization would never relinquish the motor vehicle, but would rush overwhelmingly toward its universal adoption. In 1913, approximately 1,250,000 automobiles were registered in the United States. This number was increased seventeen times in the succeeding thirteen years and, as was to be expected, the increase has been going on at an accelerating rate.

The increase in the number of automobiles has been so great that it is useless to talk about shaving sidewalks for a few blocks to help the parking situation, when provision for one year's increase in Wayne County, Mich., which includes the city of Detroit, would require both sides of an 86-mile street. The parking problem is the business of the individual and not of the municipality, whereas the right-of-way space required for moving traffic at all times is one of the most vitally important concerns of the governing body. Great improvements can be made at relatively low costs in the open country, but the cost of the necessary measures for relief in the thickly built-up sections may be enormous.

A pedestrian takes up about 10 sq.ft. A moving auto-



COL. S. D. WALDON

mobile with a safe margin all around occupies 270 sq.ft. Assuming an average of two persons per vehicle, then each pedestrian requiring 10 sq.ft. on the sidewalk will as a motorist require 135 sq.ft. in the traffic space. Assuming that nothing but private passenger automobiles are to be used and that the full capacity of two 15-ft. sidewalks is to be balanced by a roadway of equal automobile capacity of two persons per car, there will be needed central traffic space of 198 ft. Adding two 8-ft. parking strips and the two 15-ft. sidewalks would make a total right-of-way of 244 ft. On the other hand, passengers in bus, street car and rapid transit train occupy only 5 to 10 sq.ft. —reasonably comparable with the space requirements of the pedestrian. While the pedestrian and the street car passenger occupy about the

same square footage of street area as formerly, the average motorist requires approximately 13½ times as much space as either. If, in providing for future transportation, the automobile is to be regarded as a permanent factor, then the old standards of street and highway width are obsolete and new ones must be adopted.

## CAR SPEED VERSUS ROADWAY CAPACITY

It is a serious fact and one not generally understood that the speed at which the greatest number of motor vehicles can pass a given point in a single lane is 15 to 20 m.p.h. The reason for this is that at each increase in vehicle speed there must be an increase in the face distance between vehicles. For a speed of 20 m.p.h. approximately 2,000 vehicles can pass per hour. This rated capacity is approximated every day when conditions are favorable upon the Detroit Grand Boulevard, but not for very long at a time, because one or another of the intersections is soon closed to boulevard travel to permit intersecting vehicles to have the right of way.

If two streets of equal width cross and each has equal traffic then the capacity of each is reduced at least 50

\*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.



per cent, because neither can occupy the crossing more than half of the time. The intersecting street or highway is the most frequently recurring handicap to the efficient movement of motor vehicles. This is because the cars approaching an intersection with the signal set against them will close up the gaps which are necessary while they are running. When the red signal changes to green, the vehicles begin to move and the operation is reversed. The last car in the line can do nothing until every vehicle in front has got under way in turn. This still further reduces the traffic efficiency of the intersections. If the number of lanes is multiplied by say three, the same number of vehicles will cross the intersections in one-third of the time.

Traffic figures show that the capacity of a single lane of traffic on lower Woodward Avenue, Detroit, which is controlled by traffic towers, averages less than 500 per hour. On Fifth Avenue in New York it rarely reaches, even for a few minutes, the rate of 600 vehicles per hour. This is less than one-third of the capacity of the same lane of vehicles if allowed to move continuously at 15 or 20 m.p.h.

#### GRADE SEPARATIONS EXPENSIVE

Grade separations for surface traffic purposes are extremely expensive and should not be undertaken without the most careful consideration of all of the factors involved. It is a grave question whether the demand for such expensive improvements does not indicate the need of an entirely new mode of transportation; that is, electric trains operating upon exclusive right-of-way. Except in very special cases, it would be foolish to embark upon piecemeal grade separations for surface traffic only, because most projects of this kind would simply result in moving the bottle neck to a new location a short distance away.

If, as a nation, we want to make the maximum use of the advantages offered by the automobile for individual rubber-tired rapid transit, then we must establish new standards of street and highway widths more generous than those that have been sufficient in the past. If, in the earlier development of our future cities, we provide the wide rights-of-way necessary adequately to take care of individual transportation by motor car, then we will, by so doing, be laying a proper foundation for meeting the needs of mass collective transportation later on.

The effect of increased accessibility resulting from any form of collective transportation is to stimulate development along the route and throughout the area served. Population is attracted because of the special service given. This in turn demands more service and so on, until the limit in capacity is reached of the particular form of transportation that is used.

When a beginning is made in rapid transit operation, the cycle of stimulated development begins anew, but with an added impetus given by street car and motor bus if used as feeders to the rapid transit line. Gradually the territory is built up to a new and higher standard of use, the two-track system becomes filled to capacity and there are also demands to lengthen the line into new territory. It is then economically possible, if the right-of-way is sufficient, to give a new and most valuable addition to the service by adding two more tracks. This will permit the running of express trains with limited stops so as greatly to increase the speed and consequently the area that can be reached within the same travel time of say 45 minutes.

Underground rapid transit is preferred by adjacent property owners to elevated forms because it does not interfere with light, air or surface traffic, and consequently, gives all the advantages of increased accessibility while retaining the full use of the pavement in the street that is occupied. Elevated or surface rapid transit are preferred by the riders because they are out in the open. In undeveloped territory, it is far cheaper to lay the rapid transit rails on the ground and to provide the necessary separations at logical station points than to build any form of elevated structure. For these reasons, the Detroit Rapid Transit Commission adopted underground rapid transit within the thickly built-up area and surface rapid transit upon super-highway rights-of-way for the suburban districts. It was also established as a principle that no two-track lines should be built without making provision at the time of construction for the increase in right-of-way necessary later to add the two additional tracks for express purposes.

Four tracks, together with main sewers and other sub-surface utilities, can be housed comfortably beneath a street measuring 120 ft. from building to building without disturbing the foundations on either side. This width may be considered as a basic measurement in plans for the major thoroughfares of a great city. If we let our minds run ahead to the further development of 50 to 100 years, 120 ft. becomes little enough.

#### MASTER PLANS PROVIDE FOR GROWTH

In the last 25 years Detroit has added 110 square miles of new territory and a population of 957,000. Facilities that will cost millions in future street openings and widenings would be in existence today at no expense to the city simply through the existence of such a plan. That cannot now be helped but it is never too late to make a beginning.

Detroit believes that it is destined to become one of the world's great cities. It believes that one of the ways to make this possible is to lay plans now while so much of the area of the future city is undeveloped and consequently in a plastic state so as to insure the automatic creation of wide rights-of-way at properly spaced intervals to serve all sections equally. This has resulted in the creation and adoption of what we call the "Master Plan." The principle underlying the master plan is that it is better to select a limited number of routes properly spaced with respect to each other, and to make these adequate to carry the individual and mass transportation of the district traversed with speed and safety, than to make every street of equal capacity.

The master plan provides a checkerboard of north and south and east and west arteries at approximately mile intervals and includes three existing and several projected radials, also laid out so as to give equal service to the entire territory. The area between these main thoroughfares is considered as devoted to local and secondary traffic only.

The master plan uses four standards of width.

1. One hundred and twenty feet for interior main thoroughfares and exterior mile section line roads.
2. Two hundred and four feet for super-highways 3 miles apart connecting with 120-ft. interior thoroughfares and extending from approximately the 6-mile circle outward.
3. Eighty-six feet for secondary traffic streets within the city and for  $\frac{1}{2}$ -mile roads out in the suburban area.
4. Sixty feet for residential streets.



It is our belief that, with the automobile as an established and permanent factor to be considered in all future street and highway planning, no village or town should be laid out without its main street being 120 ft. in width and with provision for a checkerboard system of the same width at mile intervals. A wide main street in a rural community invites business because it makes it easy to park and still leaves plenty of room for through travel. According to our present view, 120 ft. of right-of-way should be the basic unit underlying all planning for future transportation.

The super-highway is made up of the elements of the 120-ft. street, only assembled in a different manner. The four tracks are laid upon the surface in a central reservation of 84 ft., while the 120-ft. street surface is split down the middle and 60 ft. placed on each side of the rapid transit tracks. This gives a total of 204 ft. If we regard the 120-ft street with its tracks underground as a two-level thoroughfare, then we can consider the super-highway with its tracks in the center as a single-level street of the same capacity. The 60 ft. of space at each side is divided into 15 ft. for sidewalk and tree planting, 20 ft. for local roadway, 5 ft. for island strips separating the local from through traffic and 20 ft. for express roadway.

To operate rapid transit upon the surface in the outlying areas would, of course, require grade separations at every half mile and mile intersection. Advantage has been taken of this to place the station at the top of these separations so that passengers alighting from the trains will pass down through the station platforms and emerge by way of the grade separation into the underpass street.

Vehicular traffic on one side of the super-highway desiring to get to the other side would use the grade separations, while subway passages for pedestrians to cross would be provided at as frequent intervals as the requirements of the territory demand. Grade separations made necessary for rapid transit purposes at half-mile intervals also make it possible, and very much less expensive than if done solely for motor vehicles only, to carry the through vehicular traffic over the intersecting streets at the same level as the rapid transit facility. No vehicle or pedestrian would ever have occasion to cross the express roadway. With through traffic carried over all grade separations at rapid transit stations along a 10 or 15 mile route, then it would be possible to give a rubber-tired transportation facility not now available anywhere in the world. Vehicles using this would travel continuously at whatever maximum speed was allowed by law. They would swing into the express roadway between intersecting streets and they would swing out just before reaching their destination or point of departure from the route.

#### ARRANGEMENTS FOR CROSSINGS

Wherever two super-highways fully developed in accordance with the rapid transit plan cross each other, the tracks and express roadways of one would be carried above and clear of the former street level. The local roadways of both super-highways would meet at the intersection at normal grade. The rapid transit stations would be in the center of the intersection.

While designed primarily as a combination rapid transit and surface vehicle route, Woodward Avenue, when completed as at presented planned, will consist of two 45-ft. concrete roadways 13.2 miles long with two

interurban tracks in the central park strip. This is just one of a number of super-highways planned for Detroit and vicinity.

The actual improvement of these rights-of-way, while important enough, is not so vital to Detroit and the metropolitan area at this moment as is the acquisition of the land itself. What can be obtained now at relatively moderate cost would require untold millions ten, fifteen or twenty years hence. No one quarrels about how the right-of-way is going to be developed. There are, of course, differences of opinion, but these are swept aside in the universal agreement that the width is necessary and should be nailed down now.

Of the various methods of acquiring rights-of-way, the most effective and least expensive is the dedication that owners automatically make when their plats are accepted by the boards of auditors of the counties involved. Special consideration of the older sections of the city, designed long before these two new requirements of the motor vehicle and rapid transit were dreamed of, is called for. Either the older sections must be opened up by widened main arteries at regular intervals or they will suffer by reason of the bottle necks that will throttle their growth.

The master plan provides that certain routes, selected because of their alignment, continuity, relative location and connection with the outside grid, shall be widened as the needs require and funds become available, to the main standard of 120 ft. with intermediates of 86 ft. Two methods will be used;

1. Establishment of set-back lines varying from 7 to 10 ft. on a side on both sections of routes selected which are at present 100, 105 and 106 ft. in width. All told, there are 31½ miles of such route upon which it is planned to complete the condemnation of the land vacated by these set-back lines at the expiration of 15 to 25 years. In rapidly growing cities, the average life of buildings is about 33 years, which means that during the period specified for the set-back line, a very large proportion of the old structures now existing will have been replaced on the new line, and only a relatively few modern structures will have to be cut back at the city's expense.

2. By out and out condemnation to the full width desired. Development follows lines of transportation. The highest value land and the most expensive buildings front upon the transit street. To widen the street by condemnation usually requires the community to pay for the highest value land frontage and largely to destroy the most expensive buildings. When the operation is completed, the cheaper land which was formerly in the rear and which now fronts upon the widened thoroughfare steps into the same position of value as the former street frontage and acquires new value by reason of the widening. The widened street attracts a better building development, but the reduced depth of the lots is less favorable to large structures. In every way, the result is diametrically opposed to the city's and the property owner's best interests.

A charter amendment adopted by the people of Detroit will permit the Common Council to condemn property other than that actually required for the widening, to readjust lot and alley lines, to exchange one piece of property for another and, in general, to exercise the rights of a proprietor in the transaction. In a nutshell, the amendment gives the city the right to condemn cheap property in the rear of business frontage and to exchange such property for the frontage required so that buildings may be moved back upon this new property, alley and lot lines readjusted and the original owners left with the same size properties on the widened street that they originally had on the narrower one.

The financing of these city condemnation proceedings



will be taken care of on the basis of approximately two-thirds against the benefited property in an assessment district, running back on each side of the thoroughfare widened, and one-third in an assessment upon the city at large.

Much more could be said about planning for future transportation, its advantages, methods and Detroit's accomplishments to date. Sufficient has been said, however, to show why every village, town and city should adopt its own master plan, together with adequate standards of width for the various elements and then concentrate upon the earliest acquisition of the desired rights-of-way. Planning ahead of immediate needs benefits most the territory that adopts such plans.

In older cities, we have seen areas that were once the heart of business, city government and the social life of the community finally reach the limit of possible

development upon the narrow street system of the past. We have seen these areas forsaken and become blighted in favor of new areas offering better facilities of all kinds required by the increased population and altered conditions of living. The time finally arrived when it was cheaper to move than to rebuild.

History has proved over and over again that we pay for adequate facilities whether we have them or not. We pay through delays and reduced efficiency. We pay through nervous wear and tear, through loss of property, life and limb. We pay in stunted development, in blighted areas and lessened values. And as a last resort, we pay enormously for a few defensive measures that too often fail because inadequate. It is better to grasp opportunity while it exists and consistently plan ahead of immediate needs than let things drift until it is too late.

# Competition, Co-ordination or Monopoly\*

Advantages of Individual Enterprise and  
Effort Can Be Retained Without the  
Evils of Wasteful Duplication of Service

*By the Right Hon. Lord Ashfield*

Chairman Underground Railways of London,  
London, England

URBAN transport is a complex subject. The underlying principles which may govern the operation of such undertakings are three, contrasted and opposed, namely, competition, co-ordination and monopoly.

For the interpretation of these principles it is necessary to turn to the inexact science of economics. The main ideas of economics took shape about 1776, for in that year Adam Smith published his "Wealth of Nations," which gave form and definition to a hitherto unorganized mass of knowledge. Adam Smith was an individualist. He saw that all achievement and all success were attributable to personal effort, and so it was quite natural that he should think that competition was inevitably concerned with vital impulse. When, in 1859, Charles Darwin published "The Origin of Species" and established another landmark in the history of thought, he seemed only to confirm the rightness of Adam Smith. Achievement and success in evolution were based upon a struggle for existence, which was competition naked and unrestrained.

By a curious coincidence, Karl Marx published in the same year his "Critique on Political Economy," which eight years later was to be recast into his famous treatise on "Capital," in which the doctrine of the other extreme, of socialism as the negation of competition, finds its dominant utterance. The facts of life were beginning to shatter the hardness of the teachings of the orthodox economists. From that year onward criticism and discussion have attempted to fashion a new economics, but with too little success, because the

old had become consecrated and was accepted unreasoningly.

Out of evolution, however, the idea of co-ordination starts. The struggle for existence was found not to be so universal or so acute. There were associations of creatures for their mutual protection and benefit; and what the creatures did man learned to do. Slowly there sprang into existence trade unions which limited labor competition, buyers' and sellers' organizations which limited trade competition, and trusts and cartels which limited competition in the markets for raw and partly manufactured materials. Nevertheless, while the practice was changing year by year until the economic life of nations has become radically altered, there is still the same lip service by large sections of the community, to the notion that competition alone is essential, beneficial and advantageous.

It is against such a background that the idea of co-ordination, as opposed to competition on the one hand and to monopoly on the other hand, should be viewed, and urban transport is a favorable subject for the purpose of illustration.

Transport consists in public service. The service may be measured statistically in seat-miles. The use of the service may be measured in passenger-miles. If the seat-miles are not used by passengers and so converted into passenger-miles, they are lost. In this the provision of service must be distinguished from the provision of commodities. If commodities are not sold one day, unless they are perishable they may be sold the next, but service, once provided, is wasted unless it is used. Waste is costly. The whole service must be paid for out of the proceeds of the part which is used. If, therefore, the proportion wasted is, by reason of com-

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petition in services, increased, the amount charged by way of fares to the passengers must be raised. A substantial proportion of the total service provided by urban transport undertakings is wasted in any event by the operating conditions occasioned by the variable flow of the traffic—the unbalanced inward and outward movements morning and evening, the irregular movements at mid-day, the seasonable and climatic variations which can hardly be forecast with exactitude. Whether railways or tramways or motor omnibuses are taken, in Greater London the average use which is made of the facilities provided barely exceeds 33 per cent. In the cities of America it will not be greater; it may easily be worse. Only by unified management of all the means of transport and their co-ordination into a general system can such unavoidable waste be reduced to a minimum.

Transport in its commonest forms occupies the public streets. The traffic capacity of the public streets is limited. A single line of traffic will accommodate some 500 vehicles per hour in a congested street. If a wasteful use is to be made of the public street, if the vehicles using the street are to be only partly loaded, or if the general speed of movement in a street is to be slowed down by congestion due to too many vehicles trying to squeeze through, then vast and needless expenditures are forced upon the community to supply more and wider streets. In the centers of modern cities this has already become a grievous and almost insuperable problem. It is certainly not to be aggravated by countenancing the needless competition of omnibus with omnibus, or of omnibus with tramway upon the public streets.

But if competition fails, is the only alternative monopoly in one or other of its forms? There is the monopoly which is characterized by private exploitation. This can be ruled out at once. There is the thinly disguised monopoly of nationalization or municipalization in which the exploitation of the consumer is obviated, but at the price of retaining all the other defects and vices of monopoly, such as its lag on progress, its conservative methods, its stereotyped management, its infallible tendency to live upon itself in an atmosphere of red tape. It is idle to shirk the consequence of these disguised monopolies, for they are too patent. In co-ordination a golden mean is available which allows of the retention of what is good in individual enterprise and of the casting out of the ills of competition.

Changes have been wrought in trade and industry since 1860. Large undertakings, such as those providing urban transport, have become impersonal. They are in these days joint stock companies. Those who manage and control them are salaried officials, trained and expert in their work. They form a class whose duty it is to hold the balance between the shareholders and the passengers. They have built up a technique of management which they must observe conscientiously. There is no longer a mystery about it, but it has become something in the nature of a science. A change has taken place similar to that which converted alchemy, with its uncalculated magic, into chemistry, with its calculated wonders.

Finally, and maybe most important of all, publicity has entered into management. What is done in the office is shouted in the press. Management is being conducted in a glass case, so that any attempt to surcharge the public, or impair the service, or to squeeze an excess profit, fails immediately under criticism from the public.

Traffic has grown more full of variability as cities have grown in size and strength. This variability never allows of rest in urban transport. The incentive to improvement, to expansion is always there. For instance, competition remains in the design of vehicles and equipment because the vehicles and equipment must be tuned up to yield the last passenger in effectiveness. Every second of waste must be eliminated, every inch of space must be exploited. The basis of prosperity in urban transport is not a few passengers at high fares, but many passengers at low fares. These are some of the considerations which point to the truth that in urban transport, at any rate, the atmosphere, the circumstances in which it is carried on, are instinct with a spirit of competition which makes its pressure felt in subtle and impressive ways, which insures an accommodating and progressive attitude, which renders harmful and dangerous the rude competition of vehicle with vehicle and system with system. Urban transport has outgrown the stage at which tribal warfare represents the solution of the difficulties of existence.

What is meant by co-ordination? There is no one answer to such a question. Each city must work out its own. It does not necessarily involve all transport agencies being in one ownership. It does not necessarily involve all transport agencies being under one management for the routine discharge of their operations. But somewhere there must be the power and authority to insure that the operations of all the transport agencies are knit together into a systematic whole. Somewhere there must be the power to readjust the financial position of conflicting agencies to insure that whatever their ability to earn may be, all receive according to their needs, if their service is required.

In all cities there is the right, on the part of the people, to exercise control, subject to the observance of certain principles. First, that those who control shall not be interested in one transport agency more than in another. They cannot own one agency and seek to control others. They must have a single eye. Second, that the transport agencies as a whole shall be self-supporting, or if that is not to be the case because cheap transport is held in such esteem as to warrant a tax or impost on the community in some other shape, such as a charge on landed estates, a rate on property, or a levy on industry at large, then a definite policy of subsidy out of such other resources shall be defined. Third, that those who invest their money in urban transport shall be entitled to a reasonable and proper return upon their capital, for, without this, expansion is prohibited. Indeed, as a price of control there is a fair claim to a guarantee. Such an investment, under such conditions, should be almost like a government or a state security; that is, a fixed interest bearing security; in brief, a bond.

Finally, co-ordination, it will be observed, does not absolutely forbid competition. It requires that so long as adequate service at fair prices is provided, there shall be no disturbance to provoke rate wars, or to stir up overrunning, or to attract gambling investments and so to cause waste. If, however, at any moment, those who are engaged in the provision of urban transport are neglectful or dilatory or unreasonable, then the door can be opened and fresh agencies invited to take a share. Co-ordination is a closing of the door to direct and internecine competition in the interest of the transport undertakings so long as they are of good conduct and act in the interest of the public.



# Need for Revision of Our Concepts of Depreciation\*

Modern Ideas of the Permanency of an Essential Utility Require a New Method of the Treatment of Depreciation in Considering Property Value

By Prof. Henry E. Riggs

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MAJOR concepts described by the word "depreciation" are radically different. They may be described as the "valuation concept" and the "accounting concept."

The general use of the term "depreciation" in valuation commenced with the Michigan Railroad appraisal of 1900, although I find one very clear statement of the same conception in connection with a bridge controversy as early as 1840. The Michigan appraisal was begun in September, 1900, and finished the following February. The total cost to the state in round figures was \$70,600, and the theory of making an engineering estimate, or cost of reproduction, was there first used.

This work was done in connection with a study of taxation. The railroads all contended for low values, and the estimated cost of reproducing the property at that time very closely approximated actual investment. It gave the answer in terms of a new railroad. Many of the more than 150 operating railroad properties in Michigan were in sadly run-down condition. They had actually depreciated and were not earning any adequate return. To assign a value equal to the cost of building new in 1900 would have worked an injustice to such properties. Hence the attempt was made to set up a cost of "reproduction less depreciation."

The concepts adopted at this time, cost of reproduction, cost of reproduction less depreciation, the method of arriving at the so-called depreciation, the general methods of making the inventory, the forms for the inventory and the general form of the presentation of final details and summaries were adopted in subsequent valuation work and followed with relatively slight modification.



PROF. H. E. RIGGS

It must not be forgotten that this work was done seven years before the adoption of uniform accounting and nine years before the Supreme Court rendered its decision in the Knoxville Waterworks case. Those two events ought to have brought about a complete revision of the methods of computing "depreciation," but they did not.

The Knoxville case makes clear that where there is depreciation it shall be found and deducted. It does not, however, define depreciation beyond making it clear that it must be impairment of the investment. The fundamental thing about that decision is the declaration that it is the duty of the owner to "maintain his investment intact, as it was in the beginning." In other words he must keep a 100 per cent property. If he fails to do so the fault is his

own and must be taken account of when a valuation is made. The Michigan plan of determining depreciation is inconsistent with this decision because under it no property can ever be in 100 per cent condition.

The uniform accounting classification draws a very clear and sound distinction between the capital accounts and operating expense accounts. It gives a clear recognition of the principle that the using up of consumable units of property is part of the cost of operation.

## MICHIGAN PLAN IS FAULTY

The Michigan plan of determining depreciation is inconsistent with this classification because it considers progress toward the time of replacement, or operating costs not yet accrued, as being a deduction from capital.

It seems to me that the Michigan plan, which has been adopted practically in its entirety by the Bureau of Valuation of the Interstate Commerce Commission, is faulty in several respects. There are several questions to which we must find new answers.

1. What is the unit of property to be valued? The

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problem is to value the railroad. A railroad is very distinctly one property, built for a special, particular service. Most of the materials composing the property have no value at all except as part of the railroad. For example, the rails, the signals, a depot building, a fuel station have little "value" when detached from the railroad. They are all consumable parts. They were made to wear out. The better the railroad and the more its business the faster they wear out. Their wearing out is an operating expense. They are distinctly not units of property to be valued alone, any more than the windshield, fenders or tires of an automobile. The study must be, therefore, of the utility as a whole, not of its minor parts.

2. *What constitutes a 100 per cent property?* There never was such a property. Newness is of no value, and if we sought mere "newness," how much money would be invested in our utilities. The efficient property, built to render a particular service, and doing its work in a safe, efficient and economical manner, is the thing which attracts investment. Such a property, with all replacements being made just as soon as replacement is due, is the 100 per cent property. Where maintenance is not kept up, and where replacements are long deferred, there is depreciation in the sense it is referred to by the courts. It seems to me that depreciation, in the sense of failure to maintain the integrity of the investment, is measurable in dollars and cents, by the amount of money that a wise and prudent manager would be justified by sound economics in spending to bring the property up to a proper and safe standard for transacting its actual business.

3. *What is depreciation?* The Interstate Commerce Commission defines it as "loss of capacity to serve." The Supreme Court makes very clear that it means "failure to maintain the investment intact." In view of the fact that we are not now discussing value but property, this might be stated as follows: "Failure to maintain the plant or property intact, which was secured by the investment." The basic definition is "loss of value."

I do not think that we can avoid the fact that value itself, particularly as it relates to utility properties, is dependent on earnings. We may very naturally expect to find that the poorly conceived, poorly located property, which has never come up to expectations, which is not doing the business that it should, and is consequently not paying an adequate return, will be the poorly maintained property. Any formula which deducts a greater percentage of depreciation from an old, well-established, prosperous and growing utility which is fully maintained to the highest degree of efficiency than it will from the ill-conceived failure which is not fully maintained but which was built at a more recent date is an incorrect formula.

The speaker would define depreciation as that loss of value or impairment of the investment in plant which is due to the failure of the owner fully and properly to maintain to a suitable standard for the service which is to be rendered.

4. *What is the life of the property?* This conception of the total life of the unit, applied to minor consumable parts, has led to the most ridiculous inconsistencies. For example, steam railroad ties are assigned a definite life. Assuming full maintenance, the replacement each year of every tie that ought to be replaced, the maximum normal condition of the ties is

50 per cent. Grading, on the other hand, never depreciates. That is because the engineer doing the work of valuation would have to put a "life" on cuts and fills, and he cannot do so.

The real answer is that both ties and grading have a life as long as that of the railroad. If the railroad is abandoned, what is more worthless than an abandoned grade? We all know that cuts and fills wash and slide and that as constant maintenance must be expended on the grade as on the track. Certainly the life of a service structure as a whole is the true measure, not the estimated lives of parts of it. Who knows the life of a railroad, or an electric power property, or glass, or grading, or a great dam?

We must establish a new set of concepts in valuation. We must abolish guess and substitute fact. The application of the formula of the Bureau of Valuation means a deduction, based on an arbitrary set of rules, of from 20 per cent to 25 per cent of invested values in the railroads. Say four to five billions of dollars. Doubtless in some cases of small properties of low earnings there is considerable true depreciation, but in the case of the great majority of the railroads of the country the formula results in confiscation.

Thus far I have discussed the valuation or engineering concept of depreciation.

#### THE ACCOUNTING CONCEPT

The accounting concept is no less important. It seems to me that the use of the word "depreciation" in connection with reserve accounting is a misnomer and ought to be abolished.

There can be no disagreement as to the desirability of establishing accounting reserves to spread the costs of retirement or replacement over a reasonable period of years, in the case of some properties and some parts of other properties. There is, however, great disagreement when it comes to a universal requirement of reserve accounting.

The great railroad, with thousands of miles of road and thousands of cars and locomotives, may find its maintenance of way and structures or maintenance of equipment total expenditures so uniform year after year as not only not to require the establishment of reserves, but as to make it highly undesirable, because of the introduction of estimates.

What is true for the great railroad may not apply at all in the case of the small road. It appears to the speaker that whether or not reserve accounting shall be used, and if so the extent of property that shall be covered is largely if not wholly a question of policy to be decided by the management subject to the approval of the regulating body, and not a matter to be disposed of by the formulas of some bureau of control.

The question may be asked, are such reserves, if they are established, to be based on a percentage of property cost, or on costs per unit of service? But is not this wholly a matter of convenience in accounting and of securing enough money for the purpose?

When these reserves were first established it is easy to see that a good supporting argument for them was that there was a depreciation in the property over and beyond maintenance and renewals. Indeed, that is very true as to many kinds of property today, but does it apply in the case of the utility of continuing life?

Take the case of the New York Central Railroad, for example. Is it not getting better and larger and



stronger each year of its history? Is it possible to go back and find this fantasm of depreciation and add up in dollars what it now amounts to? I think not. The life of the New York Central and the other great railroads is, so far as we can now see, indefinite if not infinite.

Transportation, public transportation in cities, electric power, public water supply, communication by telephone or telegraph are public services that must continue in some form.

We know that great changes have taken place and will take place. New inventions involve constant changes of equipment, but we have well established the principle that the wearing out of the old is part of the cost of service and the cost of the old must be charged to operating expense. In the case of the continuing, going concern property any reserves raised to cover this cost are not depreciation reserves, although they may properly be such in the case of the obsolescent and dying property. My plea to you men in accounting is to find another name which will cause less of confusion and be more truly descriptive.

#### DEDUCTION OF RESERVES TO DETERMINE VALUE

Finally, I would raise this question, Should the amount of accumulated operating expense reserves be deducted from the capital account to find true value?

The Supreme Court, in the Knoxville case, says that it is the duty of the owner to keep his investment intact.

This can be done in two ways on different properties. One may so fully keep up current repairs, replacements and renewals that at any given time little or no depreciation ought to be found. Another, unable to do this by direct charges to operating expense, may elect to create reserves, and through a series of years just as fully maintain the integrity of the investment. Should he be penalized by deducting these reserves from capital?

Would it not be more proper, in this second case, to say that failure to establish proper reserves is failure to keep the investment intact, and that such failure should be penalized?

This whole subject of reserve accounting is, like engineering valuation, a new development. The subject is far from being a fixed and settled science, and the accounting question needs just as much study as that of the proper deduction to be made in valuation.

The definite use, and the clear meaning of the word depreciation, loss of value, in valuation, and the clear-cut order of the courts to find it when it exists and deduct it, seems to make it very essential that the accountants get down to exact terminology and find a name that shall be truly descriptive.

#### Rail Corrugation Studies to Continue

**P**LANs for the continuation during the coming year of the work of the committee on rail corrugation were made at a meeting held Oct. 6 in the Engineering Room of the Auditorium. Methods of using the corrugograph were discussed and arrangements made for metallurgical analyses of sections of corrugated rail.

This subject has been one that has baffled engineers for many years and it is to be expected that with the approach to this problem along scientific lines that the cause or causes resulting in corrugation will be discovered.

## Purchasing Agents Meet

Many Details of the Best Way to Handle Their Work Were Discussed by Both Railway Men and Manufacturers

**F**OR the third consecutive year, the purchasing agents and stores committee of the Engineering Association held a separate session at Cleveland on Oct. 5 to consider its report to the Engineering Association and, at the same time, to hear addresses from prominent men on the subject pertinent to the committee's work. After the address of welcome by Charles R. Harte, president of the American Engineering Association, Frank R. Coates, president of the American Electric Railway Association, gave a talk on the value of the purchasing agent to the entire railway organization.

P. F. McCall, chairman of the committee, read the formal report which was presented Thursday morning to the Engineering Association. Other committee reports were read and approved.

The principal paper scheduled on the program was "Co-ordination of Operating Budget with Purchases of Material." It was presented by Dr. Charles Reittel, head of the department of accounting and industry, University of Pittsburgh. According to him, the budget of requirements should be worked out by forecast, plus experience and adjustments. Estimates should be made for the month, and the various items tabulated on a budget sheet which can be laid out to accommodate as many divisions of the work as are required. The big underlying principle of budgeting is the psychological effect it has on the purchasing department. Abnormal expenditures which are not included in the budget should be passed upon by a group of officers of the company which may be authorized to draw upon a contingent fund to meet the emergency requirements.

#### WHAT CONSTITUTES A VALUABLE EMPLOYEE

Four factors characterized a valuable electric railway employee, according to W. E. Wood, vice-president and general manager of the Virginia Electric & Power Company. These are general knowledge of the company's business, specific knowledge of the detail work of his department, a desire to carry out the policies of the company and co-operation on his part with other departments.

Time can be saved in filling orders if the proper description is given the manufacturer so that his order department may successfully interpret the company's order. Henry S. Day, manager transportation division, Westinghouse Electric & Manufacturing Company, in his paper enlarged upon this statement and, in addition, said that his company had had considerable success in filling orders from catalog descriptions. According to Mr. Day, some railway purchasing departments permit an order to go through in rather incomplete form.

This is not good practice. Attention must be paid to details, in order that the material shipped on the order will be correct. It is up to the manufacturer to keep the purchaser supplied with new catalogs. However, it is also necessary for the manufacturer to maintain a file of back catalogs because orders may come in which an old catalog description is given. Ordering by unit quantity packages speeds the shipments. This practice is economical and facilitates the work of the purchasing department.

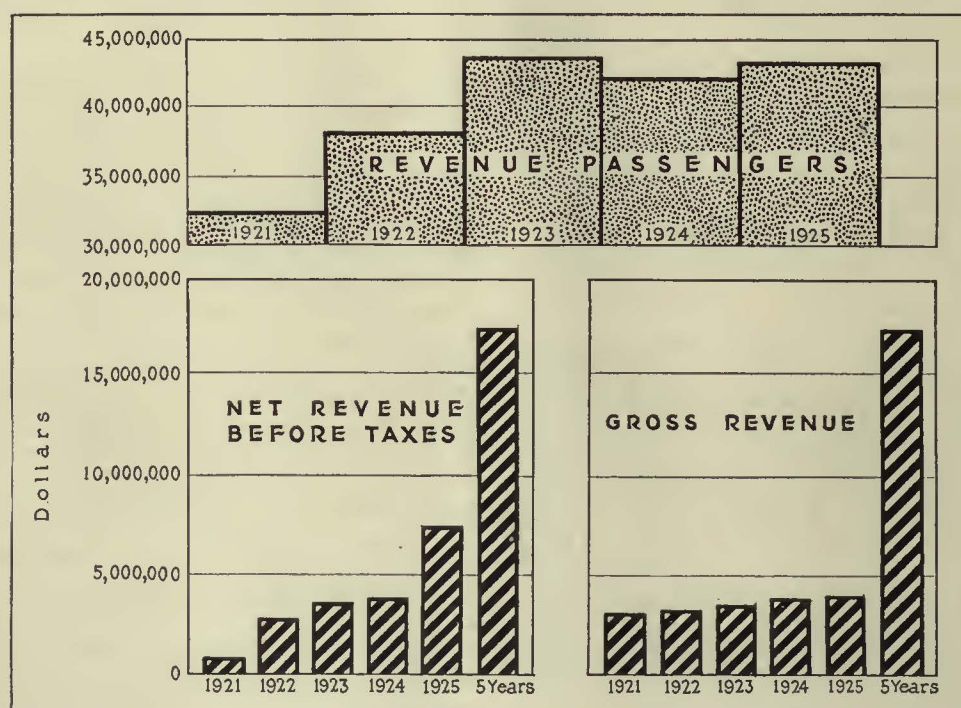


# Penn-Ohio Electric Company Wins Coffin Award

An Aggressive Campaign of Physical Improvement and Co-ordination of Rail Lines and Buses, Combined with Intensive Merchandising Effort, Earn National Recognition for Moderate Size Combination Property

**R**EHABILITATION of its railway property with a view to building up a character of service which could successfully compete for traffic under modern conditions was a large factor in winning for the Pennsylvania-Ohio Electric Company, the 1926 Charles A. Coffin medal. The award was made on the basis of the value of the accomplishments by this property to the public and to the electric railway industry as a

proper field for each to be determined. Having gone through a complete cycle of shifting traffic between cars and buses, it established the fact that the latter may be used to attract new business to a transportation system as a whole, while improved cars and service simultaneously build up the riding on the rail lines alone. It demonstrated that when the bus is operated under conditions for which the car is better fitted, improvements



whole. Concrete evidence of this company's intention to provide a complete modern service and of a constant effort to improve facilities, which in turn won the co-operation of the public and a resultant considerate attitude in franchise matters, assessments, etc., was cited as among the important accomplishments.

The committee in making its report also cited the action of this company in pioneering the operation of de luxe buses in an industrial territory while at the same time avoiding the temptation to hold bus fares below the cost of giving service. In addition, mention was made of the effort by the company to give a different character of service with de luxe buses than on the railway. Establishment of the precedent that the bus fare under such conditions should be higher than the rail rate was recognized as an important accomplishment.

In the judgment of the committee, the winning company has shown by experience that there is no permanent "rubber urge," but that the public is ready to buy what it considers the greatest value for its money in transportation regardless of the motive power. While building its bus service this company brought its rail lines up to a state of performance which permitted the

can be made in the rail service which draw traffic away from buses of even the most luxurious type. It found that when both bus and car service are intensively developed in comfort, speed and convenience, and are operated at rates of fare proportionate to the cost of giving service, neither vehicle threatens to supplant the other; that the field of each is fixed by the nature of the territory, location of lines and other similar factors.

The Pennsylvania-Ohio Electric Company operates both city and interurban service by cars and buses. The one management operates the Youngstown Municipal Railway and the lines serving Newcastle and Sharon, Pa., Niles and Warren, Ohio. Five years ago buses and private motor car competition had the company with its back against the wall. It had to choose between admitting defeat or putting more money into its property and adopting more aggressive sales methods. Choosing the latter, it has emerged triumphant after five years of vigorous fighting. This property is controlled by the Republic Railway & Light Company of Jersey City. C. C. MacCalla is general manager and R. N. Graham is manager of railways and directly in charge of rail and bus operation.



# American Committee Reports Record of Year's Progress

The Subjects Considered This Year Included National Relations, Management and Operation, Insurance, Education, Rapid Transit and Publicity—Useful Research Work Accomplished

**B**EGINNING with the convention last year the presentation of committee reports from the platform was discontinued by the American Association. The same plan was followed this year. Instead of reading the reports from the platform as in previous years, each chairman gave a brief oral résumé of the subjects presented. These topics were printed in pamphlet form by the association and distributed to the members before the meeting, allowing them to become conversant with the subject matter and enabling them to bring up questions for discussion after hearing the preliminary remarks by the chairman. Abstracts of the various reports follow.

## National Relations

**T**HE current year has furnished many things for consideration by the committee. At the hearings on the railway labor bill before the Senate



HARRY REID  
Chairman

and House committees, Mr. Henry and other representatives of the association argued for the exemption of street and interurban electric railways, and this exemption was secured by the Richberg amendment. A statement setting forth the views of the association with reference to the railroad consolidation bill, introduced by Senator Cummins of Iowa, was filed with the committee. This bill was still in the Senate at the time of adjournment. Mr. Henry and other representatives of the association have also closely followed or have spoken at hearings on the so-called "venue bill," a bill relating to railway mail cars, the use of steel cars in trains, excise taxes on automobile buses and parts, and the regulation of interstate buses and trucks. The association has also been represented at various hearings held by the Interstate Commerce Commission in different cities this summer on the question of the regulation of such interstate buses and trucks.

Mr. Henry also spoke at a hearing of the House committee on interstate and foreign commerce on a number of bills proposing to amend the interstate commerce act.

The committee on national relations has also filed with the Interstate Commerce Commission a petition, so far as its members were concerned, in regard to an order relating to the inspection and testing of railroad locomotives other than steam. It was also represented at the National Conference on Street and Highway Safety in Washington, and Mr. Henry is a member of the conference committee to draw up a suggested uniform vehicle code. It is the intention to have this code adopted in the various states.

During the year a large number of Congressional bills, resolutions and amendments were mailed to Messrs. Storrs, Henry and Welsh, as well as to others on request, as were also many copies of Interstate Commerce Commission orders, notices of hearings, etc., and six decisions of the United States Supreme Court and district courts. Many requests sent to the Washington office for information, etc., were filled, and the committee points out that this is a service which its Washington office is able to give association members. It also points out that all electric railway companies doing an interstate business and therefore required to appoint statutory agents in Washington, upon whom the commission may serve notices and other papers for such companies, can appoint as such an agent Mr. Henry, who has supervision of the Washington office. He will see that these notices are sent to the various companies and they need appoint no other statutory agent.

The report contains resolutions on the death of W. H. Maltbie, who had been retained as counsel in the preparation of the association's case on the subject of depreciation as well as of its presentation before the Interstate Commerce Commission. Mr. Nash has

taken over the work which Mr. Maltbie was doing for the sub-committee on depreciation, and all the data which have been assembled have been turned over to him for analysis.

The report was signed by E. J. Bechtel, R. R. Bradley, A. W. Brady, C. D. Cass, S. F. Curwen, J. H. Hanna, G. H. Harries, C. L. Henry, Frank Karr, T. O. Kennedy, H. A. Mitchell, L. R. Nash, Frank Silliman, Jr., D. W. Snyder, Jr., F. H. Wilson and Harry Reid, chairman.

## Rapid Transit

**C**OMPILATION of opinions and statements from authoritative sources as to methods of financing rapid transit, distribution of benefits, and advantages to be obtained from rapid tran-



G. A. RICHARDSON  
Chairman

sit in its various forms to suit different conditions constituted the work of this year's rapid transit committee. Data were compiled to indicate the amount of the toll charges to the passengers using existing structures and the possibilities of improvements in service or reduction in fare if the fixed charges were distributed according to benefits received. Other data show the relative costs of providing transportation capacity by subways or streets in the different cities.

Specific conclusions as to methods of financing or types of construction were not made, since local circumstances and requirements of law or precedent determine the detail of the plans that would be applicable or desirable.

Development of plans and proposals for rapid transit has received much attention in recent years, due to the great need for additional street space and for more freedom of communication. Projects for immediate construction are



being discussed in six cities, although actual work is in progress in but two.

Such questions as the desirability of concentration of the business district, the effect of rapid transit on a city plan or vice versa, the ultimate condition to be attained in transportation and in the city plan are vital when considering such very large, present and future expenditures involved.

The body of the report consists entirely of excerpts from and comments on rapid transit reports submitted in a number of cities. The report is divided in sections as follows: (1) Opinions and practices regarding financing; (2) effect of fixed charges on fare and service; (3) comparative costs and capacities of streets and rapid transit lines; (4) arguments for rapid transit and for special designs.

The report was signed by J. H. Alexander, H. L. Andrews, W. B. Bennett, Edward Dana, S. E. Emmons, B. J. Fallon, R. F. Kelker, Jr., E. J. McIlraith, W. S. Menden, F. R. Phillips, F. H. Shepard, C. E. Smith, J. B. Stewart, Jr., D. L. Turner, James Walker and G. A. Richardson, chairman.

### Publicity

**T**HE outstanding accomplishment of this section has been the compilation and issuance of a loose-leaf advertising book containing samples of more than 2,500 ads and posters dealing with the following subjects: Courtesy; Safety; Weekly Pass; Taxes—Paving; Parking; Motorists; Franchises; Inter-city; Buses; Merchandising Transportation.

This is the largest book of its kind ever issued by any industry, and represents effort extending over practically the entire year. It is believed that this book will be of invaluable assistance to advertising men by way of offering suggestions for copy.

An entire section of the book is devoted to a reproduction of advertising material prepared by the association, and still available through the advertising section, for the use of companies. This material, which can be had in poster or newspaper mat form, or both, covers a wide range of subjects, including safety, traffic congestion, and paving tax relief, three of the outstanding problems now before the industry. The size of the material, prices charged and all other details for ordering it are plainly set forth in the book.

The industry is particularly urged not only to make use of the material now on hand, but to send suggestions for other material to the advertising director. The committee will gladly consider any suggestions.

Two of the latest series shown in the association material section deal with advertising supplemental coach service and obtaining paving relief.

The coach advertising material comes in mat form for two-column newspaper ads. The text suggests using the company's coaches when it is impossible to use its street cars. Sales arguments for using the coaches for sightseeing, special parties, etc., are included.

The new paving poster series deals with instances in nine states where companies have been relieved of paving

charges. They not only give the facts about the relief, but also carry illustrations designed to impress the reader with the unfairness of imposing a paving charge now that the horse no longer is used in street car service. These posters come in two colors, red and black, in the regular window poster size, supplemented with suggested newspaper ads, also shown in the association section, and should be very helpful to any companies launching a paving tax relief campaign.

The book also contains an introduction by the advertising director embracing a general discussion of the best advertising methods. It deals extensively with the use of type and the utilization of newspaper space.

A survey, which was noted in a full-page story in the *Editor and Publisher*,



PAUL SHOUP  
Chairman

the outstanding newspaper man's magazine of the United States, showed that between \$4,500,000 and \$5,000,000 was spent this year for electric railway advertising.

The section also was active in aiding in the inauguration of the speakers service. The director prepared, printed and distributed seven standard addresses throughout the industry. These addresses dealt with the following subjects: Tax Situation; The A.B.C.'s of Operation; Municipal Ownership; State vs. Municipal Ownership; Co-ordinated Transportation; Transportation History; Future Transportation.

The addresses were prepared under the direction of Britton I. Budd, chairman of the speakers committee, and were compiled in such handy form that they might be delivered by the most inexperienced public speaker without difficulty. This new feature of the section's work will be continued through the coming year in co-operation with the speakers committee.

The managing director's office has furnished much material which has been helpful in obtaining publicity. Speeches and statements delivered by the managing director have been broadcast through the regular publicity channels. A standard size booklet has been adopted for the managing director's statements and it is available through the association at all times. Addresses by the president have been handled similarly.

The committee recommends that the advertising section, and the industry, during the next year do its utmost to

familiarize the public with and encourage the putting into effect of the fundamentals as set forth in the Advisory Council's report.

Subjects which should be stressed most are traffic congestion relief, tax adjustments and safety. Of these three, traffic congestion relief should be given particular attention in posters and advertising material.

The work of the speakers committee of the association is most important and should be given generous support by the advertising section. Additional addresses, along the lines of the seven prepared this year, should be prepared during the coming year and given the widest possible distribution among executives.

The industry as a whole should spend more money for advertising, and put more concrete sales talk, and not so much good will material, into its copy.

More attention should be paid to good art work by local companies. Good illustrations help sell rides. Poor ones do not. Be at least as careful in the selection of a man to do your advertising art work as you would in the selection of a man to decorate your cars.

The report was signed by F. L. Blanchard, J. S. Bleeker, V. H. Cartmell, H. O. Crews, Robert Dougan, P. H. Gadsden, L. E. Gould, J. P. Griffin, W. V. Hill, W. H. Hodge, H. M. Lytle, J. C. McQuiston, M. P. Rice, W. P. Strandborg, P. L. Thomson, R. G. Tucker, A. C. Watt, E. F. Wickwire, Barron Collier, vice-chairman, and Paul Shoup, chairman.

### Management and Operation

**N**OTEWORTHY work was done by the committee on management and operation during the past year. Its report, abstracted below at considerable length, indicates the character of its activities. In addition to the main report, each of the regional directors submitted a report giving in greater detail the accomplishments of the year in his territory. These reports indicate that interstate bus competition is a major problem, although the bus in general has been accepted as one of the common parts of the service of many railways. The majority of these regional reports contain a great deal of information gathered from personal visits to the various properties.

When the 1925 committee on management and operation presented its report, it was recommended that the work be discontinued during the present year. The association, discussing the report at the 1925 convention, decided that it would be desirable for the committee to continue its work as originally assigned, but devoting more time to the dissemination of information collected in previous years. That information was classified by last year's committee and was edited and published early in this year in the form of a "Handbook of Modern Methods and Practices."

The handbook is a bound volume of 319 pages, divided into twelve general subjects covering important phases of management and operation of transportation companies. It contains the best of the information collected during the past two years and its purpose, as



stated in the foreword, is to spread the gospel of modernization, efficiency and public accommodation to the electric railway industry. More than 900 copies of this book have been purchased by the industry.

In addition to the dissemination of information already collected by previous committees, the members made a special effort to acquaint not only executives but department heads regarding activities at association headquarters. A pamphlet was prepared, and distributed by committee members, describing these activities and showing how the association renders valuable assistance to member companies.

The committee co-operated with the committee on education and distributed in pamphlet form some very interesting information prepared by the latter committee. Executives of the properties visited were urged to inaugurate some form of employee educational work.

Members emphasized the value of the state public utility information bureaus, and urged executives of the properties visited to make greater use of those facilities. Information prepared by Mr. St. Clair, outlining the activities of these bureaus, was distributed.

The returns from the regional directors indicated that approximately 125 companies were visited during the year. Reports have been received from the committee members outlining various interesting practices in use on the properties visited and indicating that progress in modernization is being made. This detailed information has been forwarded to association headquarters, where it is being reviewed and classified. There does not appear to be a sufficient volume of data to justify at this time the publication of a supplement to the "Handbook of Modern Methods and Practices." The committee therefore has decided to hold the material at association headquarters, where valuable use can be made of it by the association's bureau of information and service. Should the work of this committee be continued at some future time, the information will be available for publication if found desirable.

#### IMPROVED CONDITIONS FOUND ON PROPERTIES VISITED

Although the competition from the private automobile continues to be a major problem of the industry, this year's survey indicates that electric railway companies have a keener ap-



R. F. CARBUTT  
Chairman

preciation of the methods which must be employed to regain the traffic which has been diverted from the public transportation systems. The motor bus, though still a competitor in some places, does not present the serious problem that it did in the past. This is due largely to the fact that electric railway companies are steadily making increased use of motor buses to supplement and round out their own service. A lack of proper regulation of interstate motor bus carriers has caused serious competition in some districts. This condition has been recognized by the Interstate Commerce Commission, with the result that a series of hearings have been held for the purpose of determining what legislation should be recommended for enactment by Congress to provide reasonable and adequate regulations.

Reports from the various districts indicate that those companies that have purchased new equipment recently are beginning to reap the benefits in increased patronage revenues and improved public relations. Many of the properties visited are contemplating the purchase of new rolling stock and are carefully studying the latest developments in car design with a view to making their equipment more attractive and

comfortable. On some properties where capital has not been available for the purchase of new equipment, extensive rehabilitation of old equipment has been undertaken, with the result that there is general improvement in the appearance of rolling stock throughout the industry.

Reports indicate that there is a keen realization on the part of managements that transportation can and must be sold, which is evidenced by the inauguration of commercial departments and the adoption of merchandising practices. Individual reports indicate the development of many merchandising methods which have been found effective in attracting riders and increasing revenues. Good service with modern, attractive equipment forms the basis for effective publicity and advertising to bring about better public relations. The reports made by members indicate that those companies which have modernized their methods and improved the service had not only reaped the benefits in better public relations, but had laid the foundation for increased business and adequate returns on the investment.

#### OPERATING ECONOMIES NOT NEGLECTED

On practically every property visited there was evidence of improved operating and maintenance methods designed to reduce operating costs. The use of modern labor-saving machinery is becoming more extensive in all departments and more attention is being paid to the development of efficient means for handling material and routing work through shops. Naturally, new equipment has fewer failures in service, so that the volume of maintenance work required on it is less than on the older equipment it replaced. The more modern cars also are better designed for accessibility of parts requiring inspection and maintenance. Power saving through the use of light-weight equipment, and labor-saving by the use of cars designed for operation by either one or two men is increasing throughout the industry.

All companies visited have been giving especial attention to accident prevention work, with the result that during the year there has been a substantial reduction in the number of electric railway accidents of all classes, even though vehicular traffic has greatly increased. This effective work is being accomplished through greater co-operation on the part of civic authorities.



J. K. PUNDERFORD  
First District



W. H. BOYCE  
Second District



SAMUEL RIDDLE  
Third District



L. M. BROWN  
Fourth District





D. W. SNYDER, JR.  
Fifth District



W. H. BURKE  
Sixth District



D. W. PONTIUS  
Seventh District



A. LE ROY HODGES  
New York State

Surveys in a number of cities which have been reported by members of the committee show that a great deal of traffic congestion is due to the unnecessary parking of automobiles on business streets. These reports indicate that more effort should be concentrated on the elimination of parking on main streets where street cars operate. In those cities where parking has been controlled, the cars have been speeded up materially, thus aiding the large mass of people using public transportation facilities to travel more quickly.

#### FREIGHT BUSINESS INCREASING

Reports from the central territory record substantial progress in building up freight business through improved schedules, better equipment and intensive solicitation. In some instances pick-up and delivery systems are being experimented with, but it is yet too early to report definite results from this form of service. Plans looking toward further development of freight business are under consideration by practically all interurban companies in the central territory and it is believed that this business will be the means of materially improving their earnings.

The foregoing outlines briefly the activities of the committee and the observations of the regional directors, which are given in greater detail following the report. The spirit of optimism which was noted last year is even stronger this year. Many companies find revenues increasing and although the percentage increase is small in most cases, it is, nevertheless, gratifying. The committee believes that the original purposes for which it was organized have largely been accomplished and that, therefore, no useful purpose will be served by continuing the committee activities during the coming year. It may be, however, that after a suspension of this work for a year or two it will be found advisable to resume it.

The committee, therefore, recommends that for the coming year, at least, its activities be suspended. It stated that it believes that much good comes from the interchange of views on managerial and operating problems and, therefore, recommends and urges the practice of sending certain employees, especially the department heads, on frequent trips to various railroads, that they may observe the methods used on other properties and



D. E. BLAIR  
Canada

discuss their problems with others engaged in the same branch of the business.

The report was signed by Regional Directors J. K. Punderford, W. H. Boyce, Samuel Riddle, L. M. Brown, D. W. Snyder, Jr., W. H. Burke, D. W. Pontius, A. L. Hodges, D. E. Blair, and Members A. J. Boardman, J. B. Crawford, E. J. Dickson, F. D. Gordon, H. H. Norris, L. D. Pellissier, Alfred Sweeney, H. R. Whitney, C. F. Crane, S. E. Emmons, D. J. Locke, A. C. Spurr, J. E. Wayne, R. J. Lockwood, G. I. Plummer, G. B. Treat, V. W. Berry, F. L. Butler, Stuart Cooper, E. W. Ford, J. P. Ingle, G. H. Harris, W. V. Hill, W. H. Lines, E. H. Maggard, S. E. Mason, E. A. West, L. J. DeLamar, J. F. Johnson, W. S. Rodger, R. R. Smith, H. E. Gough, R. R. Hadsell, J. N. Jones, R. E. McDougall, H. C. Stanton, Judson Zimmer, J. S. Hyatt, R. H. Pinkley, C. J. Griffith, W. W. Holden, S. B. Irelan, F. D. Burke, D. W. Harvey, W. G. Murrin, J. E. Watkins, Claude L. Van Auken, Morris Buck, G. C. Hecker, secretary; R. B. Stearns, vice-chairman, and R. F. Carbutt, chairman.

#### Education

**A**CCOMPLISHMENTS of the committee on education differ somewhat from other committee reports in that the principal work done by the committee has been presented to the industry from time to time during the year. This committee is not only the central clearing house for all educational activities, but it has promulgated definite plans, many of which have been put

into practice by many companies during the course of the year.

The report of this committee, therefore, is more a review or summary of accomplishments than the development of any specific problems and the presentation of the conclusions reached.

In its report the committee states that the outstanding feature of the work has been the working co-operation with the committee on management and operation in promulgating educational programs. Specifically, the work of the committee has been built around the foremen's conference, this feature of utility education having been extensively developed on the Boston Elevated.

Two demonstrations have been given during the year. These were actual conferences conducted by foremen, under the guidance and leadership of H. H. Norris, educational adviser of the Boston Elevated. The first conference was given last fall in Boston before the New England Railroad Club, meeting coincidentally with the committee on education. The second demonstration was given in Indianapolis at the meeting of the committee on management and operation in January of this year. It is also planned to have a demonstration at the Cleveland convention. The idea back of these demonstrations is to carry specifically the idea of how to conduct such a conference and at the same time to indicate the value that can be derived from such meetings.

During the year the committee has prepared and issued four booklets on "Industrial Education on Electric Railroads," "Starting an Educational Program," "How to Conduct Foreman Conferences," "How to Conduct Group Conferences." The text of each of these booklets is given in the appendices Nos. 1 to 4 inclusive of the committee report.

The report further states that the committee has concentrated this year on general plans for a series of conferences but not on the details of one type of conference.

Among the courses on the subject of economics has been one prepared by the Pennsylvania State College which was extensively used by properties in Pennsylvania. While the committee is not prepared to recommend the adoption of this or any other course on economics, it considers this fact of sufficient importance to include it in its report as a matter of information to



the industry. The Pennsylvania State College has also in preparation a course for trainmen, the text of which is to be edited by Daniel Durie. It is expected that copies will soon be in readiness.

The report concludes by stating that the best results will be secured on any property by careful selection of the type or types of educational work to be done and by attempting only as



EDWARD DANA  
Chairman

much at a time as promises to be useful. The report further recommends that the committee be continued next year as there is a growing interest in foreman conferences, interest in which can be maintained, to the end that the results may be capitalized for the benefit of the industry.

The report was signed by H. O. Allison, G. B. Anderson, V. W. Berry, H. Bigelow, J. A. Dewhurst, B. W. Duncan, W. J. Edmunds, J. A. Greenland, C. J. Griffith, J. S. Hyatt, M. B. Lambert, R. J. Lockwood, M. McCants, H. H. Norris, A. B. Paterson, Samuel Riddle, A. J. Rowland, J. V. Sullivan, S. L. Vaughan, E. M. Walker and Edward Dana, chairman.

### Insurance

THE work this year was confined to the collection of the experience of the industry and a study of it. Both members and non-members were reached, and replies were received from companies representing two-thirds of the capitalization invested in electric railways in the country. In the table on fire insurance experience in 1925 and 1924, included in the report, the companies are divided into two classes. Class I includes those companies which allocate their insurance according to the type of property covered; Class II, those companies reporting only total insurance carried. Only 17 of the companies reporting carried insurance in Mutuals during 1925 and 1924. In 1925 the amount of insurance so carried by these seventeen companies was \$31,535,366, the premium \$32,132; the rate per \$100, \$0.102; the amount recovered \$4,856; and the ratio of amount recovered to premium 15.11 per cent.

### MOTOR BUS INSURANCE

Of the 304 companies replying to the questionnaire, 114 operated motor buses in 1925, and of these 74 gave information about the bus insurance carried by them. All but three carried fire insurance and 53 carried liability insurance in addition. Property damage was carried by 28 and collision insurance by five.

The amount of the fire insurance carried by the 61 companies reporting both amount and premium was \$6,435,871 and their average rate was 60.5 cents per \$100. In 1924 the average rate for the 33 companies reporting both amount and premium was 66.4 cents per \$100. As the rate paid on the other classes of insurance was on all sorts of bases, such as a flat rate per unit of equipment, rate per mile and percentage of gross earnings, the average rate could not fairly be computed.

Sixty-four companies reported carrying group insurance to cover accidents, deaths, etc., of their employees, and the report gives details of each case. Under the head "Unusual Insurance," the following were reported as in force by individual companies: (1) Use and occupancy insurance on carhouses and shops; (2) riot, strike and civil commotion insurance; (3) insurance on mer-



P. E. WILSON  
Chairman

chandise, freight and baggage when on cars, platforms or company's right-of-way; (4) catastrophe accident insurance. Brief descriptions of unusual fire prevention methods are also given in the report.

In conclusion, the committee points out that the newness of the bus has prevented standardization of its insurance treatment, but the opinion is expressed that the rates for fire insurance for buses, on the average, are excessive.

The report was signed by O. H. Bernd, G. H. Bourne, C. E. Brown, N. H. Daniels, F. M. Hamilton, A. D. Knox, J. H. Moran, F. J. Petura, B. L. Tomes and P. E. Wilson, chairman.

THE officials of the A.E.R.A. and the editors of the journals devoted to the upbuilding of the industry are in an infinitely better position to analyze and demonstrate facts regarding our problems than any small group of men whose activities are localized in a comparatively insignificant part of the whole industry. It seems to be incontrovertible that the answer to the fundamentals underlying our local problems must come from men whose vision embraces the whole field. We as local men should supply them freely with whatever pertinent information we may have for the purpose of bringing out in a scientific way all of the available facts regarding cause and effect.

—THOMAS FITZGERALD.



# Engineering Committees Make Progress

Through Numerous Vital Reports, Knowledge Is Advanced in  
the Departments of Way and Structures  
Equipment and Power

**A**S IN the past, the work of the Engineering Association during this last year is represented largely by the work of its committees. The reports this year are of great interest, and the discussions at the convention centered around them. Not all the technical problems being studied by the various committees have yet been solved, but conclusive evidence of progress may be seen. Good reason exists for hoping that continued work along the lines now being followed will result in important accomplishments. The reports abstracted below are not only statements of what the committees have done, but in many cases they are permanent contributions to the fund of literature on these subjects.

## Way and Structures

**F**UNCTIONING this year for the first time under a new plan, the way and structures committee held no meetings, but discussed by correspondence all matters referred to it and made its decisions by letter ballot. It was not thought necessary to include in the general report of this committee the recommendations embodied in the reports of the special committees. Exceptions were made in the case of those matters not handled directly under the auspices of the A.E.R.A.

The way and structures committee approved the reports of the Division of Simplified Practice, Department of Commerce, on the conference of shovel manufacturers limiting the number of grades to three instead of four. In the case of the report under the same auspices on steel spiral rods, the conclusion was reached that three of the

tively adopted as American standard as the result of the work of the A.E.S.C. sectional committee.

Progress reports only were submitted to the way and structures committee by special committee No. 2 on standardization of switch tongues and hard centers for special trackwork, special committee No. 3 on welded rail joints and special committee No. 6 on arc welding processes and repairs to rails and manganese steel. Special committee No. 7 on substitute ties was discontinued by action of the executive committee on Jan. 27, 1926, and therefore made no report.

The report was signed by C. A. Alden, E. B. Entwisle, W. G. Hulbert, E. J. McIlraith, J. R. McKay, H. F. Merker, C. A. Smith, A. T. Spencer, H. M. Steward, W. W. Wysor, E. M. T. Ryder and H. H. George, chairman.

## Steam and Electric Railway Crossings

**A**DESIGN for manganese steel insert crossings for angles below 45 deg. to 30 deg. inclusive was recommended for adoption by way and structures special committee No. 5 on design of steam and electric railway crossings. With the addition of this design to those previously adopted, the series of designs will comprise the following:

Solid manganese steel crossings, angles 90 deg. to 60 deg. inclusive.

Solid manganese steel crossings, angles below 60 deg. to 40 deg. inclusive.

Bolted rail crossings, angles 90 deg. to 50 deg. inclusive.

Bolted rail crossings, angles below 50 deg. to 30 deg. inclusive.

Manganese steel insert crossings, angles below 45 deg. to 30 deg. inclusive.

The committee concurs in the recommendation of the A.R.E.A. track committee that crossings of steam railroad over electric railway below 30 deg. of angle, particularly for narrow treads and shallow flanges of the electric railway car equipment, should be avoided. It further shares in the general opinion that the insert type of crossings does not lend itself well for angles above 45



C. R. HARTE  
President Engineering Association

deg. and would not present any practical or economic advantages over the solid type in the higher angles.

In the opinion of the committee, after the adoption of the design herewith submitted, the series of recommended designs for crossings of steam railroad over electric railway will adequately cover the requirements under various conditions of traffic where electric railways cross steam railroad tracks laid with standard tee-rail. Recommendation is made that no further designs for other types be considered at this time and that the committee be discharged.

The report was signed by J. U. Bragg, James Budd, E. B. Entwisle, M. W. Johnston, E. P. Roundey, and V. Angerer, \*chairman.

## Buildings for Maintenance, Storage and Operation of Buses

**W**HILE way and structures special committee No. 9 was assigned two subjects—(1) design of buildings for maintenance, storage and operation of buses, and (2) design of joint railway and bus terminals—attention was concentrated largely on the first of these.

In garage design the salient points which the committee felt should be emphasized are:

1. Washing facilities.
2. Overhaul and repair pit facilities.
3. Lighting, heating and ventilating systems.
4. Fire insurance and protection requirements.

\*Deceased May 5, 1926.



H. H. GEORGE  
Chairman

seven sizes now used as cores for reinforced cement columns could be eliminated.

Specifications for railroad cross and switch ties were approved as recommended at a joint conference with the American Engineering Standards Committee and the American Railway Engineering Association. Three designs for 7-in. plain girder rail were tenta-



It is desirable that there be a decentralization of washing facilities. It should be possible to wash and clean a bus at whatever point in the garage the same may be stored. Practically all recently constructed garages embody this feature, retaining at the same time the central washing plant.

Pits are used almost universally except where prohibited by city or state laws. In such places, racks or hoists serve in their place. Overhaul and repair pits should be heated, lighted, ventilated and drained so as to assure comfort and safety to workmen. It is desirable that pits be communicating when arranged in batteries. This is possible through connecting tunnels or by open end pits. An excellent illustration of an open end pit is to be found in the February, 1926, issue of *Bus Transportation*, page 102, the report states.

Any design should afford a maximum amount of light. Artificial illumi-

nering large areas are bound to rise to uneconomical limits due to increased fire hazards. The committee therefore feels that it should at least sound a note of warning to the industry to the end that floor areas shall be kept as small as possible and still permit efficient operation. In any event large areas should be subdivided with walls separating various operations, such as forge, inspection, battery, tire vulcanizing, etc. Gas pockets should be well drained and, as far as possible, fire hazard reduced to a minimum.

Buses, because of the fine interior finish, draperies and upholstery, gasoline, oils and greases, create serious fire risks. It is very probable, the report states, that the National Fire Protective Association will formulate rules and regulations governing points in the design of bus storage, bus terminals or bus operating houses and in this event there will be surcharges on insurance rates for buildings designed contrary to such requirements.

Sprinkler systems are not designed for large areas and have in certain instances actually failed to work at a point of immediate need. Ten sprinkler heads delivering twenty or more gallons per minute should handle an ordinary fire. When more than ten heads have been called into play, it has been a serious fire, in practically every instance with a high loss. Records of the National Fire Protective Association substantiate this fact. Sprinkler systems will not materially lessen insurance rates for very large areas.

Storage of gasoline as required by code — 30 ft. from any structure and underground—offers no serious fire hazard and from an insurance standpoint is not of such grave importance. In many instances city and state ordinances control the quantity which may be stored, also the manner of control, whether remote or otherwise.

As an addenda to the report of the committee is given a report made by W. W. Wise of a detailed inspection, from the standpoint of fire risks and prevention, of the bus garage of the Fifth Avenue Coach Company, New York.

Comprehensive descriptions are given of the Fifteenth and Cumberland Streets garage of the Philadelphia Rural Transit Company, the 41st and Haverford Avenue garage of the same company, the Union Square garage of the Boston Elevated Railway, and the Waukegan garage of the Chicago, North Shore & Milwaukee Railroad.

Concerning the design of joint railway and bus terminals, the committee does not find any new developments save that by the Philadelphia Rapid Transit Company of parking areas for motorists. At the 69th Street and Bridge Street terminals and also at 31st and Market Street this company has provided parking space where motorists may park their cars and use the suburban and elevated systems as a rapid means of transit. The fee charged for parking includes a round trip fare to the city.

Recommendations made by the committee are:

(1) That the study of the design of buildings for maintenance, storage and

operation of buses be continued; (2) that a study be made of the effect of design upon fire insurance rates in co-operation with other interested organizations, and (3) that the study of design of joint railway and bus terminals be assigned to a separate committee.

The report was signed by A. J. Blackburn, G. H. Halderman, L. F. Parlette, W. W. Wise, Judson Zimmer, J. R. McKay, chairman.

### Surface Hardening of Rails

PROGRESS of this committee in 1926 was confined to the tracing of wear tests and the mileage and production of treated rail. The committee's information is that in American equipment for treating rails by the Sandberg sorbitic process has been installed at only one mill. Because of the time taken to apply the treatment to each rail, it is difficult to arrange rollings



J. R. McKay  
Chairman

nation is costly. Side windows should extend to the floor as far as possible to light the under side of buses. Lights in pits should be equipped with vapor-proof globes.

Next to light in importance of design is ventilation. Gas and carbon monoxide vapors affect efficiency of workers. However, their removal because of fire hazard is equally important. While large side windows with ventilators assist in their removal, there should be forced draft and roof exhaust sufficiently large to care for ventilation aside from any windows inasmuch as in inclement weather such means are rendered useless. It is also very essential to provide pit ventilation.

There are many types of heating and ventilating systems. The type most in use for heating is the low pressure vacuum system with direct radiation. Unit type heaters are also being more and more widely used. Hot air systems in which heat is distributed through underground and overhead ducts by a blower fan are also in use. There may be some objection to these systems due to the fact that air, which is recirculated, may be gas charged and thus dangerous from the standpoint of health as well as fire risk.

The tendency in design has been to increase floor areas until there are now in existence garages of almost gigantic proportions. While it is true that lack of floor space is costly, it is equally true that insurance rates cov-



A. T. SPENCER  
Chairman

so as to fill large contracts. Shipments of sorbitic rail from this plant in 1923 were 4,279 tons, in 1924, 4,968 tons, and in 1925, 2,772 tons.

The committee believes that the decrease in tonnage shipped in 1925 has been due to the difficulty in arranging rollings rather than to a loss of confidence on the part of the industry in the wearing qualities of the treated rail.

No additional mileage of track has been treated on this continent with the *In-situ* process since the applications on the system of the Toronto Transportation Commission in Toronto in 1922 and 1923. During the past year it has been found that the scalings referred to in previous reports have damaged the rail in certain sections to such an extent that it has been replaced after some three years of service. These defects have in practically all cases occurred where high-pressure blowpipes were used in heating the rail and where the rail itself was well worn after eight to ten years service. As noted in 1924 and 1925 reports the lower-pressure blowpipes were used chiefly on rail which had less than one year of service, and it is on these sections that comparative wear data will eventually be most reliable.

Information received from foreign systems shows the mileage treated or untreated up to February, 1926, to include original orders of 74.48 miles single track and repeat orders of 220.36



miles single track, a total of 294.84 miles. The committee was also informed that the Ministry of Transport in England has looked favorably upon the *In-situ* treatment to the extent that it is granting authority to tramways to raise loans for this purpose.

The following table has been prepared from information submitted, showing comparative wear of treated and untreated rail in England:

System	Period of Treatment		Cars Carried	Wear of Rails, In.	
	Yr.	Mo.		Untreated	Treated
West Bromwick...	2	3	Unknown	0.118	0.038
Birkenhead....	4	8	379,800	0.081	0.042
Blackpool.....	2	4	220,700	0.042	0.019
South Shields..	2	11	382,500	0.050	0.022
Wallasey.....	3	3	828,600	0.044	0.025
Wallasey.....	2	9	242,550	0.042	0.021
Swansea.....	11		162,000	0.031	0.015
Met. Electric...	3	1	145,660	0.034	0.020
Met. Electric...	3	1	289,615	0.049	0.024
Paris.....	3	6	1,050,000	0.105	0.504

Rail profiles taken in Toronto by the committee were inconclusive but indicate that the hardened rail has shown considerably less wear than the unhardened rail under similar conditions of traffic. The committee is convinced that the Toronto experiment should run over a longer period before a definite pronouncement should be made regarding the merits of the *In-situ* process under American conditions.

The recommendations of the committee were that this subject be discontinued for one year pending development of further data.

The report was signed by C. L. Hawkins, B. P. Legare and A. T. Spencer, chairman.

### Wood Preservation

**E**CONOMIES attained by the use of treated timber were discussed at considerable length in the report of the committee on wood preservation. It is said that in view of the overwhelming evidence from the steam railroads and larger communication companies it is nothing short of gross negligence on the part of electric railways not to fall in line to effect economies which they badly need, and to do their share in connection with national conservation of timber.

Illustrated descriptions with tables of characteristic applications of wood preservation are grouped under the captions of Ties, Poles, Bridges and Culverts, Piling, Building Material, Floors and Paving, Posts, Cars, and Miscellaneous Uses.

Information showing the extent of the use of treated timber on electric railway properties is given in a number of tables compiled from replies to a short questionnaire sent to about 140 properties. About 60 per cent of the properties replied, the greater number of which showed treated timber used in various quantities. Their figures show unquestionably that greater life is being received as the result of treating, but the period of use is too short to make definite comparisons. From a small number of replies of a selected list of properties, the committee feels that the criticism is sustained that the electric railways as a whole are not doing their part in effecting economies along the line of wood preservation.

A few outstanding examples of tim-

ber treatment are mentioned. In 1923 the steam railroads used 210 treated ties per mile, whereas the electric railways used only 13. The life of poles can be increased from two to three times by treating. During the unusual sleet storm of December, 1924, covering a strip about 100 miles wide from



A. P. WAY  
Chairman

southern Michigan to Texas about 60,000 untreated poles went down, whereas less than 100 creosoted yellow pine poles were lost. When treated, posts will last two to four times as long as untreated, and less durable timber can be used. Parts of cars that decay in two to eight years can have their life tripled when treated.

Cost per tie per year, including pavement replacement, on electric railways was found by a questionnaire to be as follows:

	Untreated	Treated
Bituminous macadam paving...	\$0.59	\$0.57
Asphalt paving.....	1.08	0.90
Granite block paving.....	1.64	1.38
Open track.....	0.37	0.28

Savings on bridge timber were found to be \$0.49 per year per thousand board-feet. On 30-ft. poles the saving per pole per year is \$0.06, and on cross-arms \$0.02 per year.

Material in the 1923 edition of the Engineering Manual under the subject of Wood Preservation, although revised and added to by annual supplements, was compiled a number of years ago, and in a number of instances does not apply today. It has been thought for some time that the specifications should be regrouped in a more logical order for easy reference and revised in a number of cases. The committee submitted recommendations for changes which it is felt will meet such need.

The report discusses at considerable length the development of methods of treating poles in place. Ways to increase the life of timber by means other than the application of preservatives were studied and various suggestions to this end made in the report.

Study of forms for keeping continuous records of treated timber has not been brought to the status which the committee set out to accomplish, principally on account of being unable to collect sufficient forms in use by operating companies upon which worthwhile recommendations could be made. Two forms of record cards are submitted for information, one for ties and

structural timber and the other for poles. On one side, information of kind and method is to be filled out by the persons doing the treating and then returned to the purchaser. On the other side space is provided to show date and location of installation and periodical service record. A plan for marking poles is also submitted.

Wood preservatives other than creosote and allied products and zinc chloride were considered thoroughly last year and are reported on very briefly this year, because no new preservatives have been put on the market. Mention is made of the fact that some companies use water soluble salts with sodium fluoride base for structural timber, where creosote would be objectionable. At least one company is using poles so treated in city districts where poles are to be painted. Such preservatives have not, however, been used in this country long enough to determine definite results.

Four appendices are submitted with the report. Of these, three give results of various installations of treated timber, while the fourth is a glossary of principal terms pertaining to the subject of wood preservation.

The report was signed by E. H. Berry, M. J. Curtin, T. H. David, J. L. Fritsch, W. H. Fulweiler, E. F. Hartman, W. L. Harwood, L. P. Scanlan, C. A. Smith, W. F. Graves, and A. P. Way, chairman.

### Rail Corrugation

**O**RGANIZATION of its work so that a volume of important data covering an extended period of time might be accumulated has been the principal accomplishment of the committee during the past year. At present, nineteen electric railways are gathering data on forms which were recommended by the committee last year. Each of these companies has purchased an instrument which for want of a better name is called the "Corrugraph." With these instruments they are now securing graphs of corrugation on selected sections of track.

Dimensions of some of the corrugation inspected by the committee on its trip during the summer of 1925 are presented in an appendix to the report. The wave lengths listed are irregular, ranging from 1½ to 10 in., lengths between 3 and 4 in. being the most common.

In the belief that the nature and magnitude of the forces or loads to which the rail is subjected have much to do with corrugation, a sub-committee on vibration was appointed. Preliminary tests made on track at Pittsburgh indicate a promising field for future work. More extended vibration tests and studies will be made during the coming year. Wave lengths for several different car speeds and frequencies of vibration have been computed and are shown in another appendix.

Obviously there is a close relation between track structure, vibrations and noise. Some tests of track noises made at Toledo by H. S. Williams of the committee on reduction of noise in car operation were witnessed by representatives of the corrugation committee.



These tests showed that the noise and therefore the magnitude and duration of track vibration may be radically different with different types of track structure. More specific data relative to these tests are presented in the report of the committee on noise reduction.

Figures of a number of hardness tests are presented in an appendix. Economic data relative to corrugation have been included in the same place.

Some consideration has been given by the committee to corrugation in other forms of engineering structures, particularly streets and highways. In these structures corrugation phenomena have come prominently to the attention of engineers only since the use of the automobile has become widespread. As with the electric railway, a radical change in the type of rolling stock brought with it troubles that were previously unknown. Because highway structures are ordinarily not so complex as railway track structures, and because the corrugations are larger and

sion, and second, whenever the clay bond in a gravel road is sufficient in quantity and has sufficient moisture to give the aggregate plasticity, series of corrugation develop from the squeezing of the plastic mass. While rail steel and gravel mixed with clay binder are not similar, it is noted that the principle involved in the second cause given for gravel road corrugation has some bearing in the case of rail corrugation.

In conclusion, the report says that the whole problem of rail corrugation causes and elimination is a complex and difficult one and the committee believes that it will be necessary to spend some years in accumulating data and in study of different types of track and rolling stock construction before it will be possible to draw a definite conclusion as to the best manner of minimizing this trouble. In addition to the work of collecting data which is now under way, the committee believes that the work on rail, track and equipment vibration tests and studies should be carried on in an earnest and systematic manner, and that laboratory studies, including chemical, physical and photo-micrographic tests should be made on selected specimens of corrugated and non-corrugated sections of rail.

The report is signed by E. B. Entwistle, E. L. Lockman, R. B. Fehr, T. J. Lavan, C. R. Kinnear, H. Jackson Tippet, C. H. Clark, A. M. Hardini, C. L. Van Auken, H. Fort Flowers, J. Ormondroyd, H. S. Williams, D. D. Ewing and W. W. Wysox, chairman.

### Equipment

EXISTING standards and specifications referring to equipment which are included in the Manual and in the 1924 and 1925 Supplements were reviewed and revisions and additions were recommended in the following items:

*E1-25—Design of Brake Shoes, Brake Shoe Heads, Brake Shoe Keys and Gages.*

*E2-25—Standard Journal Boxes and Contained Parts.*

*E12-25—Standard Gages for Journal Bearings and Wedges.*

*E3-25—Design of Axles for Electric Railway Motors.*

*E211-24—Rules for Inspection of Car Axles.*

*E103-25—Specifications for Case-Hardened Forged Steel Gears.*

*E104-25—Specifications for Quenched and Tempered Forged Carbon Steel Gears.*

*E105-23—Specifications for Case-Hardened Forged Steel Pinions.*

*E106-23—Specifications for Quenched and Tempered Forged Carbon Steel Pinions.*

*E208-24—Miscellaneous Method and Practice on Lubrication of Car Equipment.*

A progress report was presented on foundation and hand-brake rigging which included air-brake installation. Portions of the miscellaneous methods and practice designated as E212-25 were arranged as a recommended standard.

A progress report was included on car painting which included a study of cars painted by various methods. A large number of cars were inspected by the committee during the year, par-

ticularly at Detroit and Pittsburgh, and notes were made of the condition of cars after they had been in service for a period of years. The report gives conclusions reached by the committee from these studies, which were that all undercoating should be of the same general color as the finished coat in order that scratches or scrapes will not appear unsightly. This also makes the finishing coat cover more easily. All metal on cars when cleaned off for the application of new paint should have all rust removed so that new material will take a firm hold. Sand blasting was recommended as the best method of cleaning of material for the application of paint.

The color and varnish system was recommended for application to wooden interior finish of cars using spar varnish for window sash, window sills, arm rests and seats. Enamel and cellulose lacquer were recommended for application to the steel interior finish of cars such as seat framing, stanchions and



W. W. WYSOR  
Chairman

develop very rapidly, the difficulties in the way of studying them are not so great as in the case of steel rails.

Corrugation in highway structures seems to be limited largely to gravel roads and asphalt pavements, although it is sometimes found on tar-bound stone roads. In asphalt paving the displacement of the surface is ordinarily assumed to be due to shoving. This phenomenon was familiar to engineers before the advent of the automobile. To minimize shoving in modern pavements the tendency seems to be to use the harder grades of asphalt and a relatively lower percentage of asphalt than was used some years ago.

The bureau of public roads of the United States Department of Agriculture has made an extensive study over hundreds of miles of highways in many states. From its report it appears that corrugations do not form if the traffic is only 200 to 300 automobiles per day. With traffic above 400 automobiles per day, corrugations may give serious trouble, and where the rate of increase of traffic is well known, officials can predict almost to a day when corrugation will begin to develop.

Two methods of formation are described; first by the kick back of surface materials arising from the spin of one or both of the rear wheels of an automobile as they descend after a bounce over some obstacle or depres-



P. V. C. SEE  
Chairman

wainscoting. The enamel system was recommended particularly for application to ceilings and head linings.

The color and varnish system and enamel system were recommended for application to the body of wooden or wood and steel cars. The use of acid cleaners was considered inadvisable.

The three principal systems which include color and varnish, enamel and cellulose lacquer were recommended for application to the body of steel cars and a mixture of lead and oil or a long oil enamel was recommended for application to canvas roofs.

In connection with the study of motor coach design and maintenance methods, this year's committee was unable to hold any joint meetings with the Society of Automotive Engineers as that society had no meeting of its standing committee. A study was made of various maintenance inspection methods and a sample inspection system was included in the report. The committee recommended that the subject of developing a standard bus design be discontinued for the present, but that a committee work in conjunction with the standards committee of the Society of Automotive Engineers to take up for standardization of design, location or operation such items as operation of gear shift levers, location of hand brake, question as to whether hand



brake should be pushed or pulled to operation, distance of foot pedals from driver's seat, location of starter buttons, relative position of spark and gas levers and the location of horn buttons.

The subject of gearing was again studied this year, but the work was limited to consideration of tooth forms and to providing limit of wear gages. These were given in the appendix of the report and the committee recommended that the gages for determining the scrapping point of gears and pinions be adopted as a recommended standard.

The committee took up with the boiler code committee of the American Society of Mechanical Engineers certain points in the boiler code which were felt to conflict with best electric railway practice. The secretary of the boiler code committee advised that certain matters would be considered for revision. These include a lifting device for safety valves and the requirement of daily testing of safety valves.

A study of the standardization of car equipment and car construction with special reference to appearance, comfort and convenience of passengers, together with a study of car lighting, formed a large part of the report. The principal item was that of easy-riding cars. To produce this requires smooth track, properly designed springs, freedom of nosing and body jars. The importance of freedom from vibration may be appreciated when attention is called to tests conducted by the Bureau of Standards, which proved that vibration of an amplitude of 1,000th in. might be very uncomfortable to a passenger.

There is a tendency on the part of equipment engineers to specify a seat height of 17 in. and 17½ in., instead of the old standard of 19 in. This lower seat may have been influenced by the low automobile seats, but it is generally admitted that the lower seat is the more comfortable.

Seat spacing is also an item that requires attention, it being assumed that every one agrees that the maximum spacing possible will produce the greatest comfort. This spacing usually must conform to the body post centers, which on the standard car is 29½ in. If thick seat backs and backs with greater incline than customary are used this will require greater allowance for seat spacing to produce equal comfort. It is possible that in this case as great a seat spacing as 31 in. will be necessary.

Under the classification of providing convenience for passengers perhaps the most important feature is car speed. The committee felt that no other single feature offers such great possibilities for popularization of service as this one.

Much has been accomplished to speed up the handling of passengers by the use of the door-operating treadle, particularly in one-man cars. This has permitted the use of a rear door which tends to keep the riders from crowding about the forward door. Also where conditions are favorable this door may be opened by a street fare-taker and passengers loaded through it.

Much confusion exists due to the use of front, center and rear-entrance cars. A standardization would correct this,

though it is difficult of accomplishment.

Car signs should be given much study. Clearly, the signs should be of high visibility both day and night, and they should be sufficiently explicit to serve as a good guide. The route number is a very valuable adjunct to the sign system if properly worked out and is recommended for city service.

The committee suggests that the car painting scheme should be changed sufficiently to be noticeable to the public at least once every three years. The exterior of steel cars which are painted in light colors can be improved by the use of countersunk rivet heads.

Car interiors may be bettered as to appearance by the removal of unsightly bell cords where used on older cars and the substitution of electric signals.

The committee made a careful study of car lighting and conducted some tests, results of which were given in the appendix of the report.

The report was signed by W. S. Adams, W. C. Bolt, A. L. Broe, W. W. Brown, R. S. Bull, A. T. Clark, R. W. Cost, M. R. Hanna, J. M. Hipple, J. H. Lucas, W. H. McAloney, Joseph C. McCune, J. S. McWhirter, A. D. McWhorter, E. S. Sawtelle, R. B. Smyth, C. W. Squier, J. P. Staples, H. S. Williams, J. M. Yount, Daniel Durie, sponsor, and P. V. C. See, chairman.

### American Engineering Standards

AT PRESENT, 32 projects, several of great importance, have been undertaken, according to the report of representatives on the main committee of the American Engineering Standards Committee. Revision of the National Electrical Safety Code is now under way by letter ballot. If accepted this should end the series of arguments and experience hearings on various often conflicting state rules on overhead construction. An electrical advisory committee has been organized. This has great promise, the report states, as a board of arbitration to adjust differences of opinion in the electrical field. The American Electric Railway Association has recognized the value of the work by taking out a second voting membership, R. H. Dalgleish filling this position. The association has been honored by having the main committee vice-chairmanship.

The report was signed by C. R. Harte and R. H. Dalgleish, representatives.

### Heavy Electric Traction

OUTSTANDING in the work of this year's committee on heavy electric traction was the study of track and third rail bonds for heavy traction work. This is a new subject so far as this association is concerned. Four subjects were selected by the sub-committee for consideration, namely, a tabulation of present practice, the effect of heat of welded bonds on track rails, development of a standard basis for measurement of bond resistance and preparation of data covering results of tests of current-carrying capacity of bonds.

Information regarding current practice with track rail bonds was obtained from 25 roads, of which nineteen were electrified steam railroads and six

were heavy electric lines. Of the 29 installations included nineteen were mechanically applied and the remaining ten heat applied. On third rail bonds thirteen companies, seven of which were electrified steam roads and six heavy electric lines, showed fifteen installations. Eight were mechanically applied and seven heat applied.

The mechanically applied bond is stated to be the oldest type in general use and hence the most widely adopted. It is used in sizes ranging from No. 0 A.W.G. to 500,000 circ.mil, and varying in length from 9 in. to 53.25 in. The pin-expanded terminal predominates, probably because this type can be installed and maintained very easily



H. F. BROWN  
Chairman

under traffic and without requiring the use of cumbersome or expensive tool equipment. The advantages claimed for the mechanically applied bond are summed up as follows: Easy to install; wide range in choice of length of bond and flexibility of design to suit rail joint; low labor cost of application and replacement; only small and inexpensive tool equipment required for installation. Its disadvantages are: High first cost; necessity of being designed to fit the rail joints, length being fixed by splice bar and bolt hole spacing; larger capacity than otherwise necessary when long lengths are required; uncertainty of securing and maintaining uniform and low contact resistance.

Heat applied bonds, particularly the welded type, have reached a successful stage of their development only within the past few years, with the consequence that this type is not as yet in sufficiently wide use under heavy traffic conditions to permit drawing definite conclusions as to its comparative merits. The sizes range from No. 0 A.W.G. to 250,000 circ.mil, while their length varies from 7 in. to 15.5 in. Gas weld bonds are being used in 70 per cent of the installations. Advantages claimed for the welded type of bonds are: Low resistance due to its short length and character of contact; use of small capacity bonds, all being 250,000 circ.mil or less; easily inspected; uniformity of design; permanence of contact and consequently permanence of contact resistance providing the weld holds. Its disadvantages are: Skilled operators are required for its installation; special and more or less cumbersome tool equip-



ment is necessary; bond is exposed to mechanical injury and theft; limited to rail head application.

Comparatively little opportunity exists for standardization of third rail bonding because of the widely differing types of third rail construction.

Effects of heat in welding in changing the structure of rail were considered and references are given to earlier reports. It is hoped to continue the study during the next year.

The development of a standard basis for measurement of rail bond resistance was given attention. A comprehensive set of tables and charts giving resistances of rails with and without bonds is included. Field testing methods, by means of which the actual bond resistance may be obtained as a check on the calculations, or for purposes of ascertaining the excellence of bonds in service, are detailed.

Other subjects considered by the committee were the bibliography of heavy electric traction, branch line electrification and self-propelled cars, articulated train operation and revision of data on electric locomotives, multiple-unit cars and trains. Diagrams of recent articulated trains are given, and a comprehensive tabulation of electric locomotive and multiple-unit train data are included.

The report was signed by A. H. Armstrong, H. W. Cope, A. H. Daus, J. C. Davidson, J. H. Davis, J. V. B. Duer, J. T. Hamilton, E. C. Johnson, Norman Litchfield, J. O. Madison, M. W. Manz, L. S. Wells, A. H. Wollon, C. R. Harte, sponsor; Morris Buck, secretary; J. M. Bosenbury, vice-chairman, and H. F. Brown, chairman.

### Noise Reduction

WORK of the committee on reduction of noise in car operation during this year was devoted largely to scientific study and analysis of some of the principal noise producing elements. The report states that it is necessary in order properly to study noises, to set up accurate comparative sound values, and to have a calibrated ear capable of placing a definite value upon sound, one which will register the same value on successive tests, and in which the personal or human equation is entirely eliminated. Acting upon the recommendations of the previous committee, the executive committee made an appropriation of \$500 for the purpose of securing such an apparatus.

The practical use of the apparatus is to be able to demonstrate convincingly the relative value of changes made in elements of equipment to reduce the amount of sound generated. For example, it is desired to reduce the inherent noise in a car gear and the suggestion is made to bolt to the gear, pads of various materials to produce this result. In such a case an instrument of this character will tell the value of the proposed change in practice and will allow experimenters to arrive at the best material, shape and method of attachment. Such procedure is vastly better than trying to accomplish the same thing by the sense of hearing, because it has been shown that a man cannot always be depended upon

to place the same value on noise; that fatigue, mental and physical condition, etc., influence his judgment and make it untrustworthy.

After considerable study, a device was decided upon which uses a type of transmitter similar to the familiar loud-speaker of radio reception connected through radio amplification equipment to a microammeter. Thus the noise gives a deflection of the needle



H. S. WILLIAMS  
Chairman

which is almost directly proportional to the intensity of the sound. A device of this character was not available in the market as a unit, so it was necessary to have the apparatus constructed especially to meet the requirements encountered.

The sound measuring mechanism employed by the committee represents only the first step in the contemplated noise study and attention is directed to the fact that the measurements give the proportionate amplitude of vibration of the noises analyzed. Items of pitch and effect upon the human ear are reserved for future consideration.

One of the chief sources of noise in car operation is that produced by the gearing. Attention was called in last year's report to the possibilities of noise reduction through higher standards of maintenance by keeping bearings well fitted, and renewing gearing before the teeth are worn to the breaking point and thus decreasing noise due to back-lash. It was one of the aims of the present investigation to prove this point by test, to place a definite comparative noise value upon the standard spur, long and short addendum spur, helical, and standard spur gear with the so-called wisdom tooth pinion and also to determine the value of silencing pads bolted to the gear. Gear noise in cars is combined with a multitude of other noises, one masking the other, so that it is difficult to measure the sound from the gearing on a car under operating conditions. However, it is entirely feasible to set up car gearing in such a way as to eliminate all sound except that produced by the gears and in this manner gearing may be subjected to experimentation and not only its condition as to noise determined but the value of proposed sound improvement evaluated. This committee with the co-operation of the Department of Street Railways of Detroit had the necessary mechanism set up to conduct

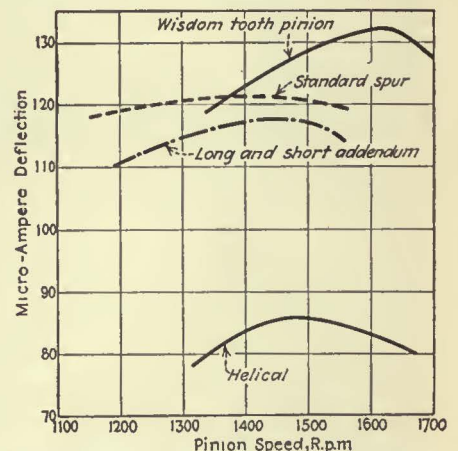
tests on gears along the lines mentioned.

The first set of tests was run with the object of determining the comparative quietness of standard spur, long and short addendum spur, helical and wisdom tooth gears. Heretofore, this has been a vigorously debated question, but opinions have always been based upon personal opinion, which is never convincing. The committee felt that it would render a real service to the industry if it could settle this question. The necessary equipment is at the committee's command and it only remains to conduct check tests to dispose of this question finally. However, the care exercised in selection of gearing and running of tests was sufficiently painstaking and the results of the tests seem so conclusive that the committee feels warranted in reporting the results of their first experiment.

Briefly summarized, the helical gear shows up best in respect to quietness, followed in order by the long and short addendum spur, the standard spur tooth and the wisdom or drop tooth gearing. Accompanying curves show the results of several tests of gears of the various types taken under as nearly identical conditions as possible.

In order to arrive at as nearly accurate results as possible, gearing of the same manufacture and treatment were measured. These were furnished through the courtesy of the Cincinnati Tool Steel Gear & Pinion Company. Care was exercised to secure gears with accurately cut teeth and with minimum warp and eccentricity.

In the first set of curves shown the micro-ampere readings are proportional to the volume of sound; that is, the higher the micro-ampere reading, the greater the sound. As the gearing was of the same number of teeth in each case, the pitch of the sound at each



Results of Tests on Gears of Various Types to Determine Relative Quietness—Gears Not Lubricated—Gears Operated on Pitch Line—14.5 Hp. Transmitted

speed was approximately the same. Consequently the micro-ampere deflection is a true comparison.

Attention is called to the character of the curves shown in that instead of increasing uniformly as the speed throughout the range of the tests they drop off at the higher speeds. This inconsistency may be due to the higher



frequency vibrations being out of the efficient range of the amplification apparatus. At the time of submission of this report, calibration of the apparatus had not been made, so a definite reason could not be assigned.

#### GEARS TESTED WITH SILENCING PADS

Tests were run to determine the value of resilient pads bolted to the gears. The results of these experiments proved beyond doubt the value of a silencing pad. To complete this phase of the work it will be necessary to try out various sizes, shapes and compositions of the cushioning pads.

To show the possibilities of reduction of noise by applying a cushioning medium to the rail in track construction, a series of tests were made by the use of the apparatus previously mentioned. Through the courtesy of P. J. O'Neill, railway engineer Community Traction Company, Toledo, Ohio, means were made available to conduct the test. Two sections of adjoining track were selected in which the structure is nearly identical except that a cushion about the rail is used in one case and not in the other. The tests were conducted between the hours of 1 and 2 a.m. to insure freedom from interfering street noise and to permit the special car which was used to move as desired. In making the tests the car was run at a uniform speed and coasted past the sound pick-up device so as to eliminate as far as possible the noise from the gearing. The results of several tests on each section of track show that the cushioned track is approximately 25 per cent quieter than the same track without the cushion.

#### ECONOMIC SIDE OF NOISE REDUCTION

The necessity for noise reduction extends further than a question of an unpleasant sensation which it is desirable to eliminate in order to make street car rides more salable and to reduce the complaints of residents, although that is the chief consideration which actuates the present movement. There is the economic side which is very important, for noise is occasioned by vibration of the physical structure and that vibration means a destructive force which ultimately will cause a breakdown.

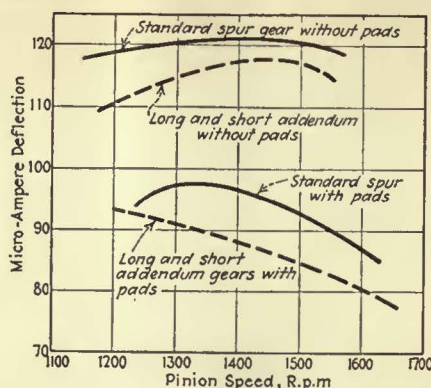
The committee found that the sources of noise in the order of their importance are:

1. Wheel and track vibration caused by wheel impact.
2. Gearing and motor noise due to gear tooth impact.
3. Noise of loose parts which are secondary vibrations due principally to the transmission of wheel impact vibration.

The remedies recommended in principle are:

1. Higher standards of maintenance.
2. Improved design, including cushioning and reduction of unsprung weight.

Much has been written relative to higher maintenance standards and the committee emphasizes this and the importance of discarding gearing with badly worn teeth. The equipment committee this year has recommended a gear discard gage which will do much



Noise Comparison of Standard Spur and Long and Short Addendum Gears with and without Cushlon Pads

to help this condition. Bearings should be tightly fitted and renewed before the wear becomes great. Individual fitting of axle bearings is strongly recommended.

In design, attention is called to the principle that any loose part or any part not rigidly supported will vibrate so it becomes necessary to cushion these parts, or brace them rigidly or to isolate the elemental parts by cushions. In some cases vibration may be reduced by so changing parts that their natural vibration periods will be materially different from the frequencies set up by wheel impact or gear vibration. It is possible also in the case of elliptic springs to break up synchronous vibration by throwing the spring seat off the center of the spring, thus making unequal ends.

Brake shoes are prolific sources of noise and there is great need for improvement of this item.

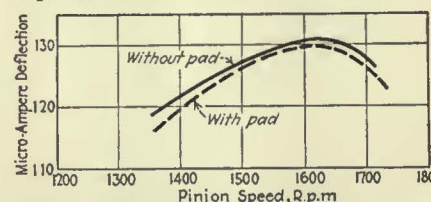
Where possible, gear ratios may be so designed as to give pleasing vibrations rather than the reverse. For example the following gear and pinion ratios combine to form harmonious musical pitches:

- Ratio 5:6 produces a minor third.
- Ratio 4:5 produces a major third.
- Ratio 2:3 produces a perfect fifth.
- Ratio 2:1 produces an octave.

Gear cases may become sounding boards due to their large flat surfaces unless means are used to overcome this tendency.

In conclusion the report states that to conquer the noise condition in car operation or at least to bring it to the irreducible minimum, further study, research and analysis will be necessary.

It may be argued that if a noise cannot be reduced sufficiently to detect it or to determine its value by ear its elimination should not be attempted and that scientific study such as is being attempted by this committee is impractical.



Noise Comparison of Wisdom-Tooth Pinion and Standard Spur Gear with and without Pads

Such a contention cannot be well supported, because the ear is too unreliable as a sound measurer, and the ear method is susceptible to too much personal element and is inconclusive. Then, too, this noise problem is composed of so many small elements whose summation makes a disagreeable condition. Neglecting bad maintenance noises which are apparent and need no expert diagnosis, the problem is to cut the sound of all the possible noise-producing elements—a little here, and a little there—and the aggregate will amount to a real accomplishment. The problem is comparable to that of reduction of weight in car design. If it is desired to reduce the weight of a car, say, 5,000 lb. it is patent that this weight cannot be taken out of any one item, but if a little is taken from the wheels and axles, a little from the motors, etc., the sum total will mean a substantial weight reduction. Therefore the committee feels that it is on the right track and that measurement, analysis and experimentation will bring success.

The report is signed by W. S. Adams, H. E. Bean, E. H. Berry, C. Bethel, W. W. Brown, L. J. Davis, M. Guynes, F. L. Hinman, G. H. McKelway and H. S. Williams, chairman.

#### Wheel-Flange Gages

THE duty of providing necessary wheel gages had previously been assigned to the equipment committee with instructions to co-operate with the way committee. At present the association has standards for a wheel mounting gage and limit of wear gages for the steel wheel contours designated as A, B, C and D. There is no wheel checking gage for these flange contours, however, and no gages have been provided for the two American Railway Association's contours, which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which are shown at present on page 499 of the Manual.

#### DESIGNATING LETTERS ON DRAWINGS DESIRABLE

In making up the drawings of various gages for wheel flange contours the committee found it of particular convenience to have designating letters for each of the wheel contours. At present the letters A, B, C and D, together with various numerical suffixes, are used to designate the association's standard tread and flange contours for steel and chilled iron wheels. The two A.R.A. wheel contours which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which appear on page 499 of the Manual have no designating letters.

To provide designating letters for these two latter contours the committee recommended that the letters E and F be assigned to them; that contour E be used for the contour of chilled iron wheels as standardized by the American Railway Association in 1909 and as adopted by the American Electric Railway Engineering Association in 1923, and that letter F be used to designate the contour for steel and steel-tired wheels as standardized by



the American Railway Association in 1920 and as adopted by the American Electric Railway Engineering Association in 1923.

NEW GAGE FOR WHEEL MOUNTING

At present the association has a standard wheel mounting gage for steel and chilled iron wheels which appears on page 122 of the 1925 supplement to the Engineering Manual. This design of gage is for mounting wheels with contours A-3, A-3½, B-2½, B-3, C-2½, C-3, D-2½ and D-3 only. There is no wheel mounting gage for the two A.R.A. contours which the committee designated as contours E and F. To provide a wheel mounting gage for these contours the committee recommended the adoption of a new gage. This gage is the same as the standard A.R.A. mounting and check gage as shown in section B, page 42 of the

tion as adopted in 1916 and revised in 1923 and 1925, and which appear in the 1925 supplement to the Engineering Manual on pages 118 and 119 have the following additions to the captions for Figs. 1 and 2 which appear on page 118:

"Gages as shown are for use with rolled steel wheels only. The same general dimensions apply to gages for use with cast-iron wheels except that the part which projects down the back of the wheel should be cut off in line with the tread face."

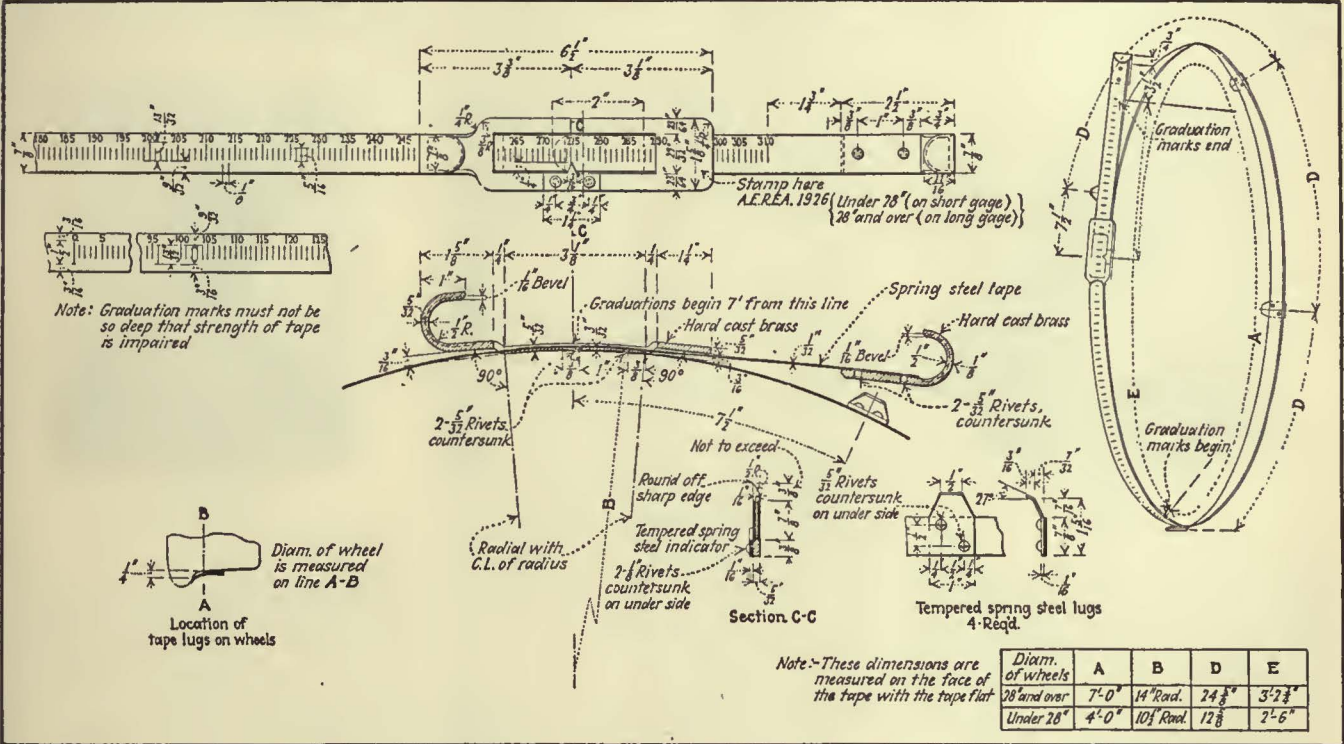
The committee also considered it desirable to provide limit of wear gages for determining high and low flanges and such a gage was presented.

The committee considered it desirable to provide standard tapes for measuring the circumference of wheels. The American Railway Association has such a tape which was adopted in

Co-operation with Department of Commerce

STANDARDIZATION of sizes and simplification of specifications for many articles used by electric railways were considered by the committee appointed to co-operate with the United States Department of Commerce. Approval was given to the recommendation for simplification of grinding wheels. A change was approved in the sizes of tacks so that their lengths should vary by ¼ in. instead of by ⅛ in. The subject of simplification of glass sidewalks and roof lights was carefully considered and it developed that the present practice of manufacturing this material is in accordance with the recommendation of the Department of Commerce.

Specifications covering iron and steel scrap for use by blast furnaces, steel



Wheel Circumference Measuring Tape for Contours A, B, C and D

A.R.A. Manual (Mechanical Section) except that the gage is provided with a center point similar to that used in the A.E.R.E.A. standard wheel mounting gage.

This gage is also to be used as a check gage for wheel contours E and F.

The 1925 equipment committee attempted to develop a wheel checking gage that would apply to all wheel contours, but it was found necessary to refer the proposed design back for further revision. The committee this year, therefore, considered this subject and decided to resubmit the gage proposed by the 1925 equipment committee and which appears on page 291 of the 1925 Engineering Proceedings, with all references to contours E and F omitted and with the thickness of the material specified as 3/8-in. spring steel.

The committee considered the subject of limit of wear gages and recommended that the present standard limit of wear gages for the American Electric Railway Engineering Association

1893 and modified in 1919. This tape was recommended to be used for the two A.R.A. wheel contours which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which appear on page 499 of the Manual.

The committee also considered it desirable to provide a new standard circumference measuring tape for steel and chilled iron wheels with contours A, B, C and D. Investigation showed that such a tape has been in use for a number of years by the various steel companies who manufacture rolled steel wheels to these contours.

The committee recommended that the wheel circumference measuring tape for standard tread and flange contours A, B, C and D of steel and chilled iron wheels, as shown in Fig. 2, be adopted as a recommended standard.

The report was signed by W. S. Adams, C. A. Alden, W. C. Bolt, J. H. Haylow, Hugh Savage and C. W. Squier, chairman.

plants, foundries, etc., were approved. At the same time, the contract for the purchase of scrap was submitted. The committee felt that this was a contract prepared by the purchasers of the material and did not indorse it.

Other subjects considered by the committee included: simplification of self-opening die heads, new billet steel bars for reinforcing concrete, simplification of sizes of steel reinforcing bars, advisability of showing weights of castings on blue prints, simplification of carbon brushes, simplification of wrought iron and wrought steel, pipe, valves and fittings and simplification of shovels, spades and scoops.

Attention is called to the work now being done by the Department of Commerce in the Simplified Practice Division. The association is represented at the conferences and is endeavoring to take care of the interest of its members. In all cases, the recommendations are approved for one year, and at the end of the year changes may be made



in the recommendation if there is sufficient demand. If members of the association find difficulty in securing the proper material due to the recommendations of the Department of Commerce, notification should be sent to the executive secretary of the association in order that the committee may be able to correct any difficulties. It is possible that in the case of simplification the practice might be carried too far for satisfactory results, and in such cases, the committee would be glad to take up the matter and have the objectionable features eliminated.

The report is signed by R. H. Dalgleish, chairman.

### Engineering Symbols

**A**LL of the material which had been prepared and partially completed by the committee of the preceding year was reviewed by this year's committee. To keep the cost of the report within reasonable limits, as well as to concen-



H. W. CODDING  
Chairman

trate the efforts of the committee on types of symbols most generally used by electric railways the work was limited to the following classifications: Topographical, electrical equipment of buildings, miscellaneous electrical, railroad, and railroad signal symbols. Drawings were made and cuts prepared of all the symbols which the committee felt should be included in the report.

During the year the subject of symbols for engineering and mathematical work has received active attention from a number of different organizations. With this in mind, the committee felt that it should confine its activities to those subjects most intimately connected with electric railways in order to complete a report that would include symbols most essential for electric railways to have considered in any general standardization work. Symbols concerning architecture, heating and ventilating, mathematics and mechanics were considered but were omitted, as other organizations are better equipped to formulate them. Some additional power distribution symbols were considered, but as there was no general agreement in the symbols studied they have been omitted.

The chairman of the committee, as a representative of the American Electric Railway Engineering Association, attended a conference called by the

American Engineering Standards Committee on drawings and drafting room practices and also attended the organization meeting of the sub-committee on electrotechnical symbols and abbreviations, including radio, of the A.E.S.C. sectional committee on scientific and engineering symbols and abbreviations. This sectional committee has now undertaken the standardization of symbols, but as the work of the sectional committee will, by virtue of its organization, move slowly, the committee decided to complete its report.

The symbols submitted are classified as follows: Topographical, Figs. 1, 2 and 3; electrical equipment of buildings, Figs. 4 and 5; miscellaneous electrical, Figs. 6, 7 and 8; railroad, Figs. 9 to 18 inclusive; railroad signals, Figs. 19 to 31 inclusive.

Where possible, topographical symbols should be printed in the colors given with the symbols.

The symbols for batteries and instruments included with railroad signals (Figs. 19 to 28 inclusive and Fig. 31) are of the same general form as shown under miscellaneous electrical symbols, but vary in minor details in order to keep them the same as those adopted by the signal section of the American Railway Association. The symbols for transformers, reactors and resistors (Figs. 29 and 30), however, are identical in both groups submitted. These differ from the corresponding symbols of the signal section of the American Railway Association, which conflict with those generally used in most branches of the electrical industry.

Since a sectional committee of the American Engineering Standards Committee has now undertaken general standardization of symbols and as their work will be connected closely with the attempt of the International Electrotechnical Commission to prepare international standards, the symbols submitted in this report will be of assistance in having symbols acceptable to the electric railway industry considered by the sectional committee. In the period intervening before the A.E.S.C. can adopt standards, these symbols should be of particular value to electric railways. The committee recommended (1) that the symbols submitted in this report be adopted as a recommended standard; (2) that the committee be continued to co-operate with the sectional committee of the American Engineering Standards Committee.

The report was signed by M. M. Johnston, J. D. Kent, G. H. McKelway, W. F. Graves, sponsor; C. W. Squier, vice-chairman, and H. W. Coddington, chairman.

### Review of Engineering Manual

**W**ORK of way and structures special committee No. 1 on review of buildings and structures and way sections of the Engineering Manual consisted largely of carrying forward the recommendations of last year's committee and studying various suggestions submitted. A few minor changes in the Engineering Manual were recommended. The report was signed by T. H. David, D. J. Graham, J. S. Mahan, D. H. Walker and W. R. Dunham, Jr., chairman.

### Unification of Car Design

**T**HE question of car design was considered in a joint session with the committee on essential features of modern cars, appointed by the president of the American Electric Railway Association. Designs were prepared covering proposed city type, double-end and single-end cars; also, double-end and single-end interurban cars. After detailed consideration, the committee found that the designs of the city type of car corresponded with the recommendations made in previous reports. Consequently, it approved the proposed designs. The question of limiting stresses to be used in the design of cars of these types was considered and the following is recommended:

1. The car body should be designed to carry under service conditions the maximum live load for which it is intended in addition to its own dead weight.

2. The direct stress in the body bolsters, platform arms, and side frame girder, due to maximum static load,



H. H. ADAMS  
Chairman

must not exceed 12,000 lb. per square inch of either tension or compression.

3. The combined stress in the body bolster, due to carried load plus the stress due to the tractive pull of the truck and application of the brakes, must not exceed 16,000 lb.

4. All connections should be designed for the maximum load to which the member connected may be subject. The secondary stresses in any members caused by eccentric loads should be combined with the direct stresses in such members. The fiber stresses (except in body bolster, referred to in paragraph 3) may be taken at 20 per cent greater than those given in paragraph 2, but the direct stresses, considered alone, must not exceed the 12,000 lb. above stated.

5. The report of the committee on unification of car design of 1922, Fig. 2, gives the typical stress analysis of a car body. Proper provision must be made in the side girder to prevent buckling over the bolster.

6. The permissible stresses above given are predicted on steel having the characteristics called for in A.S.T.M. specification No. A-11-24, Structural Steel for Cars. Where other materials are used, they should bear the same proportion to the ultimate strength of material used.

It was recommended that the commit-



tee be continued to act in the same capacity for another year.

The report was signed by C. A. Alden, J. A. Brooks, L. J. Davis, H. F. Flowers, C. Gordon, J. A. Greig, J. W. Hulme, A. P. Jenks, G. L. Kippenberger, J. Lindall, Victor Willoughby, W. F. Graves, sponsor, and H. H. Adams, chairman.

Stores Accounting

**E**NLARGEMENT of the present classification of materials and supplies to include a classification of bus material was recommended in the joint report of the committee on purchases and stores of the Engineering Association and the committee on stores and accounting of the Accountants' Association.

It was pointed out that whereas certain companies operating buses were carrying stocks of considerable size, while other companies were able to operate without any stock, being able to

ing and stores departments, recommending that report be made on uniform method of distributing materials by supply trains or trucks.

3. Recommend that a uniform practice of testing or inspecting material by testing or inspecting materials on receipt or at factory be adopted.

The report was signed by the following:

For the Engineering Association—J. Y. Bayliss, A. S. Duncan, J. Fleming, B. W. Forkner, C. A. Harris, A. E. Hatton, F. A. Jordan, A. A. Ordway, C. W. Stocks, C. Thorburn, W. J. Walker, R. H. Dalglish, sponsor; F. L. Wheaton, secretary, and P. F. McCall, co-chairman.

For the Accountants' Association—G. H. Caskey, W. S. Stackpole, F. E. Wilkin and R. A. Weston, co-chairman.

Power Generation and Conversion

**E**XISTING Manual sections were gone over to determine revisions desirable. In the section containing specifications and contract for the purchase of fuel the committee recommended further study. Since the prime movers committee of the National Electric Light Association has not been active on this subject during the past year the committee was unable to make desired progress.

In regard to specification for high-tensile strength bolts for use on superheated steam pipe lines, which was submitted at the 1925 convention, the committee found that a proposed specification on this subject, as drawn by the American Society for Testing Materials, was accepted as a recommended standard by the American Electric Railway Association. This specification has since undergone a slight revision and has been accepted by the American Society for Testing Materials as a recommended standard, subject to the outcome of a letter ballot. The committee recommended that no further action be taken regarding the acceptance of this specification at this time.

The application of various types of equipment to automatic substations and the subject of remote supervisory control have been rather thoroughly covered in past reports of the association. Efforts of this year's committee were concentrated upon the compilation of data pertaining to operating phases of this type of station, including consideration of the cost of operation and maintenance. For the purpose of collecting information questionnaires were sent out. Replies were received from 44 companies which have a total capacity of 745,955 kw. of conversion equipment, practically all of which is in the form of synchronous converters. The information received was analyzed and tabulated to show the distribution of equipment as divided between manually operated, full automatic and semi-automatic apparatus, also a classification of converters according to service. A number of questions were included relative to the frequency of inspection, type of men used, methods devoted to inspection and maintenance cost. Further tables were compiled to show inspection practice used and com-

parative cost of inspection and maintenance labor.

The committee attempted to determine the extent to which supervisory control or some form of distant indication is being used. Companies operating approximately one-third of all automatic equipment employ supervisory control either for all or part of their equipment. Seven companies rely on lamp signals near the tracks and four companies on lamp signals in adjacent manual stations. Nineteen companies provide no special indication of any sort in case of a lockout, depending presumably upon reports of low voltage.

Regardless of the method used, it appears from the report that it is advisable to provide some means for prompt notification in case of station trouble. A station may lock out during a time of light load and if voltage indications alone are depended upon the trouble will not be remedied and



P. F. MCCALL  
Chairman



LAWRENCE D. BALE  
Chairman

make satisfactory arrangements with local dealers for immediate deliveries of required parts, the proposed classification was not only well constructed but, in the opinion of the committee, covered present and future needs.

Methods for handling freight and express bills were recommended following a detailed study of this subject made by means of questionnaires sent to 25 representative electric railways. The subject of co-ordination of materials and supplies with the operating budget was also considered by the committee.

Regarding the disposal of unused inactive material, the committee had prepared a questionnaire dealing with the desirability of establishing a clearing house for such material and containing a number of alternative propositions for carrying out this plan. These questionnaires had been submitted to company members and it was hoped to have the replies tabulated and analyzed in time for presentation at the October meeting.

The following subjects were recommended for consideration by the committee on purchases and stores for 1927:

1. Study and make recommendations regarding the disposal of unused inactive material.
2. Make a further study of routine methods to be followed in the purchas-

service may be seriously affected when the heavy load comes on. If supervisory control is not warranted some simple and inexpensive means can usually be found for providing definite indications at the time of the trouble.

A study was made of the application, characteristics and present status of the mercury arc power rectifier for electric railway service. The report included a discussion of the characteristics and application of the mercury arc power rectifier compared with the synchronous converter. The matters of efficiency, power factor, regulation, operation, maintenance, building requirements and cost were included. Due to the limited experience with the rectifier in this country most of the data obtained were from foreign sources.

Difficulty was experienced by the committee in comparing the application or the rectifier with the synchronous converter on account of the inherently different characteristics of the two types of equipment, with particular reference to sustained overload capacities. This was partially overcome by limiting the considerations as to applications to two general classes of systems, as referred to in the report, having widely different characteristics regarding momentary and average load demands.

The availability of American standards of rating for the rectifier com-



pared with those of the present A.I.E.E. standards for the synchronous converter is, without question, of great importance, particularly at this time in view of the advent of the rectifier in the American field. The committee considers that steps should be taken to bring the necessity of American standards for the mercury arc power rectifier to the attention of the proper engineering standards body, and to that end it recommended that the study be continued.

A large part of the report related to information obtained through a study of ventilation and reduction of noise in the operation of automatic substations. The information tabulated brings to a conclusion a series of studies which has extended over a period of four years; these studies were reported on in 1924 and 1925. The activities of the committee for the past two years have been centered on obtaining data in regard to the subject of ventilation. This was collected from tests made by the committee on representative automatic substations in actual operation.

The conclusions of the committee were that heat dissipation by means other than ventilation is of sufficient magnitude to affect the dissipation required of the ventilating air. For an ordinary substation building having 13 in. exposed brick walls, 6 in. concrete floor and 4 in. cinder concrete roof with weatherproofing it averages  $\frac{1}{2}$  watt per square foot per degree Centigrade difference in indoor and outdoor temperatures, but considerably less for thicker walls and for soundproof building construction. Wind and rain will temporarily raise dissipation by means other than ventilation in isolated buildings.

Rotating machines have well-defined suction and discharge areas. Air is drawn into the revolving element along its shaft, overbearings, commutators, collector rings, etc., and is discharged from the largest cylindrical surface, through or over the edge of the stationary element or both, the performance being similar to that of a fan with concentric housing and sides removed. The intensity and extent of these suction and discharge areas are such that the machine will circulate a sufficient amount of air to dissipate the losses at full-rated load with from 4 deg. C. to 7 deg. C. rise, 7.2 deg. F. to 12.6 deg. F., corresponding to from 475 to 270 c.f.m. It follows that if recirculation of the heated air is prevented no overheating will result either of the machines themselves or of the room air.

Recirculation can be almost entirely eliminated and natural or self-ventilation relied upon to dissipate the losses in installations of greater concentration in kilowatts of rated capacity per square foot of floor area or cubic foot of building space that now appears to be general practice for automatic substations in railway service.

The following arrangement of inlets and outlets appears to be quite effective in supplying proper ventilation for automatic substations where it is permissible to locate openings of sufficient areas in the walls of the structure at will. This arrangement is also

suggested as a means of preventing recirculation of ventilating air to the greatest extent:

(a) Locating inlets just above the floor level, but within the effective range of the machine suction, not more than 5 ft. from the ends of the machine. All inlets should be on same elevation.

(b) Connecting inlets to floor openings at the pedestal ends of the machines. These openings can in most cases be extended a short distance inside the base casting.

(c) Providing hoods over the floor openings at the ends of the machines to guide the air directly into the suction areas.

For outgoing heated air:

(m) Confining the downward heated air discharge to an inner pit, extended on that side of the machine toward which the lower part of the armature revolves, to a floor opening or outdoors.

(n) Locating outlets in the pressure zone of the station so as to take advantage of the pressure created by the machine in ejecting the air.

(o) Providing a volute housing over the discharge area to collect the heated air and ducts to conduct it outdoors.

(p) Aggregate air inlet areas should at least equal the aggregate outlet areas and preferably should be  $1\frac{1}{2}$  to two times as large.

Means of forced ventilation need only be resorted to in cases where additional resistance against the natural flow of air is introduced, such as air filters or washers, soundproof building construction, or as insurance against shutdowns from overheated apparatus other than rotating machines.

Where insurance against overheating arising from unfavorable size and location of building or the restriction of free air flow by adjacent buildings, as well as liability to prolong overload during extremely hot weather, forced ventilation has been employed with effective results.

So far as effective cooling of the machines is concerned exhausters or blowers appear to serve the purpose equally well, but the room temperature becomes more comfortable if the heated air is exhausted than if the cool air is forced in, presumably because in the latter case more cool air bypasses the machine directly to the outlet and a greater quantity of cooler air is discharged to the atmosphere, leaving the room warm. With the exhauster an equal quantity of warmer air can be discharged, leaving the room at a more comfortable temperature.

As in the case of natural ventilation, it is essential for effective cooling that recirculation be avoided and the same means can be employed to avoid it.

The report was signed by C. E. Bennett, C. A. Butcher, H. W. Coddling, H. A. Kidder, N. R. Love, F. W. Peters, G. W. Saathoff, L. J. Turley, G. I. Wright, E. H. Scofield, sponsor; W. E. Bryan, vice-chairman, and L. D. Bale, chairman.

### Power Transmission and Distribution

EXISTING Manual sections were reviewed and recommendations for revisions were made in certain ones. Others cover specifications which are

now being actively studied by sectional committees of the American Engineering Standards Committee, and while there is some need for revision of existing Manual sections, it was recommended that these be withheld until the A.E.S.C. has taken final action.

The committee prepared specifications for a number of items of material used in catenary construction and recommended that these be included in Manual Section "D." These included pole bracket arm assembly, messenger insulator pin, messenger insulator, catenary hangers, cross-span steady, pole-bracket steady, catenary messenger anchor clamp, trolley splicer, flexible pullover, feeder connector, catenary trolley sectional insulators and trolley frog and crossovers. It was recommended that the specifications covering material for catenary construction as presented be adopted as a supplement to the specifications for overhead line material for 750-volt direct-current suspension, serial designation D102-21.

The committee carried on studies of trolley wire breaks and submitted an analysis of results obtained by companies which have co-operated in these tests. The recommendation of the committee was that these studies be carried on by next year's committee.

Arrangements have been made with a number of railway companies to install test sections of trolley wire in order to determine the relation of life of trolley wire to the number of twists it will stand under test. These tests will require several years to complete and next year's committee should keep in touch with them.

A number of minor modifications were made in the specification for hard-drawn copper trolley wire. This specification was originally prepared in conjunction with the American Society for Testing Materials. The committee recommended that the work in conjunction with the American Society for Testing Materials be continued in an endeavor to bring the high-strength, low-conductivity trolley wire specifications of the two associations into complete conformity.

No work was done by this year's committee in regard to inductive coordination, except to keep in touch with the American committee on this subject. The recommendations of the committee were that this subject be continued next year and that the American Electric Railway Engineering Association be ready to furnish information that the American committee may desire.

The committee continued its study of interference to radio reception caused by the presence of electric railway facilities. Tests and experiments were made further to determine the nature of the interference to radio reception and the various sources from which such interference may emanate. The report included a series of tests conducted at Lafayette, Ind., and another made in New York City. From the tests and study made by the committee regarding this subject, it appeared that trolley car operation may be responsible for interference to radio reception for a distance up to 200 ft. or even more from the trolley cars,



wires and feeders. The distance at which interference may become a detriment to radio reception depends to quite an extent upon the receiving set used and the location of the set with respect to broadcasting stations. Thus, sets which are being operated in cities where there are a number of good-sized broadcasting stations and where the sets are being operated at a rather low degree of amplification may not be bothered by trolley car interference where such sets are located 50 ft. or more from trolley lines.

On the other hand, sets which are being operated at a considerable distance from broadcasting stations and where the degree of amplification is large in order to get loud speaker reception from a distant station may experience serious interference where such sets are located 200 ft. or possibly more from a trolley line.

Interference originating on a trolley line may be transferred to parallel lines, such as light and power lines, telephone or telegraph lines, and be distributed by them, thereby causing interference to receivers located at remote points from the trolley line. Trolley lines may also pick up interference originating at sources foreign to the trolley line and distribute it, thereby causing interference for which the trolley lines may be blamed, but for which they cannot, in any way, be held responsible.

Considerable unnecessary interference may be eliminated on trolley lines by the simple expedient of locating the sources and correcting the trouble. Much of the interference is of such a nature that it probably cannot be eliminated, although it may, to some extent, be lessened by methods as suggested in the report.

A review was made of specifications for 600-volt direct-current overhead trolley suspension and it was found that certain changes were desirable. These were included in the committee's report with the recommendation that actual revision of the existing Manual section be deferred until the American Engineering Standards Committee has completed its work on the national safety code in connection with line material specifications. After this has been accomplished it was the opinion of the committee that the specifications might require further revision.

A code of principles to be followed in drawing up joint pole use agreement was submitted. This includes sections on advantages of joint use of poles, disadvantages of joint ownership of poles, principles of joint use, and practices of joint use. The report also included an appendix with suggestions for desirable changes in the specifications for direct suspension trolley construction, the idea being to incorporate these for use of future committees.

The report was signed by J. W. Allen, S. H. Anderson, W. H. Bassett, M. W. Cooke, J. H. Drew, D. D. Ewing, C. L. Hancock, C. J. Hixson, A. J. Klatte, H. S. Murphy, J. F. Neild, W. J. Quinn, W. Schaaque, A. Schlesinger, George F. Wennagel, M. B. Rosevear, sponsor; F. McVittie, vice-chairman, and Charles H. Jones, chairman.

Economics of Automatic Substations

THERE were two points developed in connection with automatic substation application during the past two years which influenced the nature of this report so that it might be of practical value to the railway engineer.

First, the economies and other advantages of the automatic substation have been proved in practice in a sufficiently large number of cases to make the desirability of this type station a fact accepted by nearly all railway engineers. During the past two years almost all new substations (approximately 80 per cent) installed for railway companies have been automatic. When manual substation equipment was installed there was usually some peculiar condition that made its use seem desirable.

Second, it is advisable to make the study immediately on the somewhat laborious but more accurate "cut and try" method. The principal difference between the "cut and try" and the "analytical" methods is that in the former the layout of the changes in the distribution system must be prepared before estimating the costs. But it has been found the feeder layout has a larger influence on the economics of the problem than had been expected. Also the study of the proposed feeder layout is very helpful in arriving at the final conclusion.

It seems now to be the general consensus of opinion that the automatic railway substation should be used for new installations in practically all cases and in many cases manual stations should be replaced by this type. Its advantages are as follows: Economic savings will result. The service will be as reliable or more reliable. Service will be restored quicker after high-tension interruptions and with less chance of error.

The committee concludes that any engineer or management contemplating additional substation equipment should decide at once that the new station would probably be automatic, unless some unusual condition was involved. In many cases, it should even pay to remove converters from existing manual stations and install them in new locations as automatic substations, provided the converters are of a sufficiently modern type.

The electrical engineer can choose the size of automatic substation which from his experience he feels might best suit the portion of the system under consideration for use in determining its economics compared with a manual station layout. Judging from past practice, there will be very few cases where larger than 2,000-kw. synchronous converters will be used for automatic substations for surface operation. The engineer will then know that the estimated costs obtained will be slightly less for a larger size converter or slightly more for a smaller size converter.

The report then reviews the "cut and try" method, referring to the detailed instructions contained in the 1922 report of the special committee on automatic substations. A review of the past committee reports is also given

fully, with comments and data from installations recently made.

E. H. Scofield developed an analytical method of determining substation layout based on general assumptions that would give the comparative annual cost for any desired number of automatic substations planned. This analytical method for estimating the economical number of automatic substations was contained in the 1923 Proceedings. Ralph H. Rice of the Board of Supervising Engineers of Chicago suggested at that time that it should be possible to present the analytical method in the form of a formula and in the following two years proceeded to work out such a formula. The committee considers that this is an interesting and valuable contribution to the subject and submits this formula, with its complete mathematical derivation, in the report for 1926.

The committee further states: "In view of the fact that this formula has not been applied to a specific problem, little can be said one way or the other commenting on its practicability for solving automatic substation studies." In general, the same comment would apply to the "analytical" method, as noted in the 1923 Proceedings. This formula, like the analytical method, is intended merely as a preliminary study, but is probably superior to the analytical method. It should give an approximation of the most economical number of stations for any area and can be solved for an approximate cost.

There are seven appendices to this report, five of which develop mathematically five of the variables in the working formula referred to above. Appendix F is a mathematical determination of the average feeding distance for any number of substations and Appendix G gives definitions of the terms "load factor" and "line loss factor" as used in the calculations.

In conclusion, the report states that the automatic substation has been proved and accepted as the most economical and advantageous way of converting and distributing energy for street railway systems, both urban and interurban. With the summary contained in this report and the information of the preceding report of the special committees on automatic substations the method of determining the most economical substation plan and estimating its cost has been described in sufficient detail so that any railway engineer can apply the solutions to his own particular problems.

Future developments in this field can be properly and logically followed for the two standing committees on power generation and conversion and on power transmission and distribution.

For this reason this committee recommends that the special committee on automatic substations be discontinued and the problem of determining the proper design of the distribution and layout for automatic substations be referred to the two committees above mentioned.

The report was signed by L. D. Bale, W. E. Bryan, C. A. Butcher, C. H. Jones, F. W. Peters, R. H. Rice, L. R. Wagner, E. H. Scofield sponsor, and Adrian Hughes, Jr., chairman.



# T. & T. Committees Have Been Active

Investigations This Year Directed Along Lines of Merchandising Transportation, Traffic Congestion, Accident Prevention and Bus Operation Have Resulted in Reports that Are Replete with Valuable Suggestions

**B**ESIDES one joint committee with the Claims Association this year, there were but three technical committees of the Transportation & Traffic Association. Each, however, was on a vital topic and covered its subject in a very broad way. Thus, bus operation was treated under fifteen different heads and merchandising transportation under six. All reports of the association are conspicuous in the absence of statistics. This year the committees chose to record a consensus of opinion on policy methods and proper procedure. The reports taken as a whole are a veritable textbook of best practices; they form valuable reading and should produce worth-while results if put into action. Abstracts of all Transportation & Traffic reports follow.

## Merchandising Transportation

**G**ENERAL policies or principles governing operation of street railways are not laid down by the committee nor has it cataloged individual operating practices that might result in increase of riders or revenues, except where these are of so general application as to afford a guide for the entire industry.

The report is under six general headings that relate directly to the subject assigned and reported on by selected sub-committees.

### COURTESY, SALESMANSHIP AND APPEARANCE OF TRANSPORTATION EMPLOYEES

The street car operators, motormen or conductors, and all bus drivers are the salesmen of the industry. They must compare more favorably in selling ability with salesmen in other lines of business. Greater attention must be given to the training of these employees in a specific and detailed manner with a view to bringing about a standard of courtesy, personal appearance and sales practice notably high.

Courtesy, appearance and salesmanship standards attained will be in proportion to the effort used by the management in promoting these matters. This effort will not be successful until the transportation employee realizes that he is in a competitive business; that the success of this business depends upon his individual effort; that it is in his power to attract customers or to alienate them; that this competition is not temporary but permanent, and that in all cases his own prosperity, and often his job, is contingent upon his own thoughtfulness in presenting the best personal appearance, using attractive methods and co-operating in the teamwork that will produce a service satisfactory to the public.

It is not sufficient simply that the trainman listen to talks dealing with these subjects or read pamphlets on them. He must be made to understand,

indorse and then demonstrate what has been taught with respect to appearance, courtesy and salesmanship. If he is too stupid to understand or is reluctant to co-operate in these practices, his service should be dispensed with. In most cases the principal part of the work is to inculcate a complete understanding of the necessity for these practices, and the part the individual must play in them.

A great many companies might well give more particular attention to the character of uniform worn by trainmen. This consists not only of insisting upon clean and well-pressed uniforms (to secure which cleaning and pressing stations have been provided on many properties), but also a complete change in uniform. Practically ever since the beginning the standard uniform has been a blue serge with more or less shapeless cut. For the purpose of offering a better front door to the



R. N. GRAHAM  
Chairman

business, the selection of gray whipcord uniform with military cut is suggested. It is felt that the gray whipcord uniform is more practical than blue serge and that there is a psychological value to the change.

Whenever a new uniform is adopted,



G. H. CLIFFORD  
President T. & T. Association

the opportunity exists for a complete standardization of every detail of the uniform, so that the employee becomes identified with the company to such an extent that his appearance forms an advertisement of its service.

Since courteous treatment bulks so large in the attitude of the public toward our industry, there is a tendency to raise the age limit of men employed. Some companies now insist that the new employee must be at least 25 years of age. This higher age requirement will tend to stabilize the transportation organization, reduce turnover and add to the prestige of men and company. In this connection, the pamphlet written by George Baker Anderson, manager of transportation Los Angeles Railway, entitled "Salesmanship," covers the general field of instruction of new men so completely that this booklet is recommended to the attention of the industry.

Trainmen should be kept informed as to their accomplishments, such as accident prevention, curtailment of delays, power saving, unusual acts of courtesy, personal appearance, and, in general, the manner of acting as the company's direct representative. Bulletin boards, company publications or trainmen's meetings may be used in doing this. Trainmen should receive, when possible, information of new company plans, policies or problems. Advertising plans, policies or problems of sufficient importance could be explained, if necessary, by competent instructors.



This will enable trainmen to discuss these matters intelligently with their patrons and friends.

Some companies use selected trainmen to adjust complaints. The written or phoned complaint is given to the trainman just as it is received from the patron. This may be a real or fancied offense. The proper method of approaching the complainant, the adjustment of complaint and the closing up of the interview are explained. The trainman then interviews the complainant. In this way the trainman gets the patron's view of his fellow-workman's lack of duty or tact in handling the public. In other words, the trainman is liable to see himself as others see him.

#### SPECIAL CLASSES OF SERVICE AND RATES OF FARE

Special rates of fare and special classes of service are designed to augment the revenue received from the ordinary and routine transportation of passengers. But it should be borne in mind that specialties cannot make up losses from regular operation if the fundamental rate of fare is too low. There is some danger of using special rates and special classes of service to make up deficient revenues. Main consideration should be given to the development of such a standard of regular transportation service in the community as to form the basis in public favor of securing a rate of fare adequate to bring a fair return. With this condition established, then special types of service, with special rates of fare, may be expected to promote interest in and add to the number of users of the regular service, as well as to return a profit in themselves.

A number of transportation companies, both city and interurban, are experimenting with special rates of fare and special types of service designed to attract:

1. The rider who desires a superior service and is willing to pay the relatively high fare required to furnish it. Such service compares with that offered on the extra fare trains operated by the steam railroads.

2. The rider who will not pay a higher fare for superior service, but will become a customer and pay regular rates for an improved service.

3. The rider who will use the service at times of light traffic because the transportation company can then afford to sell its surplus capacity at a relatively low rate of fare.

In the first class are included parlor car service, dining and buffet cars, sleeping cars, special theater service, etc., operated by a number of interurban companies. Under this head may also be included the de luxe motor coach service which a few companies are operating to high-class residential districts.

An example of service of the second class is the "Ceramic Flyer" of the Steubenville, Ohio, and Beaver Valley Traction Company operating between Steubenville, Ohio, and Beaver, Pa. This is a parlor-car limited service making only five stops in the 40-mile run, with a running time 30 minutes less than the regular service and with no extra charge.

The third class includes the use of the weekly pass, the monthly ticket, the Sunday and holiday pass, and other similar methods of attracting business during periods of light riding.

The experience of member companies along these new selling lines is as yet more or less limited, but would seem to indicate that these methods offer good possibilities of popularizing transportation service and, at the same time, attracting additional business.

During the last twelve months the Northern Texas Traction Company performed a notable piece of merchandising work in conjunction with the meeting of the American Legion in Fort Worth, Tex. The railway company, through its manager and staff, sold the idea to the American Legion that it should, as a courtesy to delegates, provide the necessary transportation as a part of the entertainment costs. The American Legion did this and also provided free tickets to other events planned for the convention. The railway company printed up small books with the necessary entrance tickets to the various events and also ten tickets of special form; each of which was good for a ride on the local cars of the Northern Texas Traction Company during any one of the four convention days. When the books were used up they could be renewed upon presentation of the old cover. The books were originally issued, as well as the renewals, at the registration desk of the American Legion.

At the end of the convention, the railway company presented the coupons to the Legion treasurer and received nearly \$1,500 in payment for the transportation rendered.

Another example is the instance of the Beaver Valley Traction Company selling tickets at the regular rate of fare, but giving with them coupons which were redeemed by the merchants of the community as part payment on cash purchases of \$5 or more. The company put up the tickets in books of 40, and sold the books for \$2.25 each, giving with each book eight of the coupons, which had a cash value of \$2 when applied to the cash purchase of merchandise. The management felt, however, that even better results would have been obtained had the tickets been sold in \$1 quantities, without the 25 cents extra charge and with a reduced merchandise purchase requirement.

Several companies have profited by special party service, outings and tours. Some of the larger properties have provided comfortable waiting and lounging rooms, with quarters for the departments handling this special business.

Schools, public and private, all over the country are more and more transporting their pupils by bus. In some instances, groups of parents underwrite the cost. This type of service can usually be handled in off-peak hours and is attractive. For a moderate rate per month, buses can be assigned to school routes, making door-to-door pick up and delivery. With good chauffeurs and well-maintained buses, the service will prove to be an excellent good-will builder.

In some of the large cities, or in places where there are a large number of transients, sightseeing buses can be

operated in the off-peak hours at a profit. Special week-end, all-expense tours of one or two days duration have proved popular and profitable in several instances. These tours should be organized by the company and should be well advertised.

#### MAXIMUM USE OF EXISTING FACILITIES

Careful attention should be given to car assignment, to the end that maximum possible use be made of good equipment. It is suggested that in many cases, by a careful selection of cars, it will be found possible to make such adjustments as will permit operation of a greater proportion of the service with the higher grade equipment, thus building up public good will, increasing receipts, and at the same time reducing operating expenses.

Sunday and holiday car assignments and, on some properties, Saturday car assignments, should be carefully studied, with the idea in mind that on these days it may be possible to operate a very much greater proportion of the service with the better classes of equipment. Such studies may show also the possibility of utilizing a greater number of one-man cars on Sundays and holidays to the improvement of the service and the decrease of its cost.

The committee urges that special consideration be given to reduction of the number of stops. This can be considered under two divisions:

1. The elimination of stops consistent with the locality will decrease the running time for the service as a whole in many cases.

2. The elimination of stops for the purpose of operating express service. This may be considered with or without co-ordination with coach operation. Interesting and successful experiments along this line have been conducted in both Providence and Baltimore.

The maximum use of existing cars and tracks cannot be had if the average speed is unreasonably low. Slow movement of street cars is also one of the chief causes of their unpopularity in this age of swift-moving automobiles.

There is a possibility of operating on a skip-stop or stagger-stop plan in rush hours and on the ordinary plan at other times. This should be given careful consideration.

In order to equalize the loading between the through cars and the short-routed cars, the through cars could be operated as "limited stop" cars, making no stops to discharge passengers between certain limits in the local territory. These limits could be judiciously selected so that the average loading of all cars would be approximately the same.

#### GENERAL COMPANY INTEREST IN CIVIC PROBLEMS

Every company, in addition to being a good citizen in the communities it serves, should strive to attain the higher plane of being a good neighbor. In being a good neighbor, it will be active in boards of trade, chambers of commerce and the so-called service clubs such as the Rotary, Kiwanis, Lion, American Business, Civic, etc. Such clubs, however, do not contain as large a percentage of the companies'



customers as the community improvement associations, Veterans of Foreign Wars, American Legion Posts, etc.

It is important that companies take out individual memberships in such organizations as are identified with the local community interests, such as improvement associations, district and ward clubs, etc., and pay the dues of such memberships.

Every company should be active in the work of the Safety Council, whether this be a part of the national body or a local organization. Where such an organization is not in existence, and there seems to be a need for concerted action in bettering the safety conditions of the community, the company should lend every assistance in the formation of such an organization.

#### ADVERTISING

As an aid to getting best results from the advertising done by member companies, it is strongly urged that each company send to the director of advertising of the American Electric Railway Association copies of all advertising used in order that he may be a clearing house for such information.

There is no need to expand on the use of the newspaper as an advertising medium unless it be to point out that it should be continuous. It is better to have a brief message in the papers every day or several times a week than to have a full page infrequently.

Newspaper advertising in general should be specific and have a definite sales plan. The most successful newspaper advertising campaigns in the electric railway field have been attempts to increase traffic by suggestions that people ride to the zoo, the museum, the park, or in pushing the sale of a certain type of ticket or freight service. Merely filling your advertising space with generalities about your good service is not enough. Sell something definite.

In addition to the use of paid advertisements in the newspapers, much valuable advertising may be secured by friendly contacts with the reporters in keeping them informed fully as to the company's plans and operations.

Very few companies are using their own advertising mediums to the greatest advantage. One of the best forms of advertising in the world is the street car display.

Care should be taken, however, to obtain brevity in copy for street car posters or signs. Dash posters which are to be read from the outside of the cars should never contain more than sixteen words and it should be possible to read them from a distance of 50 ft., at least. Cards used in the inside of the car should never have more than thirty words.

Company publications distributed through the "Take One" boxes, or sent out to a selected mailing list, can be printed easily and cheaply. If kept short, snappy and interesting, they will get over to the public many of the facts about the street railway. There are many successful house organs of this character.

At the present time the total advertising appropriation of 260 electric rail-

ways in the country is between \$4,000,000 and \$5,000,000, which amounts to about one-half of 1 per cent of their gross income. It is felt that the industry should be spending approximately 1 per cent of its gross income annually for its advertising and merchandising efforts.

#### DESIGN AND CARE OF EQUIPMENT

Future design of both buses and rail cars must be as much the concern of the transportation engineer as the master mechanic. Not that the master mechanic's job is done, but rather that the transportation features demand far more attention than they have received in the past. Both the car and the bus must approach the comfort, appointments and convenience of the private automobile, as this is the largest competitor to common carrier service today.

Economies, important as they are, must not forbid conveniences. The electric car of an antiquated design, poorly maintained, does today suffer from an invidious comparison with the rubber-tired vehicle. Perhaps the best way to establish greater confidence in the electric car is to alter the design, as much to create a different appearance as to improve its operating characteristics.

Opportunity exists, particularly in the design of new equipment, to avoid some of the noise which seems inseparable from the business. Attention in this regard should be given to brake rigging. Improved motor suspension is being studied and results may be forthcoming that will reduce some of the present noise from gears.

Steel against steel is a difficult combination to combat from the noise standpoint. Perhaps the best opportunity lies in better spring construction, and elimination of as much unsprung weight as possible. The springs of a bus receive far more attention and lubrication than the springs of an electric car. Consequently during service they are more resilient and responsive in action than the more rugged, but equally important, springs of an electric car. After all is done some noise will remain. However, by using double floors, insulated side sheathing and headlining on roofs, this inherent noise can be suppressed and lessened for the passengers riding in the car.

The old style car was cluttered up with bell cords, register rods, hand straps, baggage racks, pipes and stanchions. There is no reason why the conductor's bell should not be as inconspicuous as the passenger signal; likewise a less visible arrangement for operating overhead registers is available. An attempt should also be made to make the register less noisy in its operation, and interurban whistles less offensive, and thus relieve the conscious or unconscious strain on the nerves of the passengers.

Old cars can be improved and made more popular by the addition of comfortable seats. Certainly the luxurious, deep, well-formed cushion seats on the better grades of buses are one of the drawing cards to this type of vehicle. Recently the Cleveland Railway fitted out three trains with comfortable upholstered and leather-covered seats of

the semi-individual bucket type. This company's telephone lines were busy with calls as to when and where these particular trains were operating. People wanted to ride in these rather than in the older types. It may be difficult to trace a direct return from an expenditure of this kind, but if it pleases the public, the returns must follow.

The question of seat spacing is important. It is of little avail to spend money for high-grade seats if they are crowded so close together that the passengers' knees are wedged against the seat ahead. That is only spending the dollar and destroying the purchase. Even with thin backs the seating spacing should be approximately 30 in., and with thick cushioned backs the spacing should be 32 to 35 in.

Higher schedule speeds is one of the economies that contribute directly to better service. Waste time should, of course, be eliminated, and cars should be built to accelerate as rapidly as is comfortable. To avoid congestion and delays, the rate of acceleration should be equal to or exceed that of automobiles. If the autos accelerate faster than cars after traffic stops, they cut in ahead of the car and usually block the car at the next crossing, often requiring a double stop, which adds to the delay and increases the congestion. To obtain this higher acceleration in city streets, cars must be adequately motored. Gearing may be low, as rapid acceleration is far more important in increasing schedule speeds in service having frequent stops than higher free running speeds.

#### KEEP UP THE APPEARANCE

As an industry it should devote more care to keeping up the appearance of equipment. There is too general a tendency to consider the acquisition of new equipment an opportunity to reduce maintenance costs for a year or two, and to neglect mere appearance.

The same considerations that would dictate an unholstered seat compel the resolve to keep this seat clean and the upholstery intact. The benefit of plate glass is not fully realized unless the windows are cleaned and polished. A beautifully lacquered job does not show its real quality unless frequently washed. In industrial communities, the complete washing of cars in regular service twice a week is considered almost a minimum. The desirable point to reach would be a complete washing of the transportation vehicle on a daily basis.

Passenger and service equipment also should be kept up to high standard of appearance.

Bus and car stop signs and standards preferably should be enameled instead of painted, in order that they, in turn, may be kept up to a high standard of appearance.

This committee insists that in order to get the best results in merchandising transportation, the master mechanic and maintenance organization must recognize as keenly the necessity of good appearance as they have always recognized the necessity of efficient mechanical operation.

The report was signed by O. A.



Broten, H. L. Brown, W. H. Burke, J. A. Dewhurst, J. B. Donley, R. W. Emerson, S. E. Emmons, W. W. Holden, J. F. Johnson, E. A. Palmer, C. D. Smith, A. C. Spurr, J. C. Thirlwall, W. E. Wood, R. N. Graham, chairman; W. H. Boyce, sponsor, and E. M. Walker, sponsor.

Accident Prevention

REPORTING jointly, the committees of the Transportation & Traffic and of the Claims Association presented statistics for 1925 and 1924 of companies reporting, the number of companies varying from 87 to 175. The statistics showed improvement during 1925 in accident records, as there was a decrease in the total number of reported accidents and in every classifica-



M. W. BRIDGES  
Chairman

tion of those accidents with but few minor exceptions. Even the number of collisions with motor vehicles was less, although the number of vehicles increased. A few of the figures given are contained in the table below.

The following definite recommendations were made:

- 1. Co-operation with state, municipal and civic bodies in the work of prevention of traffic accidents on the streets and at railway crossings. Local conditions require local remedies and it is only through the active co-operation of electric railway companies with local bodies that these conditions can be met and accidents reduced.
- 2. That member companies send their representatives into the schools in their communities in accident prevention work that the younger generation may be educated to the danger of thoughtlessness and carelessness on our streets

and around our cars and tracks. Speakers going before civic bodies, women's clubs and parent-teachers' associations with this message will do a great work in spreading the safety education which will result in reduction of the loss of life, limb and property.

3. The work of educating the employees in accident prevention work should be continuous and so arranged as to keep this subject uppermost in their minds and made a part of their every day work. In some of the companies, award and merit systems have been carried on, safety entertainments, dinners and even medals and uniforms awarded to stimulate the work of continuity of effort in the prevention of accidents.

The committee also indorses the value of moving pictures to help reduce accidents, co-operation with the National Safety Council, the adoption of a standard code for vehicles, as considered at the meeting of the National Conference on Street and Highway Safety in Washington, and close relationship between the operating, claims and safety departments of electric railways. The report was signed by the following:

Representing the Claims Associations—Seth Baldwin, B. F. Boynton, N. W. Funk, G. H. Ingles, A. G. Jack, W. H. Moore, T. C. Neilson, V. T. Noonan, E. J. Paige, R. A. Sears, J. J. Sharkey, L. F. Wynn, and H. K. Bennett, co-chairman.

Representing the Transportation & Traffic Association—E. J. Dickson, Arthur Gaboury, Roy R. Hadsell, A. W. Koehler, T. E. Lawrence, M. McCants, G. B. Powell, C. F. Schmidt, Samuel Riddle, sponsor; Edward Dana, sponsor, and M. W. Bridges, co-chairman.

Traffic Congestion

NO OUTSTANDING or single method of relieving traffic congestion was developed during the year, but the so-called Hoover conference reports indicate the method by which lasting relief may be had. If this conference had accomplished nothing more than to center national attention on this problem it would have been a great success.

Believing that the Hoover conference was the event of the year from a traffic standpoint the committee submitted a full analysis. This analysis is confined to that part of the Hoover traffic studies which directly touches the business of transportation. [This report was abstracted in ELECTRIC RAILWAY JOURNAL for April 3, 1926, page 602.]

In addition to this the committee has considered any specific methods of relief of traffic congestion of which it learned, such as prohibition of parking, signals, subways for pedestrians and staggered hours of business.

One of the fundamental factors in determining the best method to pursue in handling the problem of traffic congestion in the downtown area in any large community is to determine first the relative importance of the different modes of transportation.

Promiscuous parking is the greatest contributing cause of congestion and the slowing up of all moving vehicles. This is a very real danger menacing downtown merchants, a danger which many of them fail to see, namely, the danger of decentralization or the driving of business to the outlying and



A. R. MYERS  
Chairman

therefore less congested business centers. It follows that street car riding shoppers will be more and more reluctant to shop downtown if their progress is impeded to such extent that their patience and allowable time are exhausted.

It also follows that the shopper who drives her own auto dreads the trip downtown more and more as congestion increases and her chances of parking where she wishes to shop become less and less.

If this be true, then the future of our downtown merchants in the larger cities is solely dependent upon the rapidity and convenience with which their patrons can reach them.

In an effort to throw some light on the various phases of this subject the Cleveland Railway proposed an extensive traffic survey. It enlisted and received the co-operation of the Retail Merchants Board of the Chamber of Commerce. The object of the survey was to determine how and in what proportion patrons reached the various stores in downtown Cleveland. Through the Retail Merchants Board consent of 22 stores for the survey was secured. These stores were not only the largest in Cleveland, but represented the greatest diversity in goods which they sold. [This important study and its result were covered by Ralph W. Emerson of this committee in an article in ELECTRIC RAILWAY JOURNAL of July 10, 1926.]

The survey continued three days with the addition on the third day of a large 5 and 10-cent store, which made 23

ELECTRIC RAILWAY ACCIDENT STATISTICS

Accident Statistics	Number of Companies Reporting	1925	1924
Total number of accidents.....	172	341,423	352,901
Accidents at grade crossings.....	116	2,162	2,254
Number of persons injured.....	161	57,836	60,820
Number of fatalities.....	177	887	874
Total cost of claims.....	147	\$12,565	\$13,285
Miles of single track.....	171	19,350	19,370
Car-miles operated.....	173	*850,576	*866,063
Ratio cost of accidents to gross earnings, per cent.....	145	3.00	3.12
Ratio amount paid in settlement of claims to total cost of claims, per cent.....	133	63.72	65.88
Ratio cost of claims department to total cost of claims, per cent.....	125	23.04	22.23
Total cost of accidents per car-mile, cents.....	146	1.46	1.54
Number of accidents per 10,000,000 car-miles.....	168	3,679	3,772
Persons injured per 10,000,000 car-miles.....	157	690	720

\* Last 000's omitted.



stores for that day plus a large typical office building.

The employees in the stores conducting the survey voted on the first day only. The distribution of the survey follows:

Shoppers voting .....	85,657			
Employees voting .....	7,698			
Total vote .....	93,355			
SHOPPERS				
Motor Coach 8,910 (10.4 per cent)	Street Car 53,738 (62.74 per cent)	Automobile 19,551 (22.82 per cent)	Walk 3,458 (4.04 per cent)	
EMPLOYEES				
563 (7.31 per cent)	6,208 (80.64 per cent)	762 (9.9 per cent)	165 (2.15 per cent)	
TOTAL GOING TO STORES				
9,473 (10.15 per cent)	59,946 (64.21 per cent)	20,313 (21.76 per cent)	3,623 (3.88 per cent)	

The above figures indicate that only about one shopper in five used a private automobile.

The committee is informed that the city of Detroit has considered and purposes to experiment on a large scale with construction of pedestrian subways from sidewalk to street centers, where loading platforms will be located, the car tracks having been spread at the selected points so as to permit of loading and unloading of cars on the so-called "devil strip" side.

Inasmuch as the plan has been fully described in the daily and technical press it is mentioned here only for the purpose of directing the future committees that they may study and report on the results of this experiment.

Automatic signal light control of vehicular traffic in congested areas is a fairly recent development and little or no engineering study had been made prior to 1925 with respect to the speed at which vehicles moved through the controlled area.

At the request of the Chicago Association of Commerce, E. J. McIlraith, staff engineer of the Chicago Surface Lines, assisted by H. B. Cammack of the same company, began a study in August, 1924, of all existing methods of handling traffic by signal light control, with the object of determining if any improvements could be made. The result of this study was the development and installation of an entirely new system in Chicago which is known there as the "co-ordinated" system. It has speeded up street car movement in the Loop area of Chicago from 25 per cent to 50 per cent on various streets. An installation embodying some of the principles of the Chicago system, but termed the "reciprocal" system (because it was believed that this name was more descriptive of the actual operation of the lights) has been worked out by engineers of the Community Traction Company in Toledo for installation in that city about Aug. 1, 1926. [The Chicago system was described in *ELECTRIC RAILWAY JOURNAL* March 27, 1926, page 537.]

The committee recommends that careful study be made of each installation of traffic control equipment either operating or to be installed. Continuous movement instead of the less desirable synchronous system is desirable.

This association should continue to

study and keep closely in touch with the detail and minutiae of traffic congestion, but respectfully suggests that if a way could be found to add one or more men from the Engineering Association, and a more direct contact with,

and guidance of, the American Association, the work could be better done and the results attained more quickly.

The report was signed by A. W. Brohman, C. H. Evenson, R. W. Emerson, D. L. Fennell, A. J. Fink, Arthur Gaboury, J. A. Gemg, J. E. Heberle, A. L. Hodges, George Kuemmerlein, Jr., F. R. Latta, R. J. Lockwood, J. A. Miller, Jr., J. P. Pope, E. S. Rider, C. D. Smith, W. E. Thompson, J. P. Tretton, E. A. West, P. E. Wilson, sponsor; George B. Anderson, sponsor, and A. R. Myers, chairman.

### Bus Operation

**D**IFFERING somewhat from other years, the committee on bus operation for 1926 decided that this year it would define the policies of member companies on the many features of bus operation rather than concentrate on



J. B. STEWART, JR.  
Chairman

the obtainment of statistics from member companies.

The committee report is, therefore, divided into sixteen sections covering the following subjects. Fares, both city and interurban; underlying reasons for higher rates of bus fare; taxation during development period; proper agency to operate bus lines in competitive territories; chartered coach and bus operations; terms of franchise, package express delivery, including handling of United States mail; utilizing the motor bus in developing better public relations and more favorable senti-

ment of financial interest toward electric railways; the problem of supporting non-paying route extensions; tire mileage contracts; liability insurance; double-deck bus operation—when and where it is justified; development cost; and bus accounting.

It is the committee's belief that the question asked during the earlier years of bus experience as to whether electric railway companies should undertake bus operation has been answered by the Code of Principles adopted by the American Association in 1925. The committee has included this code with reference to bus operation in its report. In brief, this section of the code stated that no medium had been developed that could replace the electric railway as a means of conveying masses. The electric railway companies supplying the local transportation should provide and control and operate all of the buses that are needed, as an auxiliary service in the communities they purport to serve. The code further states that buses should be regulated by law as common carriers and that both buses and electric railways should bear proportionate taxes and other public obligations that are fairly chargeable to them as public carriers.

### UNDERLYING REASONS FOR HIGHER RATES OF BUS FARE

From a theoretical economic point of view the fare per passenger should be based on the cost of service per passenger. Consequently buses designed for mass transportation which carry large numbers of standing passengers may produce a service where the cost per passenger will be considerably less than the cost per passenger for a service rendered by a de luxe bus, where standing is either not permitted at all or reduced to a comparative minimum. Such a difference in cost should be reflected in the rates charged for the difference in the kind of service rendered. In one case the passenger receives mass transportation at a lower fare and in the other case he obtains greater comfort, probably greater speed and should pay extra for it.

Practically, where buses are co-ordinated with cars and expected to give a service identical with cars the fare should be approximately the same. If, however, the bus furnishes any element of service which the car does not furnish this added element should provide a logical reason for a higher rate.

The report closes by saying the bus service is still in a state of evolution, and opinions may not be rigidly fixed until the place of this new agency becomes crystallized with respect to existing transportation facilities. As more concrete information is developed, it is believed that succeeding committees will be in a position to set forth more definite data and conclusions on all important phases of bus use.

The report was signed by B. W. Arnold, C. H. Chapman, C. B. Cooke, Jr., E. D. Dreyfus, D. L. Fennell, R. N. Graham, S. W. Greenland, M. L. Harry, R. B. Hill, Adrian Hughes, Jr., D. A. Scanlon, Alexander Shapiro, R. H. Smith, A. T. Warner, J. V. Sullivan, sponsor; V. W. Berry and J. B. Stewart, Jr., chairman.



# The News of the Industry

## Seattle Mayor Has Report on Transportation Ills

In recommending operating changes for the Seattle Municipal Street Railway, Seattle, Wash., to stem the tide of decreasing revenues and patronage, all of which he says could be put into effect in 30 days, Clark R. Jackson, superintendent of public utilities, in a report filed recently with Mayor Bertha K. Landes, estimates these changes would effect a saving of approximately \$800,000 a year. The most sweeping proposal is to eliminate "duplication of service" in the downtown district by turning back all cars around loops, with Pike Street as the dividing line. Under the present system, nearly all car lines traverse virtually the entire length of the retail business district. This change in operation is estimated to result in an annual saving of \$612,500. Turning back cars around loops from Pike Street would not abolish the transfer system, as transfers would be issued to south-bound loop cars at Pike Street.

The report was made at the request of the Mayor and represents a month's intensive work. Recommendations for downtown operation call for one-way traffic for street cars and automobiles on First and Third Avenues and dividing the car lines into six groups to go in and out of the business districts over as many loops.

Mr. Jackson cited many advantages of the Loop system. Other features of his report show that the total number of pay passengers on weekdays for the year ended Sept. 1, compared with the calendar year 1921, fell off 4.6 per cent and the number on Sundays 25.3 per cent.

Upon receipt of Mr. Jackson's report, Mayor Landes appointed a committee of citizens prominent in civic life to consult with her on the municipal railway problem.

## Seven-Cent Cash Fare in Cleveland

Fares on the lines of the Cleveland Railway, Cleveland, Ohio, will be 7 cents cash, eight tickets for 50 cents, after midnight Oct. 15. The directors of the railway so decided on Oct. 1 to curb the decline of the interest fund, which now shows a deficit of more \$75,000, with losses of close to \$100,000 monthly at 6-cent fare.

The advance is expected to net about \$125,000 a month increase in revenues. If Cleveland Heights, East Cleveland and Lakewood pay a rate a cent higher than Cleveland's at all times, there will be \$25,000 a month additional.

The interest fund will not reach "normal" until it touches \$300,000 and fares cannot be reduced until it reaches \$1,100,000. For many months it has

been below \$500,000, the point at which fares might have been increased automatically.

Efforts are under way to get the three suburbs to accept franchises with the 1-cent increases. Cleveland Heights City Council has virtually agreed to accept such a franchise in return for extensions on Mayfield, Cedar and Fairmount boulevard.

East Cleveland City Commission is holding off acceptance because it wants the company to supplant the service on the Euclid-Superior extension with through service to Public Square by way of Superior Avenue.

In Lakewood, where a sliding scale franchise on the "same-as-Cleveland" basis was adopted a year ago, fares will go to 7 cents Oct. 15 along with Cleveland's. In Cleveland Heights and East Cleveland 6-cent fares will continue till new franchises are worked out unless increases are accepted voluntarily. Lakewood is expected to make a bitter fight against the 1-cent differential.

## Philadelphia Council Favors "L" Extension

A 30-year extension of the present lease of the city-owned Frankford elevated lines to the Philadelphia Rapid Transit Company, Philadelphia, Pa., was approved on Oct. 1 by the City Council by a vote of eighteen to two. The agreement with the Philadelphia Rapid Transit was sought by administration leaders with a view to relieving the borrowing capacity of the city for the amount of the Frankford "L" bonds. With this it is believed it will be possible to borrow the \$5,000,000 needed to finance the Sesqui-Centennial.

The bill provides that the Philadelphia Rapid Transit Company in consideration of the extension of the lease of the Frankford "L" for 30 years shall pay \$903,000 annually, which is the full interest and sinking fund charges on the \$13,421,000 bonds. The amount represented by the bonds would be added to the city's borrowing margin if the Public Service Commission and the Court of Common Pleas give their approval. W. W. Roper, member from Germantown, and Clarence K. Crossan, counselor representing the northeast, voted against adoption of the ordinance. Criticism of the compact came from various sources, dealing chiefly with the "untimeliness" of extending the lease with negotiations for the new Broad Street tube still pending. C. Oscar Beasley, counsel for the United Business Men's Association, announced that a taxpayers' suit was contemplated to upset the granting of the lease. An amendment to the agreement providing for a recapture clause which would allow the city to recover the line upon six months' notice was offered in Coun-

cil by Mr. Beasley through W. W. Roper, but it was rejected.

The Mayor said he felt the provisions of the agreement were fair and equitable to the city and, unless otherwise convinced, he would go ahead and sign the measure.

## Kansas City Ordinance Passed a Second Time

At the meeting of the Kansas City, Mo., City Council on Oct. 4 the ordinance passed the previous week and providing for a twelve-year extension to the existing street railway franchise was again hailed into the Council for another vote. Mayor Beach, who has strenuously opposed the passage of the bill, filed a notice with the city clerk on the preceding Saturday, causing the bill to be sent back to the Council, although that body had unexpectedly passed the measure by a majority vote at the preceding meeting. Despite the Mayor's charges that the bill's passage had been by "arrangement" between the five Democratic Councilmen and William G. Woolfolk, president of the Kansas City Public Service Company, the bill was repassed with the same party vote as in the earlier passage, after a heated discussion.

Following the passage of the bill for the second time, the Council approved the appointment of a committee of five Councilmen, including A. N. Gossett, chairman; Henry L. McCune, C. Jasper Bell and C. A. Burton. This committee was instructed to meet with Mr. Woolfolk at an early date to enter negotiations for a complete new city franchise to replace the extended one now in existence. Mr. McCune expressed the opinion that a new franchise could be worked out within 30 days that would be satisfactory to all concerned.

The appointment of this committee was in accordance with a suggestion of Mr. Woolfolk, from whom the Councilmen and the city manager received letters on Sept. 29, stating that he was ready at any time to negotiate with the Council or other officials for a new franchise. All Councilmen are said to be in favor of such negotiations at as early a date as possible.

The principal objection to the extension is apparently in connection with the valuation set upon the local railways property by the new operating company. The Kansas City Public Service Company purchased the properties from the federal court for a nominal bid of \$8,000,000, while the franchise measure passed this week was constructed on a basis of a \$34,000,000 valuation. Mayor Beach contends that the valuation should now be cut to a fair value of the bonds used in the purchase of the properties, since the railways had suffered for many years as a result of overvaluation.



## Indiana Commission Collects More Than Expenses

Collections made by the Indiana Public Service Commission during the fiscal year just ended total \$295,692, or more than twice the expenses of the commission for that period, due to a system of collecting established by Howell Ellis, secretary. In his report, which covers activities of his department from Oct. 1, 1925, until Sept. 30, this year, Mr. Ellis points out that there has been a 100 per cent collection of all fees due the state as a result of formal orders issued by the commission. This has been accomplished through a rule established by Mr. Ellis, with the approval of the commission, that no order promulgated by the commission go into effect until the utility pay costs for conducting hearings and investigations.

The report shows that total expenditures of the commission for the year were \$144,355, which is \$26,644 less than the appropriation for the commission in the state budget. This latter sum will be turned back into the state general fund. Fees collected were \$151,607 in excess of the actual operating expense of the department. The fees collected aggregate the largest amount ever collected in one year and expenditures for the year have been the lowest for the last five years.

## Improvements Planned for Expediting Service in Tacoma

An active program of improving its tracks and the pavement along its rails, of repainting its cars and otherwise bettering its rolling stock and lines was outlined recently by the Tacoma Railway & Power Company before the City Council of Tacoma, Wash. The company states it will add about 25 men to its maintenance crews and will increase its monthly expenditure to about \$23,000. In addition \$39,000 will be spent on paving McKinley Avenue, where \$35,000 was spent last year.

Plans will also be made at once to speed up service on all street car lines, to reduce operating costs by collecting fares at outlying points both on inbound and outbound trips and to install the skip-stop system. The report issued by the company shows that earnings are still disappointingly low under the new fares in force, but that the first weeks of August showed improvement over July figures. The fact that 60 per cent instead of 40 per cent of riders, as expected, are using tokens is throwing earnings off estimates.

## Illinois Cities Denounce Utilities in Move for Home Rule

The growing hostility of many cities and villages of Illinois to state control of public utilities was again evidenced at the second "home rule" conference of the Illinois League of Municipalities, held in Rockford on Sept. 23.

Mayors, attorneys and Aldermen from 30 different cities denounced the Illinois Commerce Commission as a "body of tyrants" and pledged their support to a finish fight to restore local sovereignty.

City Attorney W. S. Spaulding of Springfield declared that the utility companies "are gradually edging themselves into control of the government, instead of the government controlling them."

The conference adopted a set of resolutions demanding that the public utilities act allowing cities to withdraw from control of the Commerce Commission be amended so that the process could be carried out speedily, and that appeals from decisions on utility questions be made by the courts instead of by the Commerce Commission.

## Chicago Transportation Heads and Bankers Disclose Merger

A plan for the consolidation of Chicago's entire traction properties, embracing all the surface lines and the elevated system into a new \$250,000,000 corporation, is fast taking shape in the hands of committees representing all the companies.

A general scheme of consolidation with an interchange of transfers between surface lines and possibly motor coach lines, with tentative agreements as to extensions of lines and the use of subways, has already been reached by bankers representing surface line bondholders and executives of the elevated lines. It is based on the belief that the city will be able to secure state legislation permitting the granting of an indeterminate permit and then formulating an ordinance along this line. The general plan will be presented to the City Council committee on local transportation in a short time.

Under the present arrangement the Surface Lines will be taken into the consolidation at about the current purchase price to the city, as fixed in the 1907 ordinances. This is approximately \$165,000,000. It is expected that the elevated lines will be taken in at about \$80,000,000. The new corporation would have a bonded indebtedness of something like \$200,000,000, or sufficient to convert the present outstanding bonds of the various companies. Some of the present junior securities would be converted into stock of the new company.

The plan contemplates that the city shall forego its present share of 55 per cent of net earnings. Just revenues and the increase in earnings expected would be devoted to two purposes: First, extension and improvements to the properties, and, second, amortization of the funded debt of the company over a period of years. It is further suggested that the city shall own the entire system when the bonds are paid off, or that the city may assume ownership at any time by paying off outstanding obligations, which will decrease from year to year. The plan calls for city construction and ownership of the first subway tubes, the cost to be defrayed by the present \$45,000,000 traction fund accumulated by the city's division of earnings in the last twenty years. Extensions of subways would be taken care of by earnings or additional security issues.

If the purpose in general is sanctioned by the Council committee it is planned to organize the new corporation without waiting for the present

surface lines franchise to expire and the present bonds of the companies become due next January. The bondholders of the Surface Lines will be asked to accept bonds of the new company on an equal basis, with the option of selling their bonds for cash at a discount of probably 10 per cent, which is well above current market prices. Holders of the obligations of the Chicago Rapid Transit Company will be asked to accept new securities of approximately equal value.

The Council sub-committee on local transportation was recently told by traction executives and bankers that if the Aldermen's fight for "home rule" over rates and service on the elevated and Surface Lines systems continues, the city's traction problem will be more chaotic than ever.

Even with both the bankers and traction people willing to have the city control the local utilities, the State Legislature would undoubtedly oppose such a plan and refuse to give the city powers to make it effective.

## Certificate for St. Louis-Kansas City Line Denied

Judge Henry Westheus of the Cole County Circuit Court at Jefferson City, Mo., on Sept. 20 sustained the action of the Missouri Public Service Commission in refusing to grant a certificate of convenience and necessity to the St. Louis-Kansas City Short Line Railroad for the construction of an electric railway between St. Louis and Kansas City. The formal entry in the Circuit Court records of the order was delayed to enable counsel for the proposed road to prepare a motion for a new trial and an appeal to the Missouri Supreme Court.

The commission in May, 1925, declined to grant the certificate, which is the equivalent of a franchise, because the promoters of the road had failed to convince the commissioners of their ability to finance the project properly. However, they were given a year in which to present additional evidence of financial stability. Such evidence has not been given to the commission. When the state commission finally decided that the company could not get the desired certificate an appeal was taken to the Circuit Court.

The incorporators were Lee Dunlap, Kansas City, former State Factory Inspector, and several other residents of Kansas City and St. Joseph, Mo.

## Made-to-Order Service in Georgia

"Made to Order" is the way the Georgia Railway & Power Company, Atlanta, Ga., characterizes the service it wishes to give its patrons. The company is conducting a campaign among the employees for ideas as to how the service can be improved. The thought suggested to each employee is, if he were an executive of the company, what could he think of to improve the service; in this way changes must be considered from the points of view of both the patron and the company. Any suggestions offered will be put before the officials of the railway and practical and helpful changes will be put into effect.



## Insignia of Coffin Medal Applied to Pennsylvania-Ohio Equipment

Quick work on the part of the Pennsylvania-Ohio Electric Company resulted in the fixing of the insignia consisting of reproductions of the Coffin Gold Medal on the side of every car and bus before it rolled out of the barns last Wednesday morning. The award was not formally presented until late Tuesday evening Oct. 5, but the spirit that prompted C. S. MacCalla, R. N. Graham and the employees of the company to win the prize made it possible to rush the job of applying the transfers on to the car panels so that the citizenry of Youngstown and the neighboring communities might know that here was a gold medal road.

## Power Project Revived at Kansas City

The engineering firm of Woolfolk & Company, Chicago, and the banking firm of Eastman, Dillon & Company, New York and Chicago, are to be brought actively into the negotiations on the projected Osage River hydro-electric project. It is proposed that the Kansas City Power & Light Company and the Kansas City Public Service Company, the successor to the Kansas City Railways, jointly operate and control the hydro-electric project.

William G. Woolfolk is senior member of the engineering firm. His engineering partner, Frank L. Conrad, vice-president of Woolfolk & Company, will investigate the engineering features.

The suggestion is made that the two Kansas City public utilities take over control of the development, independent of the arrangements for financing its construction. The present proposal provides for the use of the new power as an auxiliary supply for the power and light company and the railways.

Following the failure of the original promoters of the project to arrange the sale to the Kansas City Power & Light Company and the Kansas City Railways, a proposal was advanced to the United Light & Power Company, holding organization of the local power and light company, to finance the development of the project.

After the Kansas City Public Service Company became the tentative owner of the local railways Mr. Woolfolk stated that the hydro-electric project would be considered by his company as a possible power development for the railway, since the present railway plant is considered inadequate.

## Mr. Storrs on Vacation

Lucius S. Storrs, accompanied by Mrs. Storrs, sails for Europe on Saturday, Oct. 9, where he will take a brief vacation returning about the middle of November. When asked about his itinerary, he replied that his idea of a vacation was not to have any. He did intimate, however, that he would probably visit points of interest in England, France and Germany. Without doubt he will take occasion to look into the new car designs which have been reported from Paris and Berlin during the last few months.



**Contributions Sent to Florida by Chicago Men.**—Donations of officers and employees of the Chicago Surface Lines, Chicago, Ill., to the Red Cross for Florida relief amount to \$13,500. This exceeded by \$1,000 the quota fixed by the Chicago Association of Commerce for all utilities in Chicago. Under this quota the Surface Lines was expected to raise only \$2,500.

**Twenty-eight One-Man Cars Expected.**—Announcement has been made by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., that approximately 28 one-man cars will replace the present 23 two-man cars on the Oakland-Delaware line in accordance with an order issued to that effect by the commission on Sept. 14. The change will be made about Nov. 1.

**Good Morning—Grand Rapids Welcomes You.**—A greeting card is the latest idea of the Grand Rapids Railway, Grand Rapids, Mich. The plan is to send good morning folders to the different hotels of the city from time to time during conventions, and at other times so that guests will have a message from the railway before they have done any sightseeing about the city. The welcome folder with the company's monogram can be kept as a souvenir. It tells about the electric rail coaches, the places of interest en route and the small expense incurred for such deluxe travel.

**New Extension Being Operated.**—For the first time since the war the Key System Transit Company, Oakland, Cal., has completed and is now operating a new extension. This latter, approximately 1 mile in length, was built along Park Boulevard, crossing Dimond Canyon on the new bridge and providing means of transportation for a recently built up section of Oakland that has previously been inaccessible so far as street car traffic is concerned. The cost was \$40,000.

**Benefit Association Formed.**—A mutual benefit association has been organized by employees of the Northern Ohio Power & Light Company, Akron, Ohio. Benefits are \$10 per week, commencing on the eighth day of disability. Dues are \$1 per month. F. S. Summy, who has been associated with the company for several years, has been selected secretary-treasurer.

**Tramway Refuses to Pave.**—The Denver Tramway, Denver, Col., on Oct. 1 notified City Engineer Vickery that it was not disposed to pay for any paving between its tracks on various streets designated by the city engineer as in need of paving. The company took the stand that if it had a perpetual franchise it did not have to pay for the paving.

**"E" on Sleeve Means Efficiency.**—Thirty members of the transportation department of the Georgia Railway & Power Company, Atlanta, Ga., will wear a coveted "E" on the sleeves of their uniforms as a result of a campaign to promote efficiency of operation. Of the

30, 21 are conductors and nine motormen. These 30 trainmen are the first to meet the requirements specified. The method used by the company in awarding efficiency emblems is to set a "bogie" in power saving for motormen and a similar "bogie" on the Ohmer register for conductors. In order to gain the coveted emblem, this "bogie" must be met for three consecutive months. In order to secure the "E," conductors must work twenty days during each month with an average of 97 per cent or over, making it as difficult an accomplishment for the conductors as for the motormen. The campaign has been under way only three months.

**Extends Air Mail Service.**—The air mail service provided by the Philadelphia Rapid Transit Company, Philadelphia, Pa., between Philadelphia and Washington will be extended to Norfolk on Oct. 10. The mail will be transported between Philadelphia and Norfolk in 3½ hours. This new service will place Norfolk in touch with overnight air mail service between Norfolk and Chicago by way of New Brunswick, N. J. Letters mailed in Norfolk at noon with special delivery stamps will be delivered in Washington and Philadelphia the same day.

**Uniform Fare Desired.**—The Southern Public Utilities Company, Charlotte, N. C., has received numerous requests from its Winston-Salem patrons to provide a uniform fare for all its lines there. At present the fares range from 5 cents to 10 cents. Only one bus line, that to the Union Station, has street car transfer privilege, but patrons of other lines are asking that the same privilege be accorded. Should this rate be established, with transfer privilege, patrons could go from any section of the town to another on only one fare.

**Disapproves Traffic Plan.**—The citizens' bond issue supervisory committee of St. Louis, Mo., by a vote of twelve to one on Sept. 20 decided against the plan of Director of Streets and Sewers Brooks to place street cars on Olive Street. The plans would put cars in a center parkway on Olive Street when that thoroughfare is widened from 60 ft. to 100 ft. between Twelfth Boulevard and Channing Avenue. Director Brooks' plan has been approved by the Board of Public Service.

**Doing a Bit in a Big Way.**—The Key System Transit Company of Oakland, Cal., has just "done its bit" to aid the Florida relief fund now being raised in the East Bay cities. A big theater was offered in which to hold the benefit show that began at midnight, Oct. 2, and lasted till 3 o'clock in the morning. Prominent actors and actresses gave their services free. There were ten bands and a big crowd came to enjoy the show. Oakland, however, is without all-night transportation; the cars stop running between 1 and 2 o'clock in the morning. The problem then arose, how to get the crowd home? The Key company solved this problem in a public-spirited way. Cars were sent to the theater where the benefit was held at 3 o'clock in the morning, and those who so desired were transported to their homes free of charge.



## Recent Bus Developments

### Bus and Interurban to Stone Mountain Memorial

With the completion of a hard-surfaced road from the town of Stone Mountain to the memorial carving on Stone Mountain itself, bus service has been resumed between the interurban terminus and the mountain by the Georgia Railway & Power Company, Atlanta, Ga. In the shuttle service are seventeen passenger buses, painted cream and white, the same combination used on the Morningside and Virginia Avenue buses of the Atlanta Coach Company. The coaches will meet each interurban car as it arrives in Stone Mountain, carrying passengers wishing to see the memorial around the mountain and back in time to catch the next interurban. In case visitors wish to stop over, they can do so, taking the bus back at any time.

A special Sunday service to Stone Mountain has just been started by the Georgia Railway & Power Company which is proving very popular. Stone Mountain interurban cars are dispatched on a 30-minute schedule Sundays instead of the usual one-hour schedule, with a special price of 75 cents for the round trip, including car and bus fare.

### Bus Line in Logan, Utah

Permission to abandon its street car line in Logan, Utah, and to substitute a bus line has been granted the Utah-Idaho Central Railroad by the Public Utilities Commission of Utah. The decision allows the company to tear up its tracks and repair the streets where the tracks have been.

Application for permission to abandon the railway was filed by the railroad on Aug. 4. This application declared that for many years the car line had been operated at a loss; that the revenues from such operation had been insufficient to meet the actual operating expenses, much less to pay interest on the capital invested. It was pointed out in the application also that, because of the growth and expansion of the city of Logan, the present street car line was inadequate to serve all the city, and that it was not feasible nor practicable to build other lines to certain sections. The application declared that it would be possible to give the citizens of Logan much better service with a bus line than with an obsolete railway. Permission was asked to operate the motor vehicle line, charging 7 cents for single fares, three fares for 20 cents, and selling twenty school tickets for one dollar.

At the hearing the commission found that a fair value for the 3 miles of track in Logan was \$86,400; that the interest upon the fair value, at 8 per cent, would be \$6,912. The net income in 1925, excluding interest and maintenance, was \$1,599. A franchise to operate as a common carrier by motor vehicle of passengers over the streets,

alleys and public places of Logan has already been granted by that city to the company.

### Developments Continue in Lincoln Bus Tangle

The Lincoln Traction Company, Lincoln, Neb., a subsidiary of the United Light & Power Company, has made application to the State Railway Commission and the City Council for authority to substitute eleven buses for car service to the state hospital for the insane, the state penitentiary, the state college of agriculture, to Bethany suburb, and for a crosstown line, with the same fare as prevails on street cars, 10 cents cash and four tokens for 30 cents is asked, with 2 cents more beyond certain fare limits.

E. R. Heiny, general superintendent, in a communication to the Council, said that it was doubtful if there was enough business in the city to pay the operating expenses of one company, but that the owners were committed to do whatever was possible to maintain the system. He claimed that for the last two months the net income has been \$1,700 each month less than enough to meet fixed charges. In order to avoid the payment of \$16,000 paying tax in a newly created district the company has asked the authorities for permission to abandon six blocks of track on the old Epworth lake park line, and at the hearing a petition was presented from property owners asking that the company's tracks be removed and the street improved.

In addition to this situation City Attorney Peterson has advised the City Council that a recent Supreme Court decision places entirely within its hands the question of whether any permits to operate buses are granted. He says that this power also includes the question of how far the substitution of the bus for the street car shall go, whether there shall be free transfers between buses and cars, and the matter of securing bus service for newly developed areas of the city.

C. N. Chubb, general manager of the United Light & Power Company told a group of business men at the Chamber of Commerce that the directors of United Power have agreed to expend \$1,300,000, estimated cost of the rehabilitation of the traction company, if the proper co-operation can be secured from the progressive business element of the city.

The discouraging feature of the Lincoln situation, he said, was that out of a clear sky came competition, referring to the request of the Omaha, Lincoln & Beatrice interurban to penetrate the downtown business section, where its rails never entered, with buses. Mr. Chubb said his company was willing to step out if any other company wished to operate the system in this city, where now there is no chance of one making an adequate return on its investment, but if no other company was willing to do that he

thought his company should be given full leeway.

**Buses Between Hamburg and Buffalo.**—The Public Service Commission has issued a certificate of convenience and necessity to John F. Burke, as receiver of the Hamburg Railway, for the operation of bus lines between the village of Hamburg, N. Y., and the city of Buffalo over two distinct routes. It is proposed to operate four buses, with a fare of 40 cents, from Hamburg to Buffalo, divided into four zones, with a 10-cent fare in each, except that the fare on Ridge Road extension will be 5 cents. Local passengers are not to be carried in Athol Springs or between Athol Springs and Woodlawn and from Buffalo, nor in the city of Buffalo.

**Would Substitute Bus Line.**—The Scranton Railway, Scranton, Pa., has filed application with the Pennsylvania Public Service Commission for permission to abandon the Wilson Creek-Forest City trolley line. This permission is sought on the ground that operation is expensive and also unsafe because of mining conditions. Coincidental with the filing of the application for abandonment the Scranton Bus Company, a subsidiary of the railway, requested permission to operate buses in the same territory. The buses would run from Forest City over the public highway to the city hall and Carbondale. J. J. Coleman, vice-president and general manager of the Scranton Railway, explained that with the bus and trolley schedules to be arranged improved transportation facilities would be furnished.

**Riding Into the Past by Motor Coach.**—The Fifth Avenue Coach Company has published in leaflet form an account of the engagements during the Revolutionary War on Manhattan Island between Sept. 15 and Nov. 16, 1776. A most interesting feature of the leaflet is an excellent map showing the movement of the American and British troops prior to the battle of Harlem Heights on Sept. 16. The greater part of the district described is now served by coaches of the company.

**Buses to Replace Cars on Some Troy Streets.**—The Public Service Commission recently approved a declaration of abandonment by the United Traction Company of certain tracks in the city of Troy, N. Y. Simultaneously with such approval a certificate was issued to the Capitol District Transportation Company, Inc., a subsidiary company of the United Traction Company, to operate buses over the same route.

**Church Charters Bus for Parishioners.**—The Union Federated Church, East St. Louis, Ill., started on Sept. 19 the hiring of a bus from the East St. Louis & Suburban Railway to increase attendance at the Sunday morning services. On that day there was an appreciable increase in the attendance at the church and Sunday school services. The plan, which will be tried out for six weeks, originated with the pastor, the Rev. Walter Schlaretski. He interested nine members of the congregation in his idea and they are now paying for the use of the bus. Each Sunday morning the bus starts out on a round of collections, picking up parishioners and their children. It reaches the church at 9:30 a.m.



## Financial and Corporate

### P.R.T. Stock on Sale to Public

The public is again invited by the Philadelphia Rapid Transit Company, Philadelphia, Pa., to participate in the purchase of the last \$5,000,000 of its 7 per cent preferred stock, being the remainder of an issue of \$15,000,000 which was authorized by the City Council a year ago. The first \$10,000,000 of the issue was purchased by the public some months ago. The stock is offered at par, which is \$50 a share. This stock has no voting power, but its dividends are preferred over the common or voting stock. Right is reserved by the company to purchase outstanding stock at any time for \$55 a share. Subscriptions can be made by mail to Securities Department, 433 Land Title Building.

It is the desire of the Mitten Management, Inc., that the stock be as widely distributed as possible, and to aid this purpose the stock is offered on the installment plan. The public can purchase the stock at the rate of \$1 a week per share.

It is said the company will use a large part of the money in expanding its bus system and the city taxi system and to retiring securities. Approximately \$800,000 will be spent in the installation of new service, construction of repair and garage buildings, and \$150,000 will be used for bus service equipment. An appropriation of \$1,700,000 will be made for extensions and improvements.

### Deficit on Mexico Tramways in 1925

The gross earnings of the Mexico Tramways, Mexico City, Mexico, for the year ended Dec. 31, 1925, was \$9,997,033 (Mexican currency), compared with \$11,692,369 for 1924. The operations resulted in a net deficit of \$530,255, after allowing for taxes and depreciation. This is a decrease of \$684,834 on the net earnings for 1924. Managing Director Conway in his report, included in the twelfth annual report of the board of directors, said that the situation created by the jitney competition had been intensified owing to the improved organization of the jitney service and the co-operation of the jitney owners throughout the whole of the city and suburban districts. Aside from the question of the jitney competition, the company's gross and net earnings suffered heavily from a serious strike during the first two weeks in March. Apart from the financial loss of the company, the effect of the strike was to destroy for some time all discipline among the men, but during the latter months of the year this discipline was restored, conditions greatly improved, and a harmonious relation re-established between the company's officials and the men.

As a result of explaining the financial situation of the company to the President of the republic and to the

Minister of Finance, a decree was published on June 29 which relieved all tramway companies from the 5 per cent tax on gross passenger earnings. Every effort was made during the year to reduce operating expenses to the lowest limit, and during the first few months of the year the staff in the shops was reduced by about 250 employees.

For repairs and maintenance of equipment the sum of \$1,766,078 was spent during the year. For the same

	Mexican Currency	
	1924	1925
Car Earnings:		
Passengers.....	\$8,932,977	\$7,635,801
Monthly tickets.....	1,622,708	1,415,932
Chartered cars.....	45,857	49,251
Freight.....	351,874	339,050
Baggage and parcels.....	127,340	107,628
Funeral.....	230,336	211,723
Omnibus.....	241,563	78,081
Total.....	\$11,552,657	\$9,837,468
Miscellaneous earnings....	139,712	159,564
Total earnings.....	\$11,692,369	\$9,997,033
Expenses:		
Operation.....	\$6,594,912	\$6,482,819
Maintenance, taxes and depreciation.....	4,942,878	4,044,469
Total expenses.....	\$11,537,790	\$10,527,288
Net earnings from operations in Mexico.....	\$154,579	*\$530,255
Passengers carried:		
1st-Class.....	69,625,847	62,947,208
2nd-Class.....	28,469,758	22,561,126
Omnibuses.....	1,961,634	510,805
Total.....	100,057,239	86,019,139
Car mileage:		
Motors and trailers....	17,688,506	17,167,951
Gasoline and mule cars..	79,907	113,430
Freight and sundry....	606,037	604,098
Omnibuses.....	545,284	205,362
Total.....	18,919,734	18,090,841
Average number of passenger cars operated per day		
Electric.....	382.99	379.59
Gasoline and mule car..	3.99	3.90
Omnibuses.....	12.02	3.98
Total.....	399.00	387.47
Average receipts per passenger car mile.....	.5965	.5283
Operating expenses, including taxes and depreciation, per car mile, passenger service.....	.6049	.5755
Daily average earnings from operation.....	\$31,946	\$27,389
Daily average operating expenses, including taxes and depreciation.....	31,524	28,841
Percentage of gross expenditures, including taxes and depreciation, to gross earnings.....	98.68%	105.30%
*Deficit		

period \$929,978 was expended on the track, overhead lines and buildings. The cost of operation decreased \$112,093, and by the abolition of the tax on passenger earnings, already referred to, in the month of June, the amount of taxes over the whole year decreased \$279,290. Owing to the continued decrease in gross earnings no improvement in operating expense ratio is reflected by the reduction in expenses.

The total capital expenditure during the year was \$661,248. On the other hand, property had been retired against the depreciation account valued at \$520,374, making the net amount chargeable to capital, \$140,873.

### Commission Approves Kansas City Financing

The Public Service Commission of Missouri at Jefferson City on Sept. 29, eliminated the only remaining barrier to the operation and control of the properties of the defunct Kansas City Railways by the new Kansas City Public Service Company when it approved the proposed financing plan of the new company. At the same time the commission approved the transfer of technical control of the property from Powell C. Groner to the Kansas City Public Service Company.

Mr. Groner, who is chief counsel of the new company, bid for the property at the bankruptcy sale held in Kansas City by the federal court, bidding in representation of the first mortgage bondholders. Recently, first mortgage bonds, collateral gold notes and promissory notes to the total value of \$24,542,602 were deposited in the vaults of the Federal Reserve Bank in Kansas City by Mr. Groner, who is also a vice-president of the new company. The securities deposited were those issued by the Kansas City Railways and are said to represent approximately 97 per cent of the outstanding indebtedness of that company.

It was said that, after the payment of the damage-suit claims and the preferred bills of the old company, about \$3,000,000 or \$4,000,000 would remain to be prorated among the holders of the first mortgage bonds of the old company. It was previously announced that such bondholders would receive prorated reimbursement in proportion to the value of bonds held, in cash rather than in securities of the new company.

### Upholds Rehabilitation Against Dividend Payments on Bay State

The full bench of the Massachusetts Supreme Court has handed down a decision adverse to L. Sherman Adams in his suit to compel the trustees of the Eastern Massachusetts Street Railway, Boston, Mass., to pay dividends on the common stock and on some of the adjustment shares.

The case has been before the courts a long time and was referred to a master, Judge Frederic H. Chase. Judge Chase's report was in favor of Mr. Adams, but the full bench of the Supreme Court decided in favor of the trustees, appointed by the state, upholding their position in rehabilitating the property instead of paying dividends. The court upheld also the policy of including in the cost of service allowances for depreciation prior to the period of trusteeship, when the property was known as the Bay State Street Railway and was in a run-down condition.

In referring to the powers conferred by the law the court says: "The statute was not intended to deprive the trustees of all discretion in respect to dividends. It was intended that they should act with proper consideration for the interests of the corporation and its creditors as well as for the rights of stockholders, and the Legislature contemplated that the road should continue to be operated as a going concern."



## Morgantown Properties Go Over to West Virginia Utilities

The electric railway properties of the Union Traction Company, operating the South Morgantown line through the First and Second Wards of Morgantown, W. Va., has formally passed to the control of the West Virginia Utilities Company. Sale of the Union company's property to the West Virginia Utilities Company was negotiated six weeks ago, subject to a new franchise, under which the latter concern planned to merge the operation of the Sabraton and South Morgantown lines. That franchise was granted by the Council of the city of Morgantown several weeks ago, leaving only the transfer of corporate control as the final step of the sale.

At a meeting of the Union Traction Company and West Virginia Utilities Company officials new officers and directors of the Union Traction Company, which still retains its corporate entity, were elected, all of whom are local officers of the West Virginia Utilities Company. The new officers are: President, R. P. Stacy, vice-president and general manager West Virginia Utilities Company; vice-president, O. L. Eaton, Jr., commercial manager West Virginia Utilities Company; secretary-treasurer, F. M. Burchinal, holding a similar position for the West Virginia Utilities Company, and general manager, Clark Emerson, railway superintendent West Virginia Utilities Company. The four officers, together with Judge Frank Cox, counsel, constitute the new board of directors for the Union Traction Company.

In discussing the transfer of the property, Vice-President Eaton said there would be no changes for the time being in the schedule of cars, although it was possible there will be some betterment of the schedule within a week or ten days. The patience of the public was sought in the plan for combined operation of the Sabraton and South Morgantown lines. At the present time there was much improvement work to be done on the trackage of the South Morgantown line. In all, the company expected to spend \$50,000 in track improvements and paving along this line.

As to when the new through service with the new cars and improved schedule would become effective, Mr. Eaton stated that it would all depend upon the rapidity with which the repairs to the South Morgantown line could be made. He felt sure that it would be not later than Jan. 1, 1927.

## Seven-Cent Fare in Oakland Results in Slight Increase

Officials of the Key System Transit Company, Oakland, Calif., have revealed that since the 7-cent fare went into effect last January there has been a big slump in patronage. The net loss since Jan. 17 is 3,725,403 on street car lines and 835,862 on the Key division, or a total loss to the company of more than 4,500,000 riders. A loss in traffic was discounted by engineers before the higher rates on cars and ferries went into effect, but it was expected that there would be an increase in revenue

amounting to at least \$850,000. As a matter of fact, the new rates have produced an increase in revenue of only \$152,025, insufficient to equal the amount of wage increase to platform men of \$238,429. In addition the company has been compelled to add the sum of \$280,000 per year to interest charges in order to finance its improvement program, amounting to \$3,698,789.

So disappointing has been the financial return under the new revenues that the company has been forced to abandon a portion of its projected improvement plan. The elevated over Emeryville, to speed up Berkeley traffic to the Mole, will not be built for a while. It is likely, however, that before very much longer the Key System will take steps to run an automobile ferry service to and from San Francisco. Similar service on other lines, notably the Southern Pacific, has proved highly lucrative.

## Valuation of Missouri Utilities Increases

The assessed valuation of the public utilities in Missouri for the 1926 taxes was placed at \$485,115,754 by the State Tax Commission in a report submitted Sept. 25 to the Missouri Board of Equalization. This is an increase of \$27,796,745 over the assessment last year. The valuations recommended by the Tax Commission compared with last year includes street railways, \$68,721,741, an increase of \$488,641. The United Railways of St. Louis was assessed at \$47,144,102 and the Missouri Electric Railroad, a subsidiary, at \$782,406, a combined assessment of \$47,926,508, a decrease of \$55,417. Public utilities will be given an opportunity to appear before the Board of Equalization to protest against their assessments.

## Gross in Philadelphia \$26,675,935

The Philadelphia Rapid Transit Company, Philadelphia, Pa., has issued the following financial and traffic statement:

### INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Six Months Ended June 30, 1926	Three Months Ended June 30, 1926
Operating revenue.....	\$26,675,935	\$13,768,010
Operation and taxes.....	19,585,558	9,961,016
Operating income.....	7,090,376	3,806,994
Non-operating income....	275,105	145,053
	\$7,365,482	\$3,952,047
Payments to city		
Sinking fund and Frankford elevated.....	402,079	201,039
	\$6,963,402	\$3,751,007
Fixed charges, dividends and management fee..	6,947,511	3,742,662
Surplus.....	\$15,890	\$8,345

### PASSENGER STATISTICS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Six Months Ended June 30, 1926	Three Months Ended June 30, 1926
	Total	Total
Passenger revenue.....	\$26,281,114	\$13,552,720
Passengers carried.....	483,571,941	248,835,184
Average rate per passenger, cent.	5.43	5.45
	Surface, Subway and Elevated	Surface, Subway and Elevated
Motor Bus		
	\$25,011,821	\$12,800,498
	469,916,443	240,791,676
	13,655,498	8,043,508
	5.32	5.32
	9.30	9.35

**Bonds Offered.**—An issue of \$1,500,000 Chicago, North Shore & Milwaukee Railroad first and refunding mortgage 5½ per cent bonds, series B, was offered on Oct. 1 by Halsey, Stuart & Company and the National City Company. The bonds mature April 1, 1956, and are priced at 98.50 and interest, yielding about 5.60 per cent. Proceeds of the issue will be used toward reimbursing the company for capital expenditures for additions and betterments to its properties. The company operates from Evanston, Ill., to Milwaukee, with a branch to Mundelein, Ill.

**New Directors Elected.**—Berry S. Spain, assistant secretary and assistant treasurer of the Nashville Railway & Light Company, Nashville, Tenn., and John C. Guild, vice-president of the Tennessee Electric Power Company, have been elected directors of the Nashville property. They succeed in this capacity H. H. Batchelor and W. R. Cole, resigned.

**Receivers Appointed for Missouri Road.**—E. Z. Wallower of Harrisburg, Pa., filed a petition in the federal court of Kansas City, Mo., on Sept. 14, asking that receivers be appointed to take charge of the affairs of the Southwestern Missouri Railroad, which operates electric railway lines at Joplin and at Webb City, Mo., and interurban services to Baxter Springs, Kansas, Picher, Okla., and to various other smaller cities in that district. The company, through its attorneys, on the same day filed an answer to the petition, consenting to the requested receivership. Judge Merrill E. Otis subsequently appointed F. C. Wallower and Harrison C. Rogers, both of Joplin, receivers for the company. Mr. Wallower, the petitioner, who is said to own 12,000 shares of stock and \$400,000 in bonds of the company, pointed out in the petition that the interest on the bonds had not been paid for a long time and that other creditors of the company had previously threatened legal action.

**Will Redeem Bonds.**—It is announced that all of the outstanding first mortgage gold bonds of the Kentucky Utilities Company, Louisville, Ky. (series B and E) will be retired. The series B bonds, due 1941, will be paid on Nov. 15 at 107½ and interest and the series E bonds, due 1949, will be redeemed Nov. 1 at 105 and interest. The Kentucky Utilities Company is a subsidiary of the Middle West Utilities Company.

**Audit in St. Louis Under Way.**—The audit of the books of the United Railways, St. Louis, Mo., to determine whether the company is entitled to an increase in fare from 7 cents to 8 cents was started by auditors of the Missouri Public Service Commission on Sept. 27. The audit was ordered last June following the filing of the application for increased fare by Receiver Rolls Wells.



**Acquisition Bonds Approved.**—The Massachusetts Department of Public Utilities recently approved the issue by the Interstate Street Railway, Attleboro, Mass., of \$150,000 first mortgage 6 per cent sinking fund gold bonds dated April 1, 1926, and due April 1, 1951. The proceeds are to be used solely for the payment and cancellation of \$50,000 outstanding car trust notes and \$100,000 in payment for the property and franchises of the Attleboro Branch Railroad.

**Extra Dividend Declared.**—Directors of the Pittsburgh Utilities Corporation, New York, N. Y., recently declared an extra dividend of \$187,500 as well as the regular semi-annual dividend of \$1 a share on the common and 2½ per cent on the preferred. The Pittsburgh Utilities as of Dec. 31, 1925, owned 491,500 shares of common stock of the Philadelphia Company and 25,000 shares of participating 8 per cent preferred stock of the Duquesne Light Company. An important subsidiary of the Philadelphia Company is the Pittsburgh Railways, Pittsburgh, Pa.

**Meet on Appraisal Appointments.**—A session was held on Sept. 30 by members of the Board of Public Works, Public Utilities Bureau and Mayor A. A. Will for the purpose of selecting engineers to appraise the value of the properties of the Louisville Railway, Louisville, Ky., such appraisal to be used as the basis on which to compute earnings and control fare rates. No appointment has been made as yet. A number of engineering concerns has filed proposals to handle the job.

## Book Reviews

### Safety Rules for the Operation of Electrical Equipment and Lines

Department of Commerce, Bureau of Standards, Washington, D. C. 64 pages. Price, 15 cents.

This handbook of the Bureau of Standards, No. 8, comprises part four of the fourth edition of the National Electrical Safety Code. The present edition is the result of the revision which has been carried out according to the procedure of the American Engineering Standards Committee and the revised rules have had the approval of a sectional committee organized in conformity with those rules of procedure.

### Commerce Yearbook 1925

Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. 800 pages. Price, \$1.

This publication issued by the government gives a complete and authentic record in text and tables of the American trade and industry for 1925 with a view of industrial progress. Its material has been gathered from every available source and carefully digested by experts. The contents include a résumé of production, employment, domestic trade and prices. Besides discussions of transportation, finance, banking and foreign trade there are sections devoted to construction, construction materials, motor vehicles, railway equipment and electrical apparatus.

## Personal Items

### H. A. Mullett Goes to Minneapolis to Assist Vice-President

A prominent figure in the railway and bus field will become affiliated with the Twin City Rapid Transit Company, Minneapolis, Minn., as assistant to Vice-President T. Julian McGill on Oct. 15. This man is Howard A. Mullett, prominent in Milwaukee and Chicago and also well known in manufacturing circles. Only a little more than a year ago Mr. Mullett resigned as assistant general manager in charge of the railway and bus properties of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to join the Yellow Cab Company, in Chicago. Early in the present year, after his short service, he was named vice-president of the latter company, which is now a General Motors subsidiary.

His splendid work in Milwaukee and especially the development of the com-

vice-president and general manager of that property in charge of operations.

Mr. Mullett was born in Louisville, Ky., in 1880. He was educated in the public schools of Kansas City.

### Fred G. Buffe Appointed in Kansas City

According to an announcement made on Sept. 30 Fred G. Buffe, general manager of the Kansas City Railways for the receivers, has been named vice-president and general manager of the Kansas City Public Service Company, Kansas City, Mo., and will be in charge of all operations of the local railways when the latter company has formally taken over the property and the present receivership is officially closed. William G. Woolfolk, president of the new company, tendered the offer of the position to Mr. Buffe.

Mr. Buffe was manager of the Kansas City Railways for a number of years prior to the receivership, which has been in progress for about six years, and was retained in that capacity by Fred W. Fleming and Francis M. Wilson, receivers.

During recent years he has become very well known in mid-Western street railway circles, through his activities in the local company during the receivership and through his authoritative work in connection with the electric railway associations.



H. A. Mullett

pany's bus project under his supervision paved the way for his responsible position with the Yellow Cab Company of Chicago. R. H. Pinkley succeeded Mr. Mullett as assistant general manager at Milwaukee.

In 1904, when Mr. Mullett was graduated from Rose Polytechnic Institute, he became associated with the Westinghouse Electric & Manufacturing Company, at Pittsburgh. Here he remained until 1906, when he left to join the Milwaukee Electric Railway & Light Company, as assistant to the superintendent of equipment. He did not remain assistant long, but assumed the rôle of superintendent from 1911 to 1918. In 1918 he became assistant general manager of the company's city, interurban and bus transportation department, and in 1919 his jurisdiction was extended to cover the company's newly created city and interurban bus division. Here it was that his efforts were crowned with success, for the company's bus project developed into one of the greatest in the country. Some few years ago, when the Milwaukee property acquired control of the Milwaukee Northern Railway, Mr. Mullett was made

Harry Engle has been reappointed street railway commissioner of Youngstown, Ohio, by Mayor Scheible for a second term of four years beginning Jan. 16, 1927. The reappointment was approved unanimously by the Council.

Howard R. Stearns, assistant electrical engineer of the Detroit Street Railways, Detroit, Mich., has severed his connections and assumed the position of electrical engineer and statistician with the Miller-Schorn system. He had been with the city department of street railways for the past five years. Mr. Stearns was graduated from the University of Michigan engineering college and gained his shop experience with the Westinghouse Electric & Manufacturing Company. He has had experience with the valuation of electric and railway properties in Michigan and New Jersey.

J. J. Connors, safety supervisor of the transportation department of the Georgia Railway & Power Company, Atlanta, Ga., resigned recently. He has accepted a position with the Nashville Railway & Light Company, Nashville, Tenn., where he will continue his safety work. Mr. Connors spent most of his life in Nashville and was employed by the Nashville property for many years.

Norman F. Titus, San Francisco, Cal., has been appointed chief of the transportation division, United States Department of Commerce.



## Obituary

Judge Cicero Lindly, vice-chairman of the Illinois Commerce Commission, died at his home in Greenville, Ill., on Sept. 23. He was 69 years old.

Chester L. Bisbee, for 28 years identified with street railway work, died at his home in Fall River, Mass., on Sept. 26. For the last fourteen years Mr. Bisbee was superintendent of the Fall River division of the Eastern Massachusetts Street Railway. He was born in Middleboro, Mass.

Clermont Harvey Wilcox, president of the New York Insulated Wire Company, and for many years head of the banking and brokerage house of Wilcox & Company, died Oct. 2 in the Fifth Avenue Hospital, New York, N. Y. The New York Insulated Wire Company, of which Mr. Wilcox was the founder, was the first company to make insulated wire in the United States.

Anderson Gilbert Moore associated with the Insull properties, died Sept. 30 in New Albany, Ind. At the time of his death he was industrial agent of the Interstate Public Service Company, Middle West Utilities and the Kentucky Utilities Company. He began work with the Rock Island & Southern Railway in the claims department. Twenty-five years ago he went to New Albany as cashier of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway, absorbed by the Interstate Public Service Company fifteen years ago. At that time he became industrial agent of the Interstate in Indiana.

Arthur Holland, prominent street railway organizer and at one time president of the United Railways of San Francisco, Cal., died Oct. 1 at his home in Concord, Mass. His street railway career began in 1901, when he was elected president of the United Railways of San Francisco. He remained as president of this company for several years, and about 1907 became instrumental in the reorganization of the York Street Railways in Pennsylvania. Later he was made president of the Bangor & Aroostook Railroad. He was born in Boston in 1850. He was educated at the Brooks School of that city and Harvard University, being graduated from the latter institution in 1872. Early in life he became prominent as an iron and steel merchant. Mr. Holland established the firm of Holland & Company, Pittsburgh, Pa., in 1894.

Nicholas B. Trist, special wheel engineer with the Carnegie Steel Company, Pittsburgh, Pa., died at his residence in Sewickley, Pa., Sept. 29. As a young man he entered the service of the Pennsylvania Railroad as an apprentice in the Altoona shops and served with this road in various capacities for about 23 years. Through Charles T. Schoen he became connected with the Schoen Steel Wheel Company upon the entrance of that firm into the manufacture of solid wrought steel wheels. Mr. Trist became connected with the Carnegie Steel Company when that company took over the Schoen Steel Wheel Company in 1908. He was born in Savannah, Ga., in 1862.

## 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

### Pennsylvania Railroad Places Order for Electrical Equipment

In accordance with its program of electrification of the suburban lines entering Philadelphia, the Pennsylvania Railroad has placed an order with the Westinghouse Electric & Manufacturing Company for the electrical equipment for 93 coaches, to be used on the Wilmington Division. The contract also calls for motors and controls for four huge electrical passenger locomotives of the same type ordered from the Westinghouse company last February. The car equipment just ordered is a duplicate of that previously developed by the Westinghouse Electric & Manufacturing Company for application to the Pennsylvania standard multiple-unit coaches. The Pennsylvania Railroad already has 130 of these electric coaches with Westinghouse equipment.

### Improvements to Interurban Service in Oklahoma

The Oklahoma Railway has completed a three months program of improvements on its interurban service. About \$1,000 has been spent on each interurban car operating out of Oklahoma City to El Reno, Norman and Guthrie and intermediate points. In addition to a general overhauling mechanically the cars have been repainted and reupholstered. Improvements in the interurban service of the Oklahoma Railway have been steady for the past two years beginning with the expenditure of more than \$100,000 for substations. These substations have so increased the power available on interurban lines that all the schedules have been materially improved, the running time between stations having been reduced considerably on the Guthrie and Norman lines.

### Twenty-two Double-Deckers Put on by Fifth Avenue Company

For the improvement of its service to the public, the Fifth Avenue Coach Company, New York, N. Y., on Sept. 30 put on the streets 22 of a fleet of 45 new double-deck motor coaches. The construction of these vehicles has been carried out in the shops of the company in New York City. It is expected that the last of these coaches will be finished and put into service before the end of October.

The new coaches, while retaining the best features of the company's "L" type covered upper deck vehicles, have many special improvements and are known as the "SL" type. They have a seating capacity of 55 passengers each. All lower decks are upholstered in leather. Five coaches have upper deck seats of a rubberized automobile fabric, five are upholstered in Kemi-

Suede, a newly developed material, and 35 coaches have leather seats on the upper deck. Half of the coaches have permanent covered tops and the others have "roll tops."

The engines are of the Yellow sleeve valve type, four cylinders. On the rear platform an automatic electric fare box has been installed to increase the rapidity of loading.

### Five Automatic Subs for Indianapolis

The Indianapolis Street Railway, Indianapolis, Ind., placed an order with the Westinghouse Electric & Manufacturing Company a few days ago for equipment for five substations, and the order included nine 1,500-kw., 600-volt converters, 28 transformers and auxiliaries. One substation will contain three units arranged for semi-automatic operation. It will be used as the base station. Two others will have two units and operated automatically while two others having single units will also be automatic. Although supervisory control is not included in the present contract, the stations will all be built to facilitate its application.

### Rolling Stock

Birmingham Electric Company, Birmingham, Ala., has placed an order for sixteen new cars with the Cincinnati Car Company. The outlay will cost \$250,000.

Key System Transit Company, Oakland, Cal., has ordered eleven new Fageol buses for use on the new Berkeley-Oakland Telegraph Avenue line, service on which will begin in December. The buses will be of steel construction, of the 29-passenger type, 29 ft. 9 in. in length and with a 230-in. wheelbase. This bus line will provide way service to and from the two East Bay cities, trolley cars providing the express service, thus reversing the usual process.

### Metal, Coal and Material Prices

Metals—New York	Oct. 5, 1926
Copper, electrolytic, cents per lb.	14.25
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.625
Zinc, cents per lb.	7.68
Tin, Straits, cents per lb.	71.25
<b>Bituminous coal, f.o.b. Mines</b>	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$6.00
Somerset mine run, Boston, net tons.	2.025
Pittsburgh mine run, Pittsburgh, net tons.	2.075
Franklin, Ill., screenings, Chicago, net tons.	1.525
Central, Ill., screenings, Chicago, net tons.	1.40
Kansas screenings, Kansas City, net tons.	2.35
<b>Materials</b>	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$5.75
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags.	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.4
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	\$0.935



# MODERNIZE— —MERCHANDISE!



The most successful electric railways are continually practicing this doctrine! They strive to maintain their equipment up to the very highest point of efficiency, safety and comfort in order to successfully sell their merchandise—*service!* In the carrying out of this doctrine have you noticed that nearly all the modern cars of these companies are equipped with

## PEACOCK STAFFLESS BRAKES!

Modern design demands the Peacock because of minimum platform space occupation, simplicity of operation, low installation and maintenance costs, and tremendous braking power. Their almost unlimited chain winding capacity and light weight make these brakes adaptable for all types of service.

We will gladly send facts and figures proving what these brakes have done for others and what they will do for you.



**National Brake Company, Inc.**  
890 Ellicott Square Buffalo, N. Y.

*Canadian Representative*  
Lyman Tube & Supply Co., Ltd., Montreal, Can.





## Be Sure of Customer Confidence

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

---

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

---

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

---

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

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

## The American Appraisal Company

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MILWAUKEE

PUBLIC UTILITIES • INDUSTRIALS • REAL ESTATE PROPERTIES • NATURAL RESOURCES

A NATIONAL ORGANIZATION





# Chicago, South Bend & N. Ind. Ry. Co. Purchases 5 Studebaker Busses

— investigation of bus operating costs by this company's engineers  
proved higher economy of Studebaker equipment

**F**IVE Studebaker Busses, all of the 21-passenger pay-enter street-car type, were recently purchased by the Chicago, South Bend and Northern Indiana Railway Company.

The selection of Studebakers is significant, because this company has been operating several types and makes of busses as feeders to its lines in northern Indiana.

"The medium-size Studebaker Bus was selected," states R. R. Smith, vice-president and general manager of the company, "after an exhaustive examination of operating costs of all busses on the market. Our engineers found Studebakers the most economical, both in initial and operating costs.

"We selected this medium size because the experience of transportation companies everywhere shows it is the most suitable for supplying patrons with frequent, comfortable, prompt service—and for enabling the company to operate economically.

"We found our heavy-type busses both uneconomical to operate during the entire day and unsatisfactory for city service because schedules are necessarily slower.

"Larger busses seem feasible during rush hours, but the unprofitable cost of hauling the heavy equipment around during the rest of the day mounts up to such a degree as to embarrass our effort to supply the best service."

This testimony from an experienced operator speaks volumes. And the facts are supported by the cost records of hundreds of operators all over the country.

The first cost of the medium-size Studebaker Bus is half that of the average large-capacity bus. Its operating expense is lower because it is 50% lower in weight. Operators report an average operating cost of 7 to 9 cents per unit, covering gas, oil, garage, damage, superintendence, drivers' wages, repairs and miscellaneous items—against the 16 to 17 cents per mile for the same items of operating expense on the average heavy truck-type bus.

More than 1000 operators are using Studebaker Busses—convinced by actual cost records that they insure higher profit per passenger mile. For further information on Studebaker Busses of all types, mail the coupon below.



Studebaker 21-Passenger Pay-Enter Street-Car type bus (Dual Rear Wheels); \$5125, f.o.b. factory. The most powerful bus chassis of its size in the world, according to the rating of the Society of Automotive Engineers

## Six Body Designs, 12 to 21 Passengers \$3935 to \$6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type.....	\$3935
15-Pass (including driver) cross-seat Sedan-Type.....	\$4295
18-Pass (including driver) side-entrance Parlor Car.....	\$5300
19-Pass. (including driver) cross-seat Sedan Type.....	\$5050
20-Pass (including driver) Parlor-Car De Luxe*.....	\$6150
21-Pass. Pay-As-You-Enter Street-Car Type*.....	\$5125

\*Includes dual rear wheel

THE STUDEBAKER CORPORATION OF AMERICA,  
Dept. B, South Bend, Ind.  
Send me full information on Studebaker Busses without obligation.

Name.....

Address.....

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

We have.....busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan.....Parlor Car.....Street-Car Type.....

Capacity:.....Passengers.





## You Wouldn't Back a Horse Carrying 20 lbs. Excess Weight

A lot of street cars are carrying an excess weight of 20 lbs. for every unit of seating capacity. How can any operator expect such cars to be big revenue producers under this tremendous handicap.

Modern cars utilizing HASKELITE for floors, roofs, linings, hoods, seat backs, etc., and PLYMETL for exterior side panels, dash, vestibule linings, etc., can show a saving in weight of 935 lbs. per car as compared with ordinary standard construction.

On the commonly accepted basis of 6 cents per lb. per year, the saving in operating expense from a cut in weight of 935 lbs. is \$56.10. A saving of this size on each car means a big addition to revenue and it can be secured at a first cost no greater than for heavy equipment.

The HASKELITE-PLYMETL car is attractive, comfortable and safe. It helps you build your revenue and then it helps turn that revenue into net earnings. Note the representative list of companies using HASKELITE products for car and bus construction.

*Let us send you blue-print booklets and full information.*

### Prominent Users

Boston and Maine R.R.  
Boston, Mass.  
The Chicago, North Shore & Mil. R.R.  
Highwood, Illinois  
Chicago Surface Lines  
Chicago, Illinois  
The Cincinnati Traction Co.  
Cincinnati, Ohio  
Columbus Ry. Power & Light Co.  
Columbus, Ohio  
The Denver Tramway Company  
Denver, Colorado  
Detroit United Railway  
Detroit, Michigan  
Fort Smith Light & Traction Co.  
Fort Smith, Arkansas  
Galveston-Houston Elec. Co.  
Galveston, Texas  
Grand Rapids Ry. Co.  
Grand Rapids, Michigan  
Georgia Ry. & Power Co.  
Atlanta, Georgia  
Illinois Traction, Inc.  
Chicago, Ill.  
Indiana Service Corp.  
Fort Wayne, Indiana  
Los Angeles Railway Corp.  
Los Angeles, California  
Milwaukee Elec. Ry. & Light Co.  
Milwaukee, Wisconsin  
Monongahela West Penn Public Service Co.  
Fairmont, West Virginia  
Montreal Tramways Co.  
Montreal, Quebec, Canada  
Municipal Railway of San Francisco  
San Francisco, Cal.  
Pacific Northwest Traction Co.  
Seattle, Washington  
The Pennsylvania-Ohio Elec. Co.  
Youngstown, Ohio  
Philadelphia Rapid Transit Co.  
Philadelphia, Pa.  
The Pine Bluff Company  
Pine Bluff, Arkansas  
Pittsburgh Railways Co.  
Pittsburgh, Pennsylvania  
Public Service Railway Co.  
Newark, New Jersey

HASKELITE MANUFACTURING CORPORATION, 133 West Washington Street, Chicago

Canadian Representatives:

Railway and Power Engineering Corporation, Ltd.  
Montreal Toronto Winnipeg



PLYWOOD  
HASKELITE  
PLYMETL



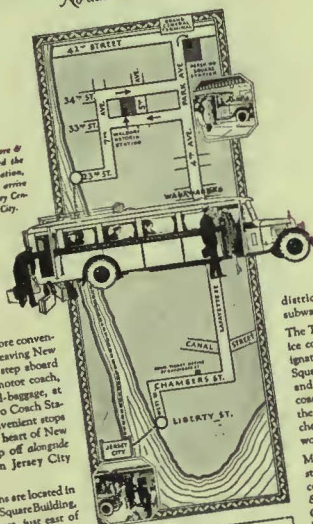




## A Service Improvement for New York Travelers

Now you make your train by simply  
stepping aboard the Train Connection  
Motor Coach in the Heart of New York  
No additional charge

On August 29th - Baltimore &  
Ohio trains discontinued the  
use of Pennsylvania Station,  
New York City. Trains arrive  
at and depart from Jersey Cen-  
tral Station - Jersey City.



HOW much more conven-  
ient, when leaving New  
York, to simply step aboard  
a comfortable motor coach,  
with your hand-baggage, at  
either of the two Coach Sta-  
tions, or at convenient stops  
en route in the heart of New  
York, and step off alongside  
of the train in Jersey City  
Terminal.

Coach Stations are located in  
the Pershing Square Building,  
on 42nd Street, just east of  
Park Avenue (directly oppo-  
site the Grand Central  
Terminal) and in the Waldorf-  
Astoria Hotel, 33rd Street  
side, corner of Astor Court.

Returning, step from the train  
directly into the coach alongside,  
on the station platform, and be  
taken safely and quickly to  
the center of New York's  
hotel, business and shopping

**Motor Coach Stops**

33rd Street routes	Liberty Street routes
Pershing Square Station	Pershing Square Station
Waldorf-Astoria Hotel	Waldorf-Astoria Hotel
Grand Central Terminal	Grand Central Terminal
42nd Street	42nd Street
43rd Street	43rd Street
44th Street	44th Street
45th Street	45th Street
46th Street	46th Street
47th Street	47th Street
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95th Street	95th Street
96th Street	96th Street
97th Street	97th Street
98th Street	98th Street
99th Street	99th Street
100th Street	100th Street

For complete list of all information apply to either of  
**J. B. SCOTT**  
General Eastern Passenger Agent  
1170 Broadway at 33rd Street, New York  
Phone FRanklin 10173

districts - convenient to  
subway and surface lines.

The Train Connection Ser-  
vice covers two regularly des-  
ignated routes - one uptown  
Square Station - one downtown.  
The coach stations provide for  
the sale of tickets, parcel  
checking, porter service and  
women's rest rooms.

Motor Coaches leave coach  
stations on regular schedule  
connecting with Baltimore  
& Ohio trains at the Jersey  
City Terminal. When you  
board your coach you have  
made your train, as the train  
will not leave until the coach  
arrives.

There is no extra charge for  
this added service - your  
Baltimore & Ohio ticket  
now takes you to and from  
the Heart of New York.

# YELLOW COACHES

**SELECTED TO MARK  
A NEW ERA IN BUS  
AND TRAIN CO-ORDINATION**



**Baltimore & Ohio**  
THE LINE OF THE CAPITAL LIMITED - NATIONAL LIMITED





Yellow Coaches line up before the Pershing Square Station of the Baltimore & Ohio Railroad at Park Avenue and 42nd Street, New York City. When a passenger steps into a Yellow Coach he has already begun his railroad journey.

1



The departure of Yellow Coaches takes place on the dot, according to railroad time table. Passenger baggage is carried in a special compartment at the rear end of the coach. There is a luxurious seat for every passenger.

2



En route to the ferry, scheduled stops are made at hotels and principal points where more passengers and their baggage are taken on. Passengers are also picked up on signal.

3

# YELLOW COACHES

## SOLVE A TREMENDOUS TERMINAL PROBLEM-

Faced with the necessity (owing to expiration of contract with the Pennsylvania Railroad) of again using the railroad terminal of the Central Railroad of New Jersey across the Hudson River in Jersey City instead of the Pennsylvania Railroad's terminal in New York, as had been done since the World War, the Baltimore & Ohio Railroad solved their problem with motor coaches—Yellow Coaches.

"Trainside motor coach service," it is called, between the new terminus in Jersey City and the heart of New York, thus inaugurating for the first time what may be termed

without reservation an integral, important and necessary part of the through passenger line of a railroad. When a passenger steps into one of the twenty-four Yellow Coaches, employed for this "trainside service," he has already begun his railroad journey.

Last year the Baltimore & Ohio carried 575,000 passengers into and out of New York. If traffic remains the same, Yellow Coaches will be faced with the transportation problem of handling an average of 1,575 passengers daily.

On Sunday, August 29th, twelve Yellow Coaches began







4

The ferry dock is approached and Yellow Coaches line up, ready to board the boat and cross the Hudson River to the train shed of the Baltimore & Ohio Railroad at Jersey City.



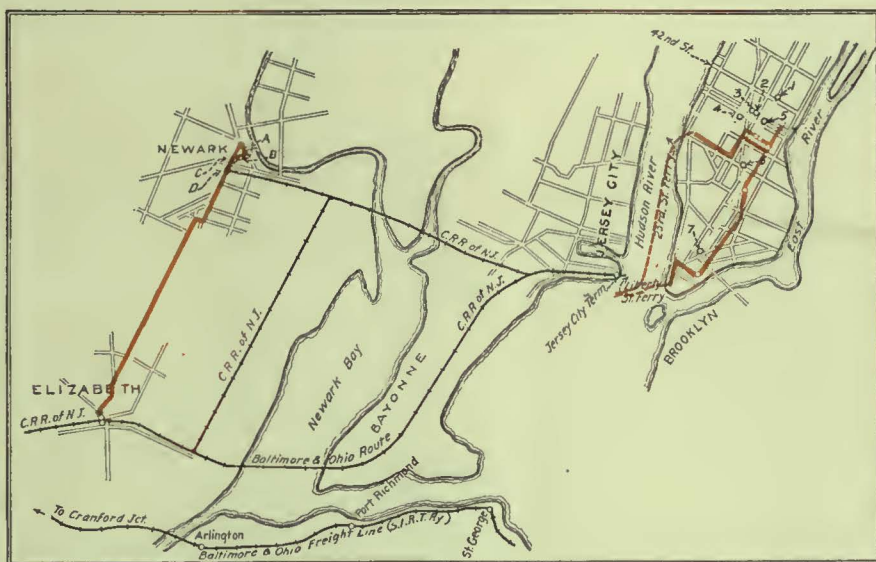
5

Yellow Coaches approach the ferry slip on the New Jersey side and passengers, having left the skyline of New York behind, prepare to alight and continue the remainder of the journey by train.



6

Yellow Coaches pull up beside the waiting train and unload. Baggage is quickly transferred and passengers find their car seats, refreshed by a comfortable motor coach ride.



The Baltimore & Ohio's Bus Lines in New York and Newark with Railroad and Ferry Connections

operating between Jersey City and New York. Two Yellow Coaches run from Newark to meet train connections at Elizabeth, N. J. All have parlor seats for 23 passengers, in addition to the driver and attendant. Hand baggage is carried in a special compartment, partitioned off in the rear where four auxiliary folding seats are located for emergency use.

So popular has the luxurious service provided by Yellow Coaches proven, that ten more

have been added to the original fleet of fourteen, making a total of twenty-four.

Thus, again Yellow Coaches are doing pioneer service in marking a new era in the coordination of motor coach and railroad transportation; acting not only as a substitute service to take the place of the lack of an actual railroad terminal in the heart of New York City, but bringing to passengers a new transportation facility having intrinsic merits all its own.





# NEW YORK, PHILADELPHIA, BALTIMORE AND WASHINGTON

EFFECT 5

STATIONS—WESTWARD		511	15	25	505	521	501	7	9	3	1
		Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
<b>New York—3rd St. Motor Coach Route</b>											
Lv Park Square Sta. (42nd St. opp. Grand Central Ter.)	PM	10:10	11:15								
Lv Vanderbilt Hotel (4th Avenue and 54th Street)	PM	10:15	11:20								
Lv Waldorf-Astoria Station (5th Ave. and 33rd and 34th Sts.)	PM	10:20	11:25								
Lv McAlpin Hotel (Broadway and 33rd-34th Streets)	PM	10:25	11:30								
Lv West 23rd Street Station	PM	10:30	11:35								
Ar Jersey City	PM	10:40	11:45								
<b>New York—Liberty St. Motor Coach Route</b>											
Lv Park Square Sta. (42nd St. opp. Grand Central Ter.)	PM	12:10									
Lv Vanderbilt Hotel (4th Avenue and 54th Street)	PM	12:15									
Lv Wamamaker's (4th Avenue and 9th Street)	PM	12:20									
Lv Consolidated Ticket Office—57 Chambers Street	PM	12:25									
Lv Liberty Street Station	PM	12:30									
Ar Jersey City	PM	12:35									
<b>Lv Jersey City (Jersey Central Station)</b>											
Lv Newark, N. J.—Jer. Cent. Sta.—Motor Coach Connection	PM	1:12									
Lv Public Service Terminal Building	PM	1:12									
Lv Robert Treat Hotel	PM	1:12									
<b>Lv Elizabeth</b>											
Lv Plainfield	PM	1:30									
<b>Lv Trenton</b>											
Lv Trenton Junction	PM	1:35									
Lv Wayne Junction, Pa.	PM	1:40									
Ar Philadelphia, Pa. (Chestnut St. Station)	PM	1:45									
Lv Philadelphia, Pa. (Chestnut St. Station)	PM	1:50									
Lv Chester, Pa.	PM	1:55									
Lv Wilmington, Del.	PM	2:00									
Lv Newark, Del.	PM	2:05									
Ar Aberdeen, Md.	PM	2:10									
Ar Baltimore, Md. (Mt. Royal Station)	PM	2:15									
Ar Baltimore, Md. (Camden Station)	PM	2:20									
Lv Baltimore, Md. (Camden Station)	PM	2:25									
Ar Washington, D. C. (Union Station)	PM	2:30									
<b>(Connections for Richmond, Va.)</b>											
Lv Washington, D. C. (R. F. & P.)	PM	2:35									
Ar Richmond, Va.	PM	2:40									

In addition to the regular Coach Train connections, frequent ferry service is operated from 23rd Street Station and Liberty Street Station.



## YELLOW COACHES

as much a part of the Time Table  
as the trains ~

Dependable train connections hinge on dependable motor coaches.

Yellow Coaches run through city traffic—New York traffic—making passenger pick-up stops at strategic, principal points. Each regular stop, coming and going, is listed as part of the Baltimore & Ohio time table. Yellow Coaches must hold to schedule; they must arrive and leave on time, for upon them depends the operation of the trains.

For every type of transportation service, Yellow Coach plus General Motors stand behind the operator with experience and equipment ready to assure low-cost, profitable miles.

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



# In Kansas City—

**U**NDER extremely difficult operating conditions—there is no route which does not have a grade of at least 5 per cent, while some of the grades are as great as 13 per cent—the Kansas City Railways Co. operates 45 motor coaches—equipped with Timken Axles, front and rear.

These vehicles are averaging 151,000 miles per month and the operating company reports "Axle service very satisfactory."

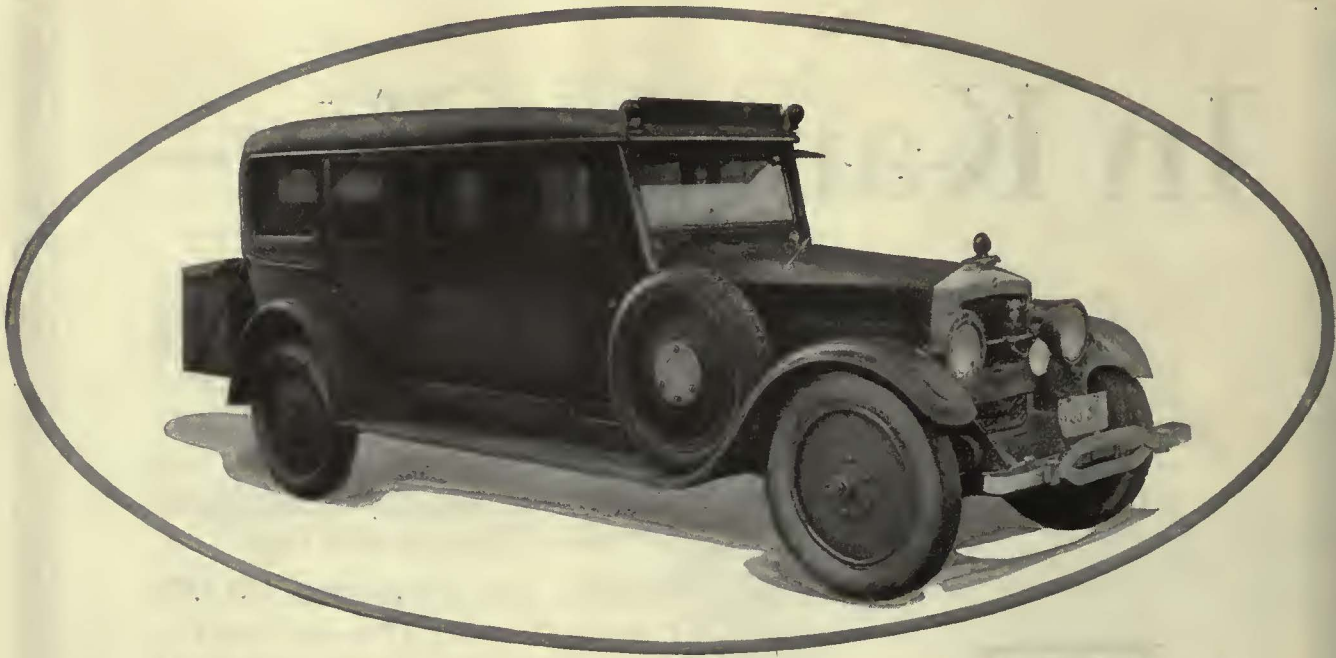


THE TIMKEN-DETROIT AXLE CO.  
DETROIT, MICHIGAN



# TIMKEN AXLES





# 108,500 miles for the bus!

*51,379 to 85,134 miles for the tires!*

Talk about sturdy bus tires! The set of Generals on this bus owned by W. L. Newcomer and operated between Ashland and Wellington, Ohio, has set a record that every bus operator should know about.

When this photo was taken, the bus itself had already traveled 108,500 miles. The first General Tire to wear out in this grueling grind delivered 51,379 profit-making miles before it quit. The last General to wear out had a record of 85,134 miles to its credit when it was taken off the wheel.

And between these two extremes were other Generals which had all gone more than 51,379 miles but less than 85,134 miles.

But the really remarkable thing is the

record of *uninterrupted* service hung up by these Generals. One stretch of 40,000 miles was covered without a tire down for any cause!

Probably you've had some long-wearing tires yourself. But have you ever had a set of tires all of which kept going for such a distance, with so little trouble and at so low a cost per mile as the Generals on this bus of Mr. Newcomer's?

It is, because The General Tire does keep going longer with less trouble and at the lowest possible cost per mile that fleet owners from one end of the country to the other are equipping their busses with Generals exclusively, and making sure of the one thing every fleet operator wants—the lowest possible cost of operation and the greatest return on the money invested in tires.



*The*

# GENERAL TIRE

*—goes a long way to make friends*

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



**\$3750**COMPLETE  
(f. o. b. Detroit)

## “Better Than a Private Car—”

“It’s even better than individual transportation in many ways . . . .”

That is what they said of Graham Brothers Parlor Coach at Cleveland. Hundreds of street railway operators commended its attractiveness in design, finish and appointments.

A quick, quiet, safe, comfortable ride for 12 pas-

sengers. A booster of earnings in de luxe inter-urban service or on city runs where a preferred or express service is desired.

Operators know Graham Brothers equipment for high quality, low cost, power aplenty and service everywhere.

**GRAHAM BROTHERS**  
Evansville—DETROIT—Stockton  
A DIVISION OF DODGE BROTHERS, INC.  
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO

[ 21-Passenger Street Car Type, complete, \$3815, f. o. b., Detroit ]

# GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE





Goodyear Balloon Tire Equipped Coach No. 214  
of the Colonial Coach Lines, Watertown, N. Y.

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.



# Passing Another Milestone

It is Goodyear's firm purpose to advance side by side with the motor bus in its development for public usefulness and comfort.

An exceedingly important milestone in this advance has been successfully passed with the perfection of Goodyear Balloon Bus and Truck Tires.

Made with the celebrated Goodyear cord fabric SUPERTWIST, these extra elastic and extra durable tires afford the motor bus the same deep cushioning and trouble-free qualities enjoyed by the Goodyear user on his private car.

Armored with the world-familiar All-Weather Tread, they assure maximum traction and security, on any road and under any operating condition.

\* \* \*

*On the night of October 14th, 1925, the Colonial*

*Coach Lines Company, of Watertown, New York, equipped their coach No. 214 with Goodyear Balloon Bus Tires.*

*In daily service, winter and summer, on the 75-mile scenic route between Watertown and Syracuse, those Goodyear Balloons rolled up an average of 37,852 miles per tire!*

*"They delivered every value we desired," writes Mr. H. B. Weaver, Chairman of the Colonial Coach Lines Company. "They saved us money on upkeep and repairs, materially reducing spring breakage. They provided our passengers with the last word in riding comfort, and so helped us win public good will."*

\* \* \*

The brilliant performance of Goodyear Balloon Tires in both passenger and freighting service is the result of a bus- and truck-tire development carried forward by Goodyear since the pioneer days of highway transportation.

Goodyear Balloon Tires, the latest expression of that development, demonstrate superior stamina, as well as finer riding qualities, at low tire cost per mile.

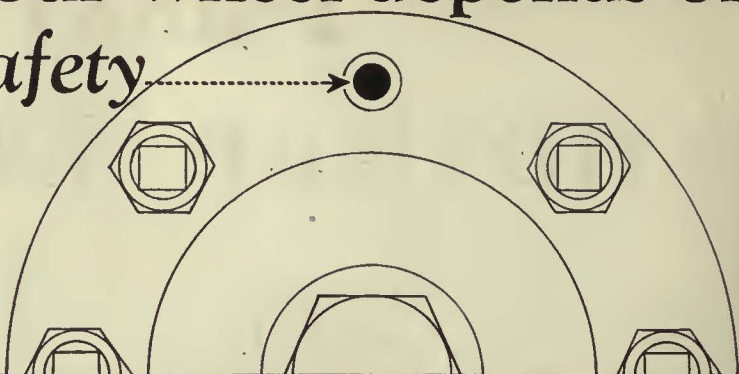
*More people ride on Goodyear Tires  
than on any other kind*

# BUS TIRES

*Made with SUPERTWIST*



# The success of your wheel depends on this margin of safety



## This oversize hole that keeps the disc from bearing on the studs

A BUS wheel has to take a lot of punishment. If it isn't made right it gets into trouble—and the bus comes off the road.

That's why engineers built the Budd-Michelin Dual Wheel with the "margin of safety"—made the stud-holes in the disc *larger* than the studs on the hub. They countersunk these holes so that when the ball-faced cap nuts are tightened, they seat perfectly—and the cap nuts carry the wheel. That stops a lot of grief before it starts.

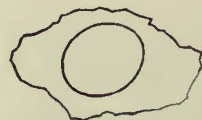
It makes it impossible for the disc to come in contact with the studs and batter the threads. With cap nuts tight there is no possibility of having the holes in the disc worn egg-shape by the studs. It makes it easy to slip the wheel on and off—and that's mighty important when a tire goes flat.

And it's mighty important when you accidentally clip a curb—even a Budd-Michelin gets a bent stud from such a wallop. And if the disc fitted *snugly* over the studs, a bent stud would make it impossible to get the wheel off, or to put another wheel on!

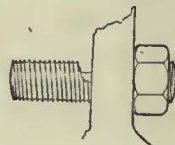
That's why Budd-Michelin Wheels have a liberal margin of space around the studs. They are made *right*—and they have proved right, on over 50 000 buses and trucks.

**B U D D**  
WHEEL COMPANY  
Detroit

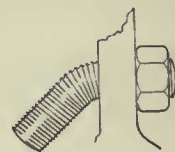
Here's what happens when the disc rides directly on the studs...



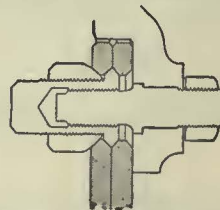
Holes in the disc worn egg-shape by the studs—causing noise.



Studs are cut off by the disc, and new studs are necessary.



Hitting a curb with force enough to bend the stud will "clinch" the disc on the hub, making it impossible to get the wheel off, or put another on.



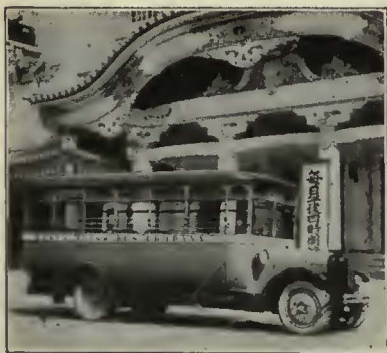
It is difficult to pull the wheel off the hub in case tire-trouble makes it necessary to change a wheel. The threads on the studs are battered and ruined.



# INTERNATIONAL HARVESTER



ABOVE: Paul Steinbach, International de luxe coach operator of Albany, N.Y., reports an unprecedented public demand for the riding qualities and luxurious appointments of the type of coach illustrated, in the face of other keen bids for popularity.



ABOVE: International coach on 4-cylinder underslung Model "SL" chassis at the Kabuki Theatre, Tokyo, Japan.

BELOW: Part of International coach fleet of the Interstate Transit Company, operating out of Omaha, Sioux City, and other cities.

## International Harvester 6-Cylinder Coaches

In forty states and twenty foreign lands the coaches of *International Harvester* manufacture are doing themselves proud. For good reasons they are depended on to carry on uninterrupted schedules, to attract and please passengers, and to keep route operation profitable. International Harvester 6-cylinder motor coaches are provided in 15 to 30 passenger capacities—Parlor-Club Coach for Cross-Country Travel, and Street Car Type for City Service—elaborately de luxe down to just plain utilitarian. Our coaches are protected by the world's largest company-owned truck and coach service organization in the world. We have 121 direct factory branches in the United States.

*Detailed information sent on request.*

INTERNATIONAL HARVESTER COMPANY  
606 So. Michigan Ave. OF AMERICA  
(Incorporated) Chicago, Illinois



# INTERNATIONAL HARVESTER

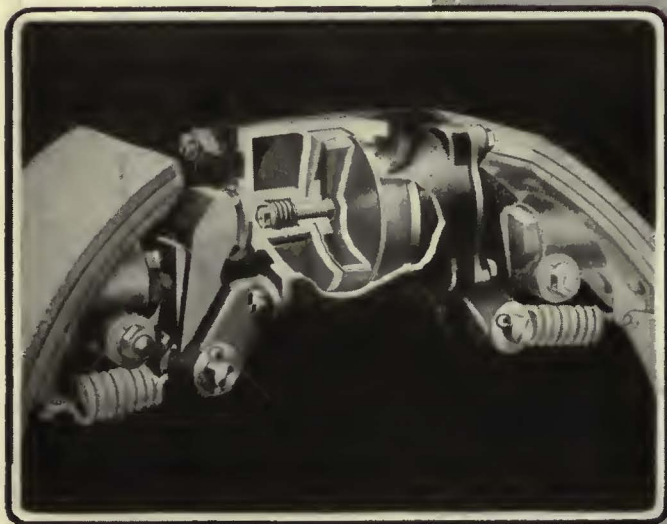


# Brakes!

THERE'S a considerable difference, you know. What we mean is brakes that *are* brakes, that hold the bus with unfailing certainty and require so little attention that brake maintenance is negligible.

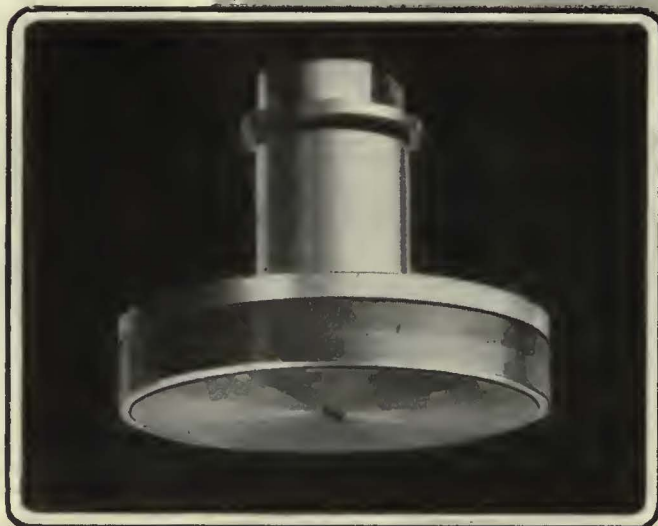
At the Show last week you probably saw the exhibit of Christensen Air Brakes in operation and saw how simple they are. Complications have been boiled out of the braking system throughout. The compressor drive is direct from an eccentric on the engine crankshaft. There are no gears, chains, belts, auxiliary shafts, or universals to cause drive trouble. The drive is *direct*.

The brake is operated without the usual pull-rods, levers, cams, universals, and "equalizers." A cylinder inside the brake drum, with two opposed pistons transmitting power to the brake shoes, does the job. The pistons are



Sectional view of Christensen Brake Cylinder showing Sealtite all-metal pistons and 2 to 1 power levers.

*Christensen Air*  
6513 Cedar Ave



Sealtite all-metal brake piston assembled.

Christensen Air Brakes on Safeway Six Wheel Bus showing rigid shoe construction and 2 to 1 power levers. In the service of the Cleveland Railway Co.





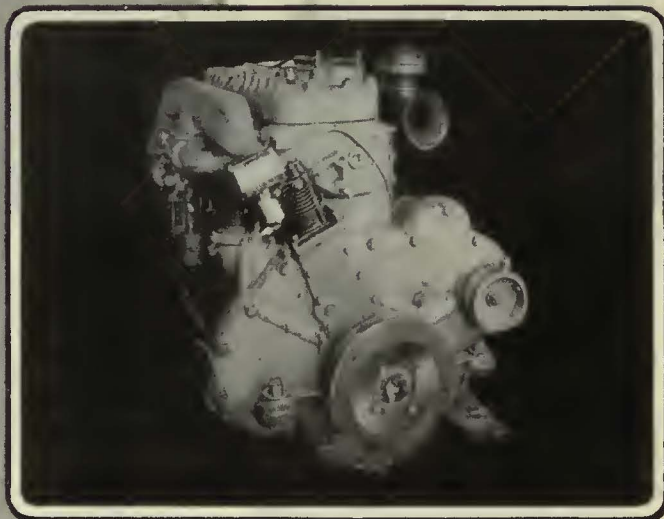
# not only in name, but in fact

Sealtite all-metal, which produces a perfect air seal and is unaffected by brake heat and oil vapor.

Since the Sealtite pistons are practically wear proof, the travel of the pistons in the cylinders is sufficient to entirely wear out the brake liner, and the design is inherently self-equalizing, the only limit to attention-free life of the brakes on a Christensen equipped bus is the life of the brake liner.

When you buy your next buses remember that *Christensen Air Brakes require no adjustment from the time the brakes are originally set up until the liners are worn out.*

Specify "Christensen Air Brakes" and you will have accomplished at least two things—an important reduction in brake maintenance expense, and the assurance that your buses have *brakes, real brakes.*



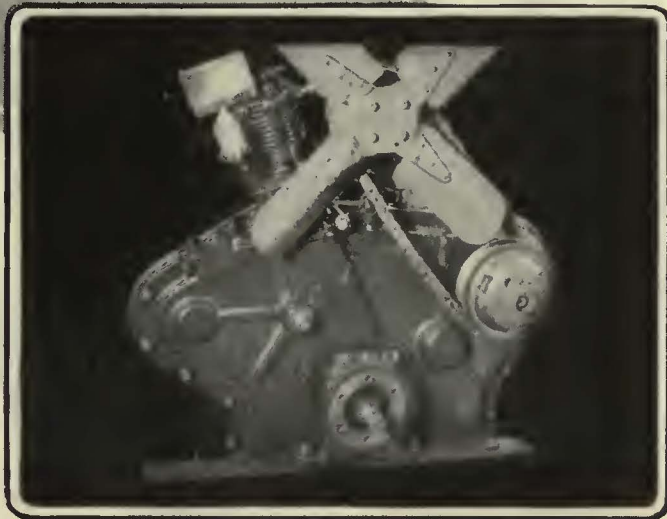
Christensen Compressor and governor mounted on front end gear case cover plate of Continental 14H engine, driven direct from an eccentric on engine crankshaft. Installed on Six-Wheel Double-Decker used by Cleveland Railway Co.

## Brake Company

Cleveland, Ohio



Christensen Compressor and governor mounted on front end gear case cover plate of Buda model GL6 engine, driven direct from an eccentric on engine crankshaft.







**D**ID you see the interesting exhibit of new bus bodies at the A E R A Cleveland Convention?

These included a 21 passenger City Pay-enter type, a 29 passenger combination Pay-enter and Parlor Coach type, and a 29 passenger De Luxe Parlor Coach type.

We build all types of high grade bus bodies. This full line of body equipment includes many new and desirable features and the experience in building fine bodies for 73 years.

We are prepared to offer a complete designing, manufacturing and sales service to the bus industry, which cannot be duplicated by small organizations lacking our wide experience and unusual building and engineering facilities.

May we advise with you on your bus requirements?

THE BAKER-RAULANG COMPANY • Bus Body Division • CLEVELAND, OHIO







*Section of Firestone  
Gum-Dipping Units  
with one tower cut  
away to show interior.*

One of the outstanding developments by Firestone Research Engineers is the process of dipping the cords in a rubber solution which impregnates and insulates every fiber of every cord. This adds strength to the cords and reduces to a minimum internal friction and heat so destructive to tire life.

The Gum-Dipping of the cords made it possible for Firestone to develop the Gum-Dipped Bus Pneumatic which gives to motor buses not only extra riding comfort and safety but a definite dollars-and-cents saving in increased mileage.



In the battle of tires on race tracks—in the day-in and day-out service of the largest truck, bus and taxicab fleets—on the cars of hundreds of thousands of motorists everywhere—Gum-Dipping has demonstrated its supremacy in greater economy, safety and comfort.

Do not deny the patrons of your bus line these advantages. Equip with Firestone Gum-Dipped Bus Pneumatics. They are built as only Firestone can build them and will perform as only Gum-Dipped tires can perform. See the nearest Firestone Dealer.

## **MOST MILES PER DOLLAR**

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER.. *Harvey Firestone*



## THE AMERICAN BRAKE SHOE & FOUNDRY CO.

at the American Electric Railway Association  
Convention, announced its new subsidiary, the

## AMERICAN BRAKE MATERIALS CORPORATION

and exhibited its product



# —AMERICAN— **BRAKEBLOKS**

## A NEW FRICTION-ELEMENT FOR BUS AND OTHER AUTOMOTIVE VEHICLES

This new automotive braking material has the following important features:

- |   |  |
|---|--|
| 1—Friction equals that of any new fabric liner—will remain constant throughout the entire life of the material.                         | 4—Drums—no cutting or scoring—BRAKEBLOKS have no metallic content.                     |
| 2—Greater cooling area—less than 1/3 of the area of drum is covered with BRAKEBLOKS, leaving a larger radiation area to dissipate heat. | 5—Labor costs—BRAKEBLOKS may be renewed without removing brake shoe from the assembly. |
| 3—Durability—far in excess of fabric liners.  | 6—Attachment—no riveting.  |
|   | 7—Unaffected by water, oil or grease.  |
|   | 8—Will not burn, smoke or squeal.  |
|   | 9—Will not grab.   |

*If you had no opportunity to see the AMERICAN BRAKEBLOKS exhibit at the Convention we will be pleased to furnish detailed illustrated information upon request.*

**AMERICAN BRAKE MATERIALS CORPORATION**

30 Church Street, New York City



## Can You Smile Over Electrical Equipment Maintenance Reports ?

You can if your buses are equipped with Leece-Neville Patented Voltage Regulated Electrical Equipment—starting and lighting.

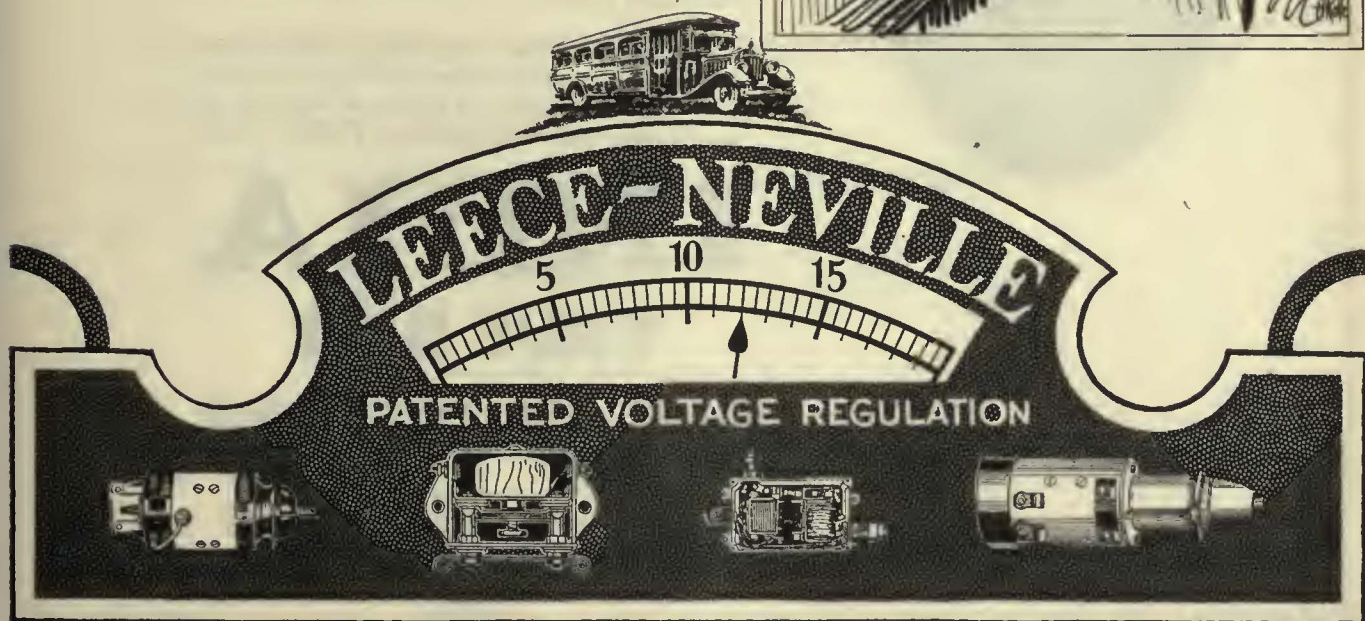
Maintenance on the equipment itself is minimum. Leece-Neville Voltage Regulation absolutely prevents overcharging of battery, and reduces the probability of it remaining undercharged. Experience shows that batteries last four or five times as long if Leece-Neville Patented Equipment is in use.

Leece-Neville Voltage Regulation insures steady and constant lights, an important factor in night operation.

All good bus makers either install this equipment, or provide for its optional installation.

Get a Leece-Neville Service Book. It will tell you of a nearby service station where you may have this equipment explained to you.

LEECE-NEVILLE COMPANY  
Cleveland, Ohio







# TRUE BLUE [HEAT PROOF] INNER TUBE

*The first inner tube to successfully withstand the "burning-up" from constant flexing under heavy loads and high speeds.*



*As flabby and lifeless as old rotted leather. Easily torn with the hands.*



**INDIA  
TRUE-BLUE  
Inner Tube**

*As tough and lively as when placed in the casing.*



This actual service test again proves the striking superiority of the TRUE-BLUE (HEAT-PROOF) inner tube under present high-speed, low-pressure, heavy load running conditions.

A new TRUE-BLUE tube and a new heavy red tube of standard make and equal price were placed, at the same time, on one of the buses of an important California bus line. When the red tube "blew out" they were both removed. The effects of this equal service on the two tubes are shown above.

Service tests like this combined with the standard laboratory aging tests, prove TRUE-BLUE tubes to be truly heat-proof—and by long odds the greatest improvement that has been made in inner tubes in recent years.

This is one of many exclusive INDIA features which enable car owners, bus and truck operators to get unusual records of uninterrupted mileage from INDIA tires.

# INDIA

## TRUE BLUE

## HEAT PROOF

## INNER TUBES



INDIA TIRE & RUBBER CO., AKRON, OHIO.





*One of the various types of cars exhibited at A.E.R.A. Convention. Built for the Jamestown Street Railway Co., Jamestown, N. Y.*

A double-end city car built for Johnstown Traction Co., Johnstown, Pa., a sixty-one foot high speed interurban built for the Union Traction Co., Anderson, Ind., and a steel parlor car built for Indiana Service Corporation of Fort Wayne were also shown.

## Quality Cars

ELECTRIC Railways continue to be the mainstay of mass transportation.

Electric Railways that have become increasingly attractive to investors are those that have taken steps to be more *attractive* to the passengers.

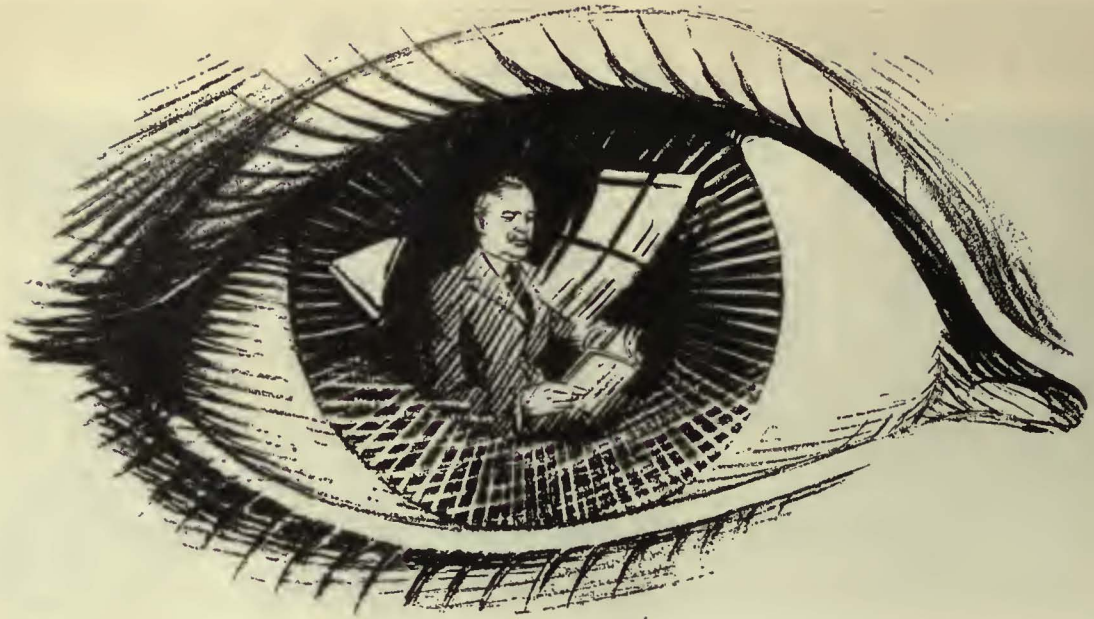
NEW MODERN CARS PAY

**St. Louis Car Company**

St. Louis, Mo.

*"The Birthplace of the Safety Car"*





## A trained eye with flawless vision

Continual developments and improvements in your field or branch of industry demand an ever-watchful eye to keep abreast of the leaders. You cannot afford to overlook a single opportunity whether it be a new product, a new method of manufacture or a change in market conditions.

A personal investigation of the ever-changing conditions is a task no individual can attempt,—one that no manufacturer can accomplish successfully.

You require a special organ, a business eye—one that has perfect, undistorted vision, trained for its particular work.

This A. B. P. paper is such an organ. It was created by the needs of its field and owes its success to the service which it renders.

In its pages you will find the latest news, the trend of contemporary thought and practice. Whether it be an editorial or an advertisement you can depend on the truthfulness of its statements, for it is pledged to maintain the highest standards of publishing practice.

# A. B. P.

THE ASSOCIATED BUSINESS PAPERS, Inc.  
Executive Offices: 220 West 42nd St., New York, N. Y.

*An association of none but qualified publications reaching  
the principal fields of trade and industry.*

*Electric Railway Journal is a member of The A. B. P.*





Thirty-Four New Cars of this type, built in the  
Cummings shops, now being delivered to  
Chicago Surface Lines

## “There’s no substitute for street railway service!”

*So says a recent newspaper advertisement  
of a prominent railway company*

Of all modes of transportation now available to the public, electric railways retain the largest share of patronage and are recognized by the public as an essential element in modern life.

The railways are more aware of this today than ever before. The new equipment being offered for the use of the public today is much superior to that which it replaces.

Cars recently shipped by this company to several Railway Companies express the new trend to a marked degree. Let us consult with you when new equipment is in prospect.

### CUMMINGS CAR AND COACH CO.

*Successor to McGuire-Cummings Mfg. Co.*

111 W. Monroe St.

CHICAGO



# Depend on



Before you buy a truck or a bus see the Whites at any of our 80 factory branches or 500 dealers. There is a White Model to meet every transportation need.

#### Truck Chassis

Model 15	— ¾-Ton.....	\$2,150
Model 20	— 2-Ton.....	2,950
Model 51	— 2½-Ton.....	3,750
Model 40-A	— 3½-Ton.....	4,350
Model 52	— Heavy Duty...	5,100

(Several types of power dumping bodies and hoists available.)

#### Bus Chassis

Model 53	— 16 to 21 pass...	\$4,250
Model 50-B	— 25 to 29 pass...	5,350

All prices f. o. b. Cleveland

"We wanted a bus that was safe, durable, dependable, and the kind of bus the public would want to ride in. It had to be economical from an operating standpoint: Our White busses have been very satisfactory and the service rendered by The White Company has been excellent. They meet our requirements and are more profitable than the cars they replaced."

(Signed) HARRY H. HANSON,  
Vice-President and General Manager  
Middlesex and Boston Street Railway Co.  
Newtonville, Mass.



# WHITE



# WHITES

**Middlesex and Boston Street Railway Co. depend on White Busses to deliver 100,000 bus miles per month - - - and with Whites every mile is a money-earning mile**

Connecting with Boston elevated lines and operating in and between 17 surrounding towns is the heavy schedule maintained by the Middlesex and Boston fleet of White Busses.

Bus operation was started in August, 1924, with 10 White Model 50-A 25-passenger busses. Since that time new Whites have been steadily added as service was extended, until today, this company has 44 White Busses in service and 18 on order.

White Busses were originally selected because of the record Whites have everywhere for delivering dependable and profit-

able transportation to bus operators.

White Busses in the Middlesex and Boston fleet are operated in all classes of service, including feeder, supplemental and charter—in substitution for former car service over the same routes where car service has been abandoned.

The public is better served, the operation is more profitable and the savings are typical of the unfailing ability of Whites to earn money in service.

White Busses will give you what the thousands of White operators have learned to expect from a White—the most money-earning miles.

**THE WHITE COMPANY  
CLEVELAND**

# BUSSES

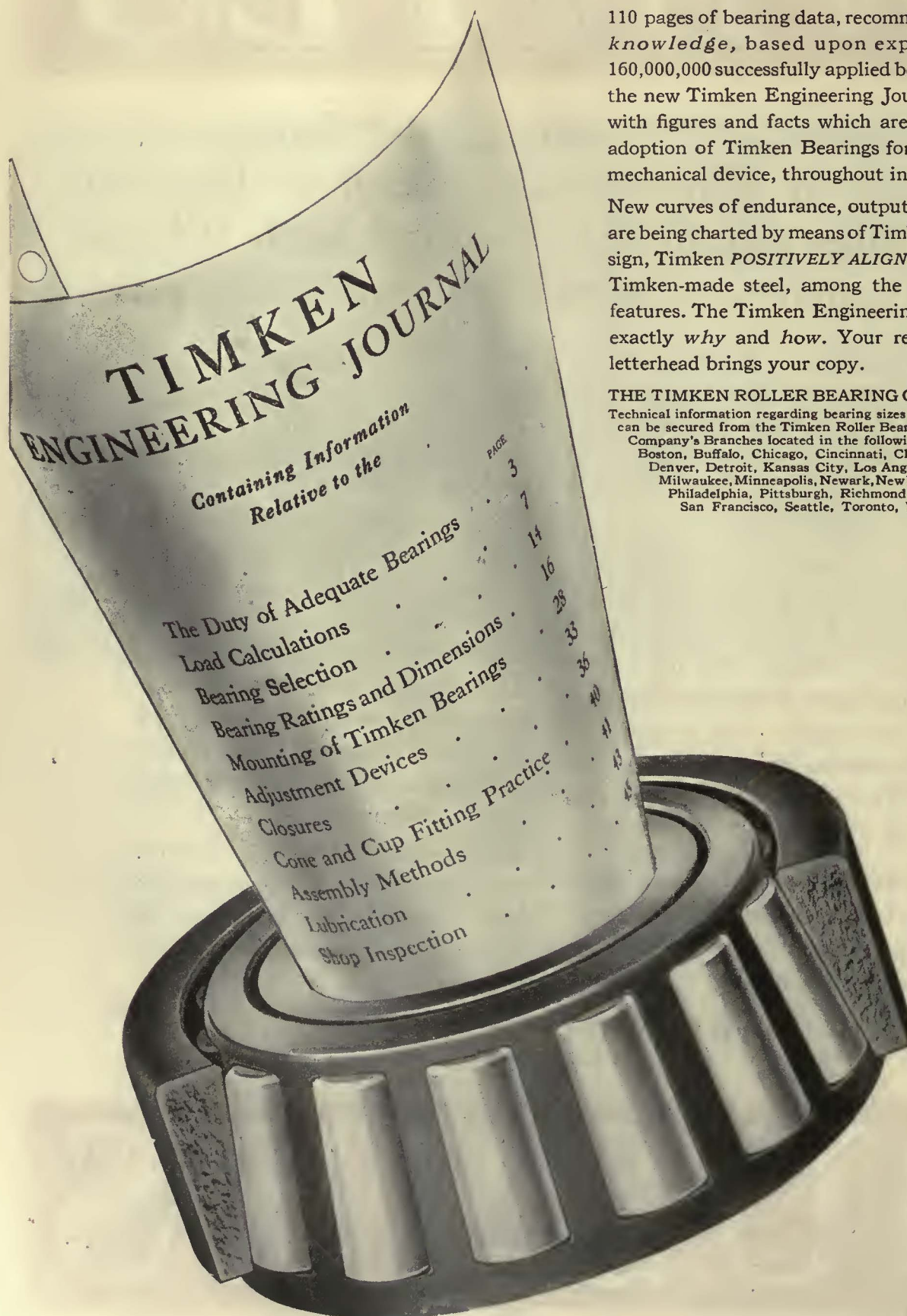


# Note the Table of Contents

110 pages of bearing data, recommendations and *knowledge*, based upon experience with 160,000,000 successfully applied bearings! That's the new Timken Engineering Journal, complete with figures and facts which are governing the adoption of Timken Bearings for every type of mechanical device, throughout industry.

New curves of endurance, output, and economy are being charted by means of Timken tapered design, Timken *POSITIVELY ALIGNED ROLLS*, and Timken-made steel, among the many Timken features. The Timken Engineering Journal tells exactly *why* and *how*. Your request on your letterhead brings your copy.

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





100 • YEARS • OF • MANUFACTURING • EXPERIENCE •



Cane  
Webbing  
For Car Seats



No. 327-M

## BETTER SEATS FOR BETTER BUSINESS

The public demands more comfortable seats, whether in new or old cars. Seat No. 327-M is an example of how Heywood-Wakefield has met this need by combining luxurious comfort with sturdy quality. It has a spring back and seat cushions, easy posture and a fine appearance.

There are H-W seat types for every kind of service. Let our passenger seating experts help select the best type for you.

**Heywood-Wakefield**  
REG. U.S. PAT. OFF.

### HEYWOOD-WAKEFIELD SALES OFFICES

Heywood-Wakefield Company, Wakefield, Mass.

Heywood-Wakefield Company,  
516 West 34th St., New York, N. Y.

Herbert G. Cook,  
Hobart Bldg., San Francisco, Cal.

The G. F. Otter Supply Co.,  
Houston, Texas

Heywood-Wakefield Company,  
439 Railway Exchange Bldg., Chicago, Ill.

Frank N. Grigg,  
630 Louisiana Ave., Washington, D. C.

Railway & Power Engineering Corporation,  
133 Eastern Ave., Toronto;  
Montreal; Winnipeg, Canada





## Sentenced to Sunday clothes for life

Those who equip their car seats with real leather upholstery sentence them to Sunday clothes for life, for there is nothing like leather for keeping up the best possible interior appearance throughout the life of the car.

Hyaline (The Finest Coach Leather Obtainable) and our many other grades of fine leather in several finishes are available to

dress your cars up in Sunday clothes. Only one suit is necessary for the leather of the Cleveland Tanning Company outlasts any other covering.

We offer complete hides or will cut them to pattern. Booklets containing samples and description of our many grades and finishes gladly sent upon request.



**The Cleveland Tanning Co.**

Dennison Ave. and Jennings Road, Cleveland, Ohio

*Western Representatives:*

Midgeley E. Borrowdale, McCormick Bldg.,  
Chicago

*Eastern Representatives:*

L. D. Rockwell, Nat'l City Bldg.,  
New York City

# HYALINE

***The Finest Coach Leather Obtainable***



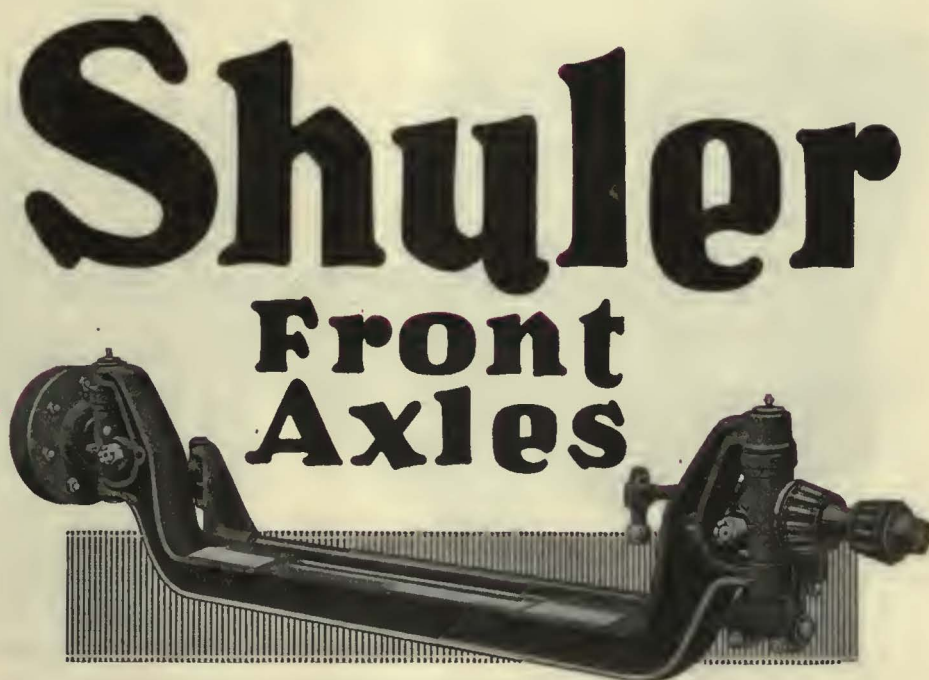
# Co-Ordination

## "OHIO POWER COMPANY DEVELOPS OWN BUS"

"The compressor used with this braking system also furnishes the air for operating the automatic bus doors. The front axle is a Shuler,"

### "The Front Axle Is a Shuler"

The above excerpt taken from article that appeared in Automotive Industries, August 12 issue, describing major units used in the specially designed bus manufactured by the Northern Ohio Power & Light Co.



For: MOTOR BUSES  
**Shuler Axle Company**  
Incorporated  
Louisville, Ky.

Member of Motor Truck Industries Inc., of America



# All along the line in every type of service —urban, suburban, interurban—and bus



Type 15A

From the great electric railway systems serving the large cities, to the small ones serving villages, Hale-Kilburn Seats are all-important factors in selling the service to the public.

Their correct design assures comfortable riding even on the longest trips. Their simple, sturdy construction assures long wear even under the severest operating conditions.

Types and styles range from the most luxurious plush creations to the most inexpensive rattan seats.

Write for catalogs and estimates.

## HALE-KILBURN COMPANY

*General Offices and Works:* 1800 Lehigh Avenue, Philadelphia

### SALES OFFICES:

Hale-Kilburn Co., 30 Church St., New York  
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E. A. Thornwell, Candler Bldg., Atlanta  
Frank P. Bodler, 903 Monadnock Bldg.,  
San Francisco

Chris Eccles, 320 S. San Pedro St., Los Angeles  
T. C. Coleman & Son, Starks Bldg., Louisville  
W. L. Jefferies, Jr., Mutual Bldg., Richmond  
W. D. Jenkins, Praetorian Bldg., Dallas, Texas  
W. D. Jenkins, Carter Bldg., Houston, Texas  
H. M. Euler, 46 Front St., Portland, Oregon

Type  
300AType  
900A

---

*To co-ordinate comfort on cars and buses*

---





## H-K Seats for cars and buses

Type 15A—Luxurious plush covered revolving chair for the finest type of interurban cars.

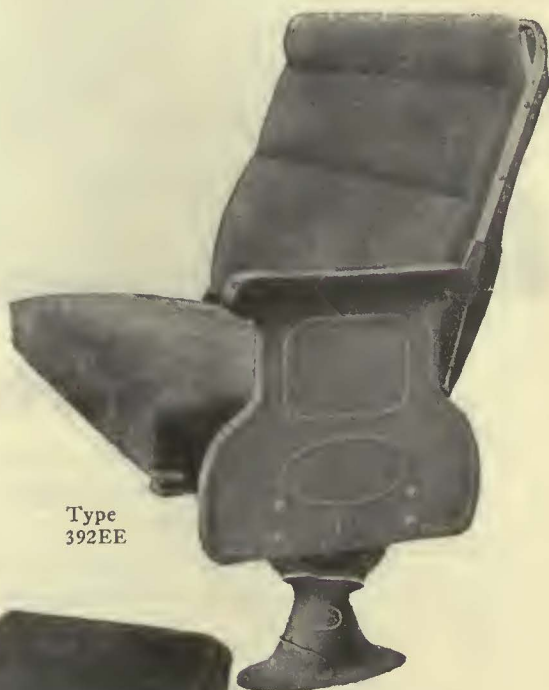
Type 300A—Thoroughly practical rattan car seat for hard city service.

Type 900A—Well-designed, comfortable double chair for buses.

Type 208—De Luxe bus seat with leather or high-grade imitation as specified.

Type 199F—Special—Inexpensive but comfortable seat for suburban and light-weight interurban cars.

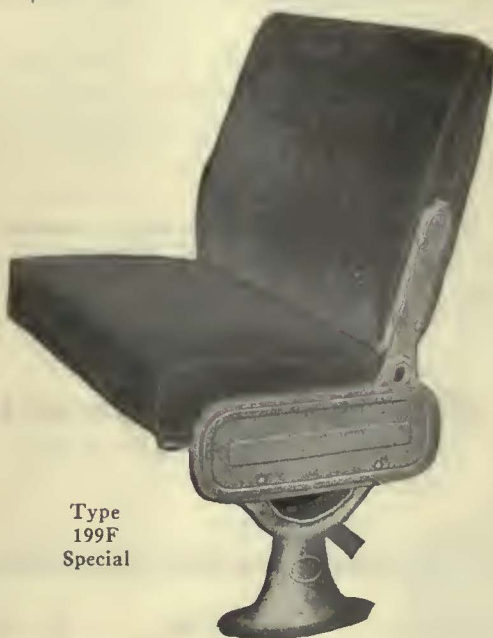
Type 392EE—Finest type of interurban car seat with extra high three part head-roll.



Type  
392EE



Type  
208



Type  
199F  
Special

# Hale and Kilburn SEATS





## Transportation Accounting

An Ohmer Fare Register in an electric railway car or a motorbus records each sale of transportation more accurately, more quickly and more permanently than could an expert accountant stationed at a desk at the point where the sale is made.

The Ohmer Fare Register is a mechanical accountant which plainly indicates the amount and the class of the fare paid and records it in the form of a condensed detailed printed report which remains forever a permanent record of the day's business.

Ohmer Fare Registers are made in many types and sizes with capacities for recording any possible cash or ticket denomination and with operating equipments adapted to all types of cars and buses.

### Ohmer Fare Register Company

Dayton, Ohio, U. S. A.



**OHMER**  
REG. U.S. PAT. OFF.  
**FARE REGISTERS**



# When You Order New Cars or Rebuild Old Cars—Specify **UTILITY**

## ELECTRIC HEATERS



SECONDARY INSULATION

1500 VOLT TRUSS PLANK SERIES HEATER

Fitted with *Chromalox* strips. Approved by Underwriters' Laboratories for Label Service

MORE THAN 42,000 IN SERVICE RENDERING  
SPLENDID RESULTS

## UTILITY HEATING SYSTEMS

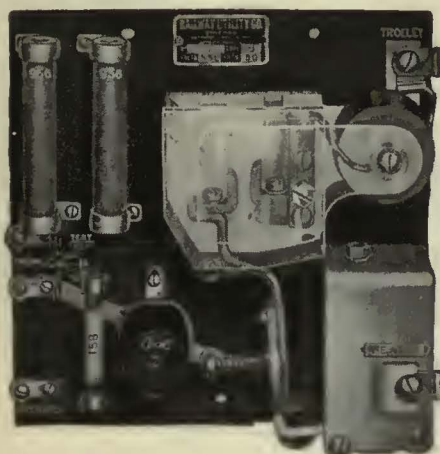
are regulated so that they *economically* render heat  
in the *proper amount*

Over 25,000 electric cars are equipped with  
**UTILITY THERMOMETER CON-  
TROL** so as to secure heat by electricity with-  
out excessive cost.

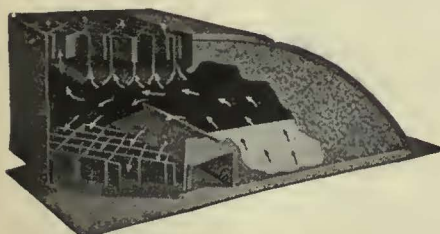
Electric Heat Properly Produced and Regu-  
lated is not only **BETTER**, but is more **ECO-  
NOMICAL** than stove or hot water heat.

### Proper Heating Requires Proper Ventilation

The Utility Compensating System, consisting of a  
Combination of the powerful Utility Honeycomb  
Exhaust Ventilators, and the Utility Compensating  
Intake Ventilators, which provide the proper or  
essential amount of clean air intake, is without ques-  
tion the best on the market.



REGULATOR PANEL



THE POWERFUL HONEYCOMB VENTILATOR



# RAILWAY UTILITY COMPANY

CHICAGO, ILLINOIS

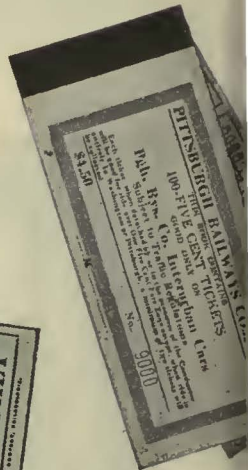
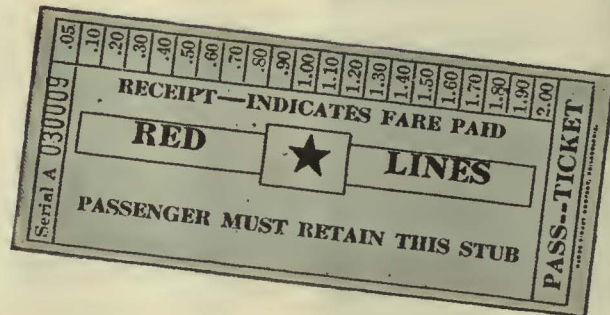
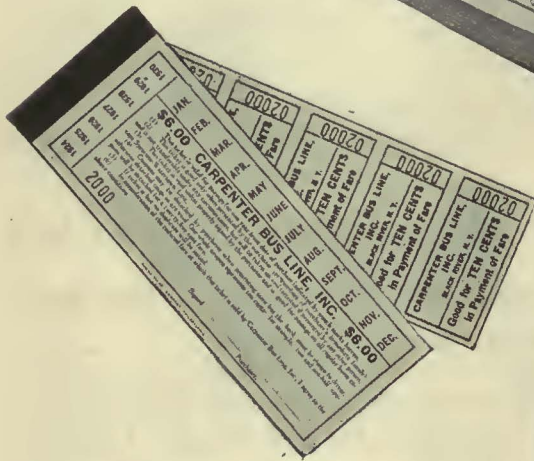
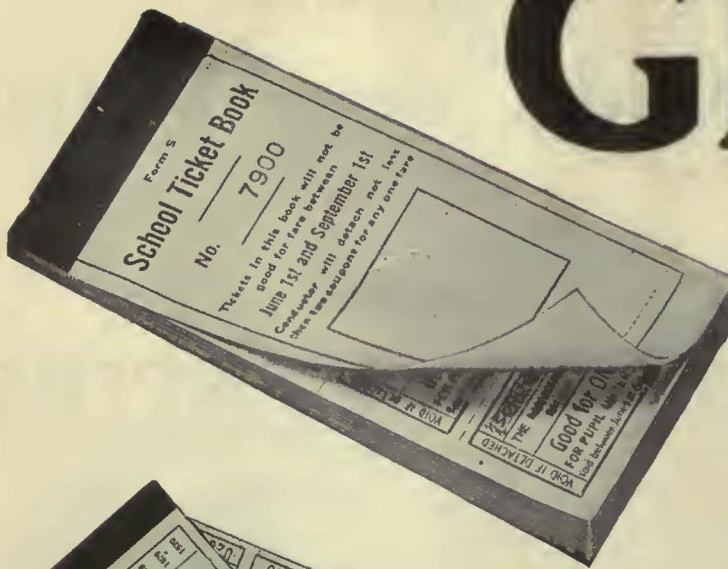
J. H. DENTON, 1328 Broadway, New York  
R. R. HOLDEN, Straus Bldg., Chicago  
F. S. McNAMARA, Barth Bldg., Denver

F. O. GRAYSON, La Salle Bldg., St. Louis  
E. J. HUNT, Equity Bldg., Detroit  
O. W. MEISSNER, 275 Craig St. W., Montreal





# GLOBE



## Note these special advantages of the Moran Patent Transfer

The time limit feature advantages are—no punching, expired limit shown by length of ticket; no possibility of confusing A.M. and P.M., when contrasting colors are used for each.



# TICKETS

*They make the collections  
easier, speedier, more accurate—*

Globe Tickets, Transfers and Passes are designed for all standard and special requirements.

We have specialized in this work for over 50 years.

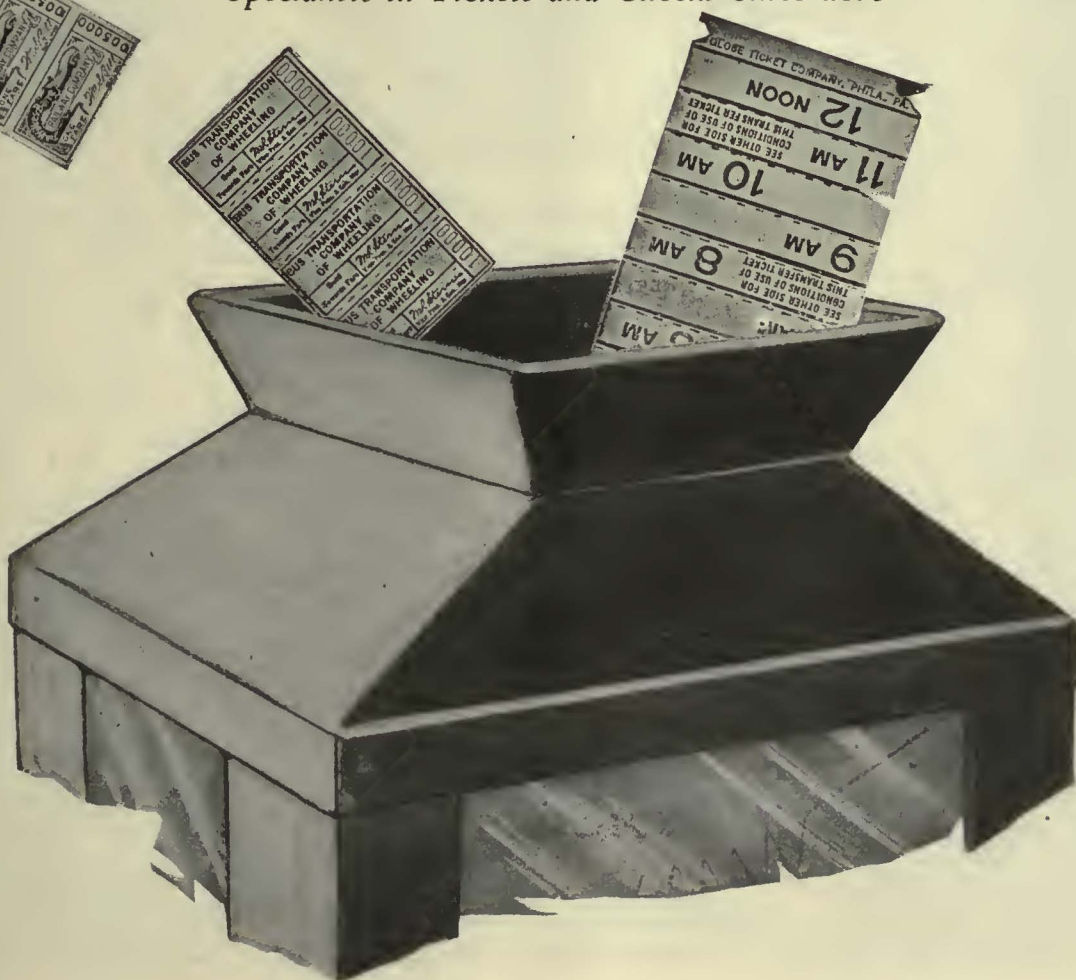
Accurate numbering, high quality printing on good tough stock, protection against counterfeiting, satisfactory perforation, and *delivery on time* are the results of our experience and service.

Tell us your ticket troubles. Perhaps we can solve them.

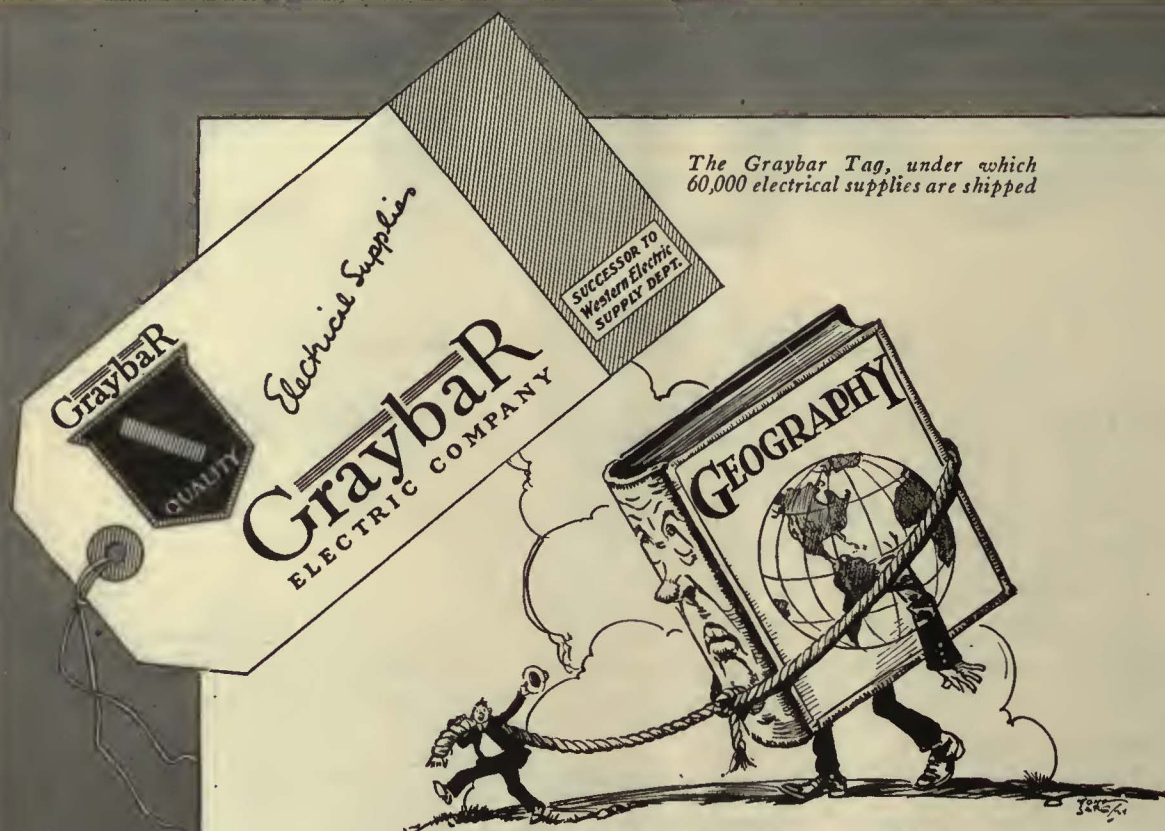
## GLOBE TICKET COMPANY

New York Philadelphia Los Angeles San Francisco

*Specialists in Tickets and Checks Since 1873*







# Tamed!

—a victory that saves money  
for the nation's business

In distributing electrical supplies Graybar Electric (formerly the Western Electric Supply Department) has been a consistent geography tamer, working to reduce the cost of getting supplies to the user, be he near or far away.

There are fifty-nine Graybar distributing houses located at strategic points of distribution. The demands of this nation-wide chain keep manufacturers busy, permit of quantity purchases and make it possible for the manufacturer to produce, and the consumer to buy, quality electrical supplies at fair prices.

Fifty-six years as the Supply Department of the Western Electric Company have given the wisdom of age in judging character in goods distributed. As the Graybar Electric Company there has been added to that wisdom the zeal of youth to serve.

Offices in 59 Principal Cities  
Executive Offices: 100 East 42nd St., New York



CAREFULLY INSPECTED—ALWAYS UNIFORM



# SPIKES-BOLTS

The Illinois Steel Company enjoys the regular bolt and spike business of many of the best known railroad purchasing officials in the country largely because these officials appreciate the value of absolute *dependability*—the sort of dependability only ample manufacturing facilities and long railroad experience can guarantee.

We are, as always, at your command.

## Illinois Steel Company

General Offices: 208 South La Salle Street  
Chicago, Illinois





“The repeat orders we have been sending you are indicative of satisfaction. This applies to all the products we have purchased thus far and we unreservedly commend to others the Valentine products as being the 'Standard of Quality.'”

## When they come back for more!

Throwing bouquets is one thing—but when customers come back for more and keep coming, you can rest assured they're well satisfied.

Valentine customers have been “coming back” for nearly a century. That's why they refer to Valentine finishes as “The Standard of Quality” by which other finishes are judged.

Nitro-Valspar is the finish used on the car of the Northeast Oklahoma Railroad Company shown above. This remarkable lacquer finish is not just a top coat, as most lacquers are, but a complete lacquer system from primer to final finishing coat.

All coats of the Nitro-Valspar system can be applied in two days or less, and what's more, no finish you can buy today is so durable!



NORTHEAST OKLAHOMA RAILROAD COMPANY

MIAMI, OKLAHOMA

Feb. 13, 1926.

Valentine & Company,

343 South Dearborn St.,

Chicago, Illinois.

FILE

Attention Mr. O. Williams

Gentlemen:-

Responsive to your request of the 28th ultimo, we are mailing you photograph of one of our cars as requested.

The entire body exterior of this car as well as the major portion of the interior is finished with your products.

The repeat orders we have been sending you are indicative of satisfaction. This applies to all the products we have purchased thus far and we unreservedly commend to others the Valentine products as being “The Standard of Quality”.

WWM:h

Yours truly,  
*O. J. Martin*  
CHIEF ENGINEER.

# NITRO-VALSPAR

VALENTINE & COMPANY

New York

Chicago

Boston

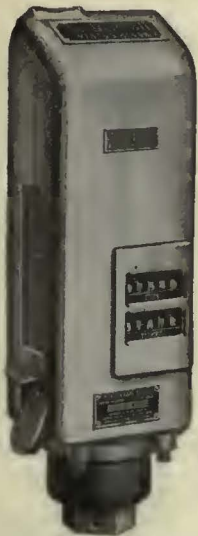
W. P. Fuller & Co., Pacific Coast



# Who knows most ?



Electro - magnet type of fare box — NOT motor driven; no drain on battery.



Full automatic fare box

Who can best solve your problem about fare collections?

We think our engineers can—and here's why:

Johnson has evolved satisfactory fare collection systems for the majority of city and interurban cars running today—as well as for bus lines.

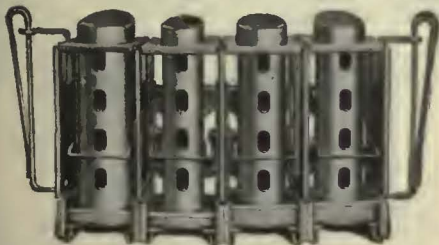
Our wealth of experience is ready to help you. Address Dept. 44 at the home office, please.

## Johnson Fare Box Co.

4619 Ravenswood Avenue  
CHICAGO

2 W. 61st Street, NEW YORK

Ever see our coin changer? Built right—a quality product, built the Johnson way throughout. Men like 'em—they don't stick or spill. Ask for folder on coin changers and how to use them.



Give this coupon to your secretary and let her write for the facts about the Johnson 99 9/10%-perfect fare collection system, now sold on the Pay-As-You-Use plan.



# Hubbard Distribution

—an important part of Hubbard Service

Unparalleled manufacturing facilities in four factories—the largest of their kind in the world—represent only a part of Hubbard Service. Another all-important factor is Hubbard Distribution, which is handled by

## 124 responsible jobbers

Strategically located throughout the country, these 124 jobbers carry complete stocks of Hubbard Pole Line Hardware and Peirce construction Specialties.

Because of this exceptional combination of manufacturing and distributing service you can meet your every requirement by using the Hubbard Catalog—the concentrated buying guide of the electric railway industry.

Write to your nearest jobber or to us for your copy of our Catalog 24.



Split Pole Bands



Peirce Forged Steel Pins



Peirce Pins



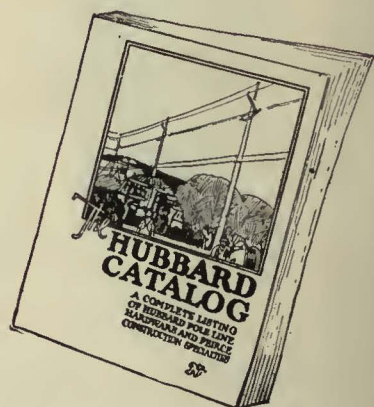
Hubbard Turnbuckles



Hubbard Heavy Rolled Steel Guy Clamps



Hubbard Pole Bands With Pull-off Rods



# Hubbard and COMPANY

PITTSBURGH • OAKLAND, CAL. • CHICAGO



## Life Insured Car Tracks

IT'S a pretty serious matter, costly as well as annoying, when a busy street has to be dug up for track renewal. That's why it pays to use ties which will last as long as the rail itself.

*International* Creosoted Ties, of carefully selected timber, thoroughly impregnated, are averaging twenty years' life on heavy traffic railroads. Compared with untreated wooden ties, the cost is only slightly more and the life is several times as great.

With *International* Creosoted Ties, you gain all the advantages of wood, resiliency, noiselessness and easy replacement, while avoiding the rigidity and high cost of mechanical substitutes. It's track life insurance at nominal cost.

We are making shipments at attractive prices to all points in the United States.  
Get our quotations.

*Let us quote you on your requirements.*

**International Creosoting & Construction Co.**  
General Office—Galveston, Texas

*Enduring*

Quality Ties  
Ready for Shipment  
Now



*International*

HIGH GRADE  
CREOSOTED TIES



# Where passenger preference



Passenger preference favors quietness in vehicles these days. Modern automobiles are practically noiseless. Modern motor coaches are cushioned and silenced to the standard of the automobile. And modern electric railway cars are rapidly developing along the same lines.

## Nuttall

NEW

TAPERED ROLLER BEARING

### TROLLEY BASE

Form U.S. 20-A

Nuttall  
Trolley Bases,  
Wheels, Harps, Poles,  
Nuttall Pantagraphs

Detailed description bulletins of any or all Nuttall Electric Railway Specialties gladly sent on request.

*Write us.*



becomes sound operating economy

# NUTTALL

## Standard Helical Gears

One of the most important factors contributing to the production of a really quiet electric railway car has been the perfection of the Nuttall Helical Gear for this service. The meshing of the teeth is like the turning of a screw,— a smooth rolling contact that delivers full power without noise, without shock and with a minimum of wear. There is no grinding and no chattering. Helical geared cars are quiet cars,— easy riding passenger-attractive and economical in maintenance.

Furthermore Nuttall Helical Gears for railway service are given the famous B P Heat Treatment. They are “tough hard,”— guaranteed specifically for 400 per cent greater wear and breakage resistance than gears of standard untreated cast steel.

The recent convention of the A. E. R. A. clearly showed the trend in car building for passenger preference. If you did not visit our exhibit let us send you now our data covering the important part to be played by silent helical gearing.

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

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

# Nuttall



---

# HITENSO *for strength*

Where service conditions are exceptionally severe—

Where traffic interruptions are unusually costly—

Where overhead wires run under elevated structures or along subway ceilings—

Hitenso Trolley Wire—exclusively an Anaconda product—serves best.

Hitenso "C" combines great strength with the least possible sacrifice in conductivity. It meets the physical requirements of the A.S.T.M. specifications for high strength bronze and exceeds in conductivity by 15%.

It has proved its dependability and economy in many outstanding installations.

ANACONDA COPPER MINING CO.  
THE AMERICAN BRASS COMPANY

*Rod, Wire and Cable Products*

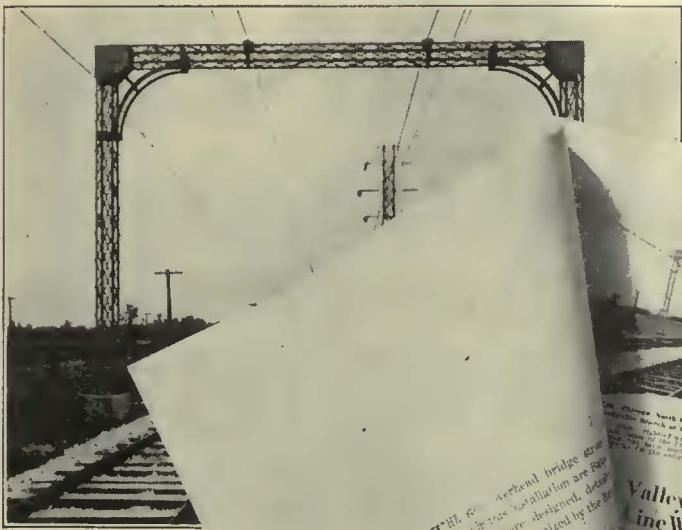
General Offices: 25 Broadway, New York  
Chicago Office: 111 W. Washington St.

---

# ANACONDA TROLLEY WIRE

---





**Valley Route Gives  
Wideened Territory  
Improved Facilities**

The steel overhead bridge structure in this installation are Bates built. They were designed, detailed, fabricated and galvanized by the Bates organization.

Close co-operation between the Engineers of the Chicago, North Shore & Milwaukee Railroad and the Bates organization resulted in the completion of this large structural part of the project, on schedule time. We believe we have just reason to be proud of this installation.

**Bates Expanded Steel Truss Co.**  
East Chicago, Indiana  
U. S. A.

**ANOTHER  
IMPORTANT  
BATES-TRUSS  
INSTALLATION**

**T**HE steel overhead bridge structures in this installation are Bates built. They were designed, detailed, fabricated and galvanized by the Bates organization.

Close co-operation between the Engineers of the Chicago, North Shore & Milwaukee Railroad and the Bates organization resulted in the completion of this large structural part of the project, on schedule time. We believe we have just reason to be proud of this installation.

**Bates Expanded Steel Truss Co.**  
East Chicago, Indiana  
U. S. A.

**Your Copy—**

I will appreciate a copy of the folder telling about the Chicago, North Shore & Milwaukee Railroad installation

NAME.....

COMPANY.....

ADDRESS.....

**INTERNATIONAL  
STANDARD ELECTRIC CORP.**  
General Export Distributors

**SAMUEL BROWN, LTD., New Zealand**  
**JOST ENGINEERING CO., LTD., India**

**BATES-TRUSS**

Expanded  
MADE  
ONLY  
BY

**Bates Expanded Steel Truss Co.**

Sales, Engineering and Executive Offices  
**EAST CHICAGO, INDIANA**



# AMCRECO

## CREOSOTED SOUTHERN YELLOW PINE PRODUCTS ARE BACKED BY AN INSTITUTION

Time is essential to demonstrate the qualifications of any business to be classified as an institution.

Time alone can prove the ability, the sincerity of purpose, the stability of ideals, etc., which are necessary attributes of an "institution."

The American Creosoting Company is not only big in its conception and in its development, but it has met the test of time. Dating back practically to the inception of wood preservation in this country on a commercial scale, it has been in the forefront of developments in this industry ever since.

*Tie and pole users readily appreciate the value of dealing with such an "institution."*

### AMERICAN CREOSOTING COMPANY

COLONIAL  
CREOSOTING  
COMPANY  
INCORPORATED



GEORGIA  
CREOSOTING  
COMPANY  
INCORPORATED

LOUISVILLE ~ KENTUCKY

#### SALES OFFICES

332 So. Michigan Ave. Chicago 350 Madison Ave. New York City

Brunswick, Ga. 401 W. Main St. Louisville, Ky. Bogalusa, La.



Poles for transmission and trolley lines.

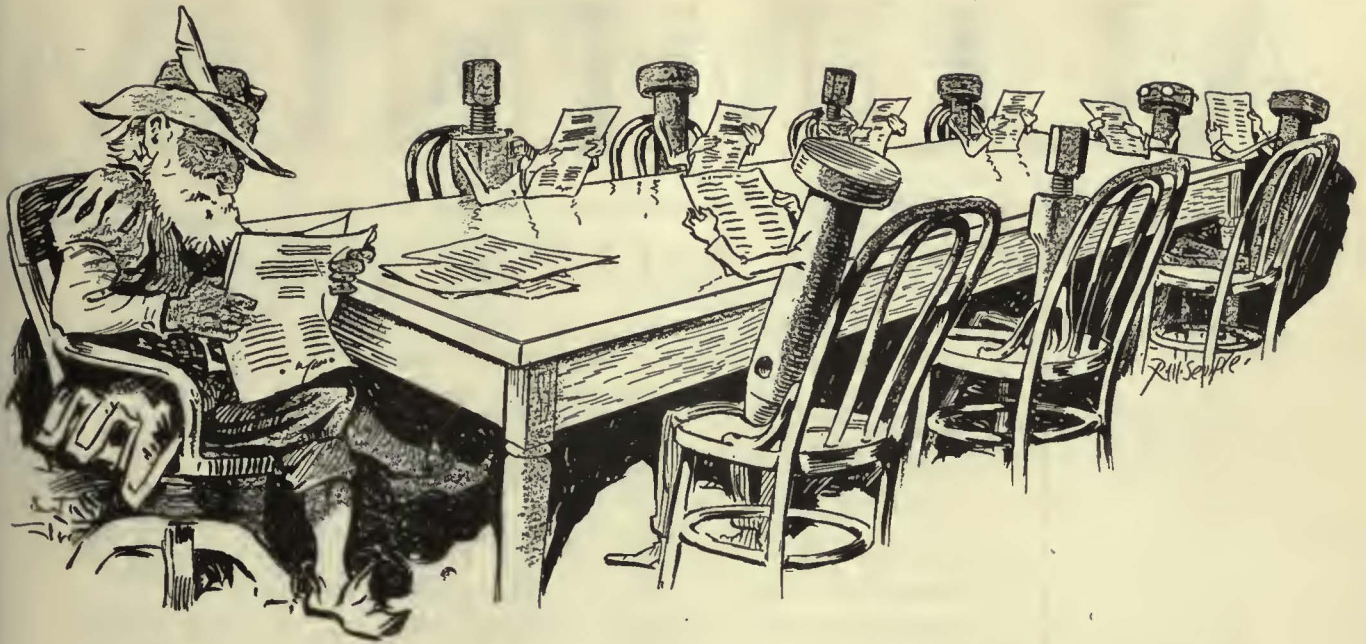


Ties for steam and electric railways.



Piling and timber for highway bridges.





## When the reports were read

—it was found that improved practice pays. And that Boyerized Car Parts had improved service and had cut operating costs because they outlast steel parts three to four times.

This exceptional service is due to a special treatment called the Boyerizing Process.

Try Boyerized Products under your own conditions and note their ability to stand up under the most severe service.

Pick the items you need. Then send for quotations.

Brake Pins  
Brake Hangers  
Brake Levers  
Pedestal Gibs  
Brake Fulcrums  
Center Bearings  
Side Bearings  
Spring Post Bushings

Spring Posts  
Bolster and Transom  
Chafing Plates  
McArthur Turnbuckles  
Manganese Brake Heads  
Manganese Truck Parts  
Bushings  
Bronze Bearings

### Bemis Car Truck Company

Electric Railway Supplies  
Springfield, Mass.

#### Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.  
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.  
W. F. McKenney, 54 First Street, Portland, Ore.  
J. H. Denton, 1328 Broadway, New York City, N. Y.  
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

The  
McArthur  
Turnbuckle





# ALUMINUM

## CAR STRUCTURE

The use of high-strength aluminum has in some cases reduced first-cost and has always reduced weight. One pound of aluminum shows a saving of two pounds over heavier metals. The modern car is a light car. . . . aluminum saves weight!

High-strength aluminum alloys are furnished in sheet, sand- and die-castings, permanent-mold castings, tubing, rivets, mouldings, etc.

## A. C. S. R.

Aluminum Cable, Steel Reinforced, is remarkable for its lightness, strength and great reliability in service. Having a core of steel, it is the ideal material for a main catenary or messenger cable because it combines the functions of messenger and feeder in one cable.

In A.C.S.R. the aluminum strands provide the necessary electrical conductivity and give the steel core positive and permanent protection against corrosion.

## CONDUIT

Its weight is about 1-3 that of ordinary metal conduit. The 1 in. size weighs only .6 lbs. per ft.; the  $\frac{1}{2}$  in. size only .3 lbs.

100 lbs. of aluminum conduit saves 200 lbs. of weight by displacing 300 lbs. of ordinary metal conduit.

Also aluminum is unusually resistant to common corrosive agents. No paint ever needed . . . . easier to install . . . . and only 1-3 the weight!

*Booklets sent on request cover Strong Alloys, Conduit, Paint Casting Alloys, etc. Please mention the field in which you are interested.*

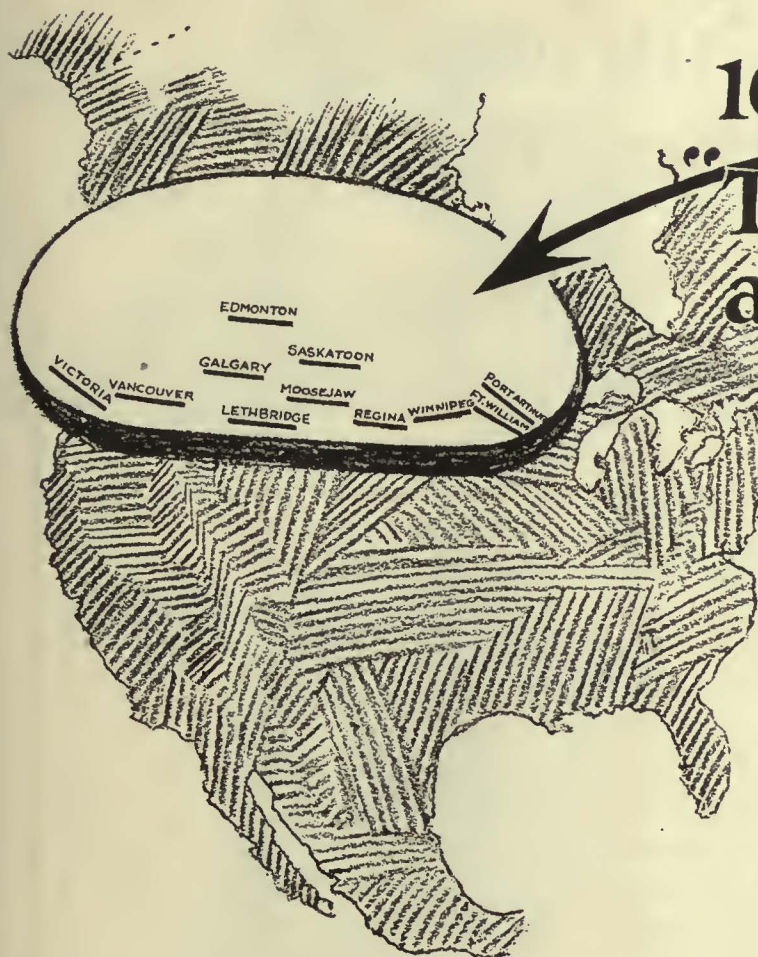
## ALUMINUM COMPANY OF AMERICA

OLIVER BUILDING, PITTSBURGH, PENNA.

Makers of Aluminum in Every Commercial Form



# In Western Canada



100% users of  
"Tool Steel" Gears  
and Pinions

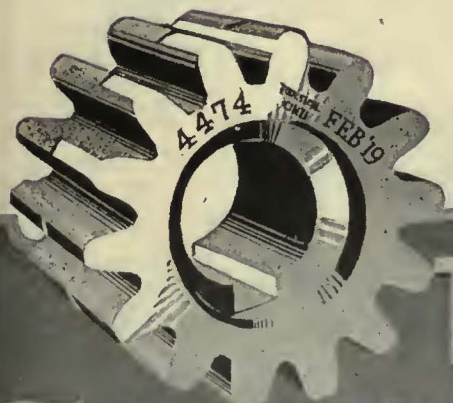
Winnipeg	Saskatoon
Regina	Port Arthur
Fort William	Brandon
Moose Jaw	Victoria
Lethbridge	Vancouver
Calgary	Edmonton

**A**BSOLUTELY every Electric Railway line in this progressive territory buys "Tool Steel" Gears and Pinions. Most of them have standardized on "Tool Steel" for years.

Can there be better proof of *Quality Leadership*?

THE TOOL STEEL GEAR  
& PINION COMPANY

Cincinnati, Ohio



**TOOL-STEEL QUALITY**  
**GEARS AND PINIONS**

*The Standard of Quality*



# The Springs they buy again

Only springs of dependable quality are bought by railway men over and over again. The fact that for more than 20 years leading railway properties have repeated continuously on "Fort Pitt" Springs, is all the *proof of reliable service* any reasonable man wants.

Order "Fort Pitt" Springs for your modern, quiet, comfortable-riding cars.

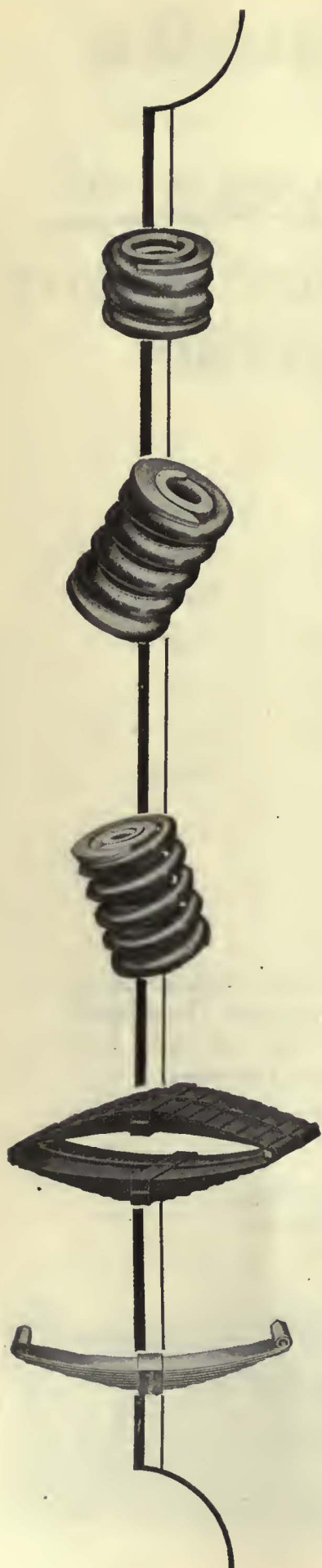
Consider some of these—

Full Elliptics for Car Trucks;  
Half Elliptics for Locomotive and Cars;  
Special Types of Quarter, Half and  
Three-Quarter Elliptics for Electric  
Railway Service;  
Drawbar Springs, Equalizer Springs,  
Extension Springs.

Prompt shipments can be made. Write for  
Catalog and Specification Book.

Fort Pitt Spring & Manufacturing Co.  
Pittsburgh, Pa.

# FORT PITT





# Another Year of Service

"Tiger" Bronze axle and armature bearings.

The exceptional toughness and anti-frictional qualities of "Tiger" Bronze insures perfect alignment and greater mileage.



Our exhibit at the convention marked another milestone in the half century of More-Jones growth. Each year we are able to display our quality products with the knowledge that we are making our exhibit to a steadily increasing number of purchasers.

These purchasers enjoy complete confidence in our uniform products and our ability to always lead in new engineering practices.



M-J lubricated and V-K Oilless Trolley Wheels and Non-Arcing Harps.

The alloy of pure new metal, offering greatest conductivity, is exceedingly tough, yet does not grind away the metal of the wires. Perfect lubrication is accomplished automatically. Properly balanced and mechanically perfect in finish, greater mileage assured. Lowest in ultimate cost and highest in net efficiency.



M-J Armature Babbitt Metal, a scientific combination of new tin, copper, antimony, and metallic nickel—no lead used—insures lowest net cost per mile of operation.

# MORE-JONES QUALITY PRODUCTS

MORE-JONES BRASS & METAL CO.  
ST. LOUIS, MO.



# BETHLEHEM RAIL

## *for Electric*



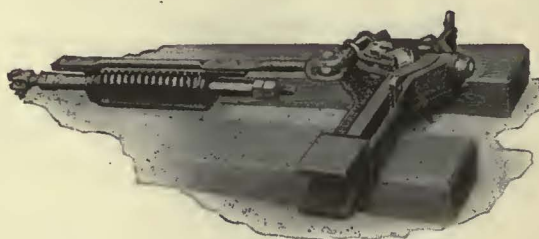
### Ore to Finished Trackwork

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

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

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

Bethlehem manufactures all types of frogs, switches, crossings and special layouts for Electric and Steam Railways; also mine track.



*Parallel Throw Switch Stand  
Model 1222—4¾ in. high*



*Center Rib Base Plate*



*Abbot Base Plate*

# BETHLEHEM



# WAY PRODUCTS

## Railways

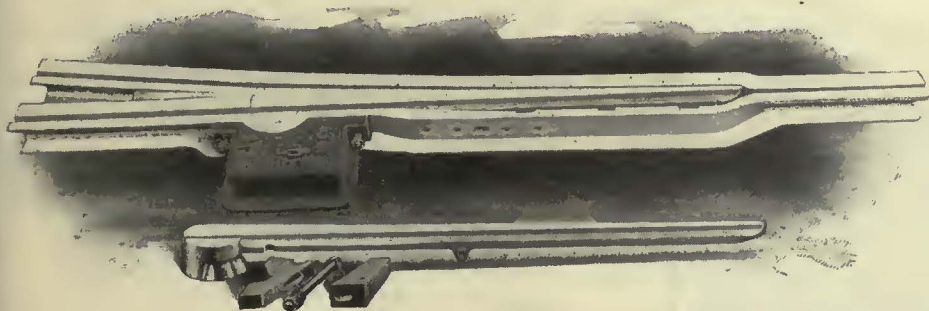


### Bethlehem Track Specialties include:

Special Trackwork; Tee and Girder Rails; Special Splice Bars for Welding; Machine Fitted Joints; Abbott and Center Rib Base Plates; Tie Rods; Bolts; Pole Line Material; Rolled Steel Wheels and Forged Axles.

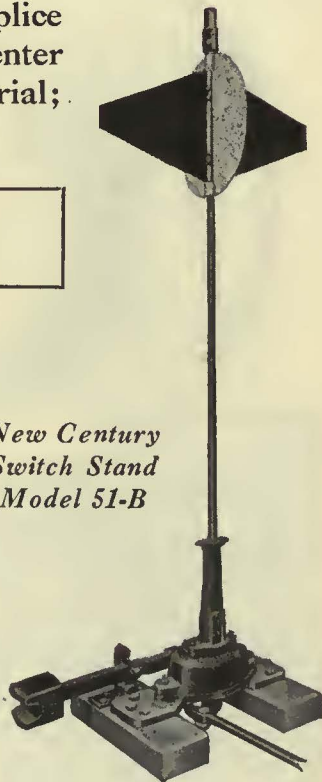
#### Special Trackwork and Layouts

*Catalog Sent on Request*



*Solid Manganese Tongue Switch, Design 905*

*New Century  
Switch Stand  
Model 51-B*



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

*District Offices:*

New York	Boston	Philadelphia	Baltimore	Washington	Atlanta	Pittsburgh	Buffalo	
Cleveland	Detroit	Cincinnati	Chicago	St. Louis	San Francisco	Seattle	Los Angeles	Portland

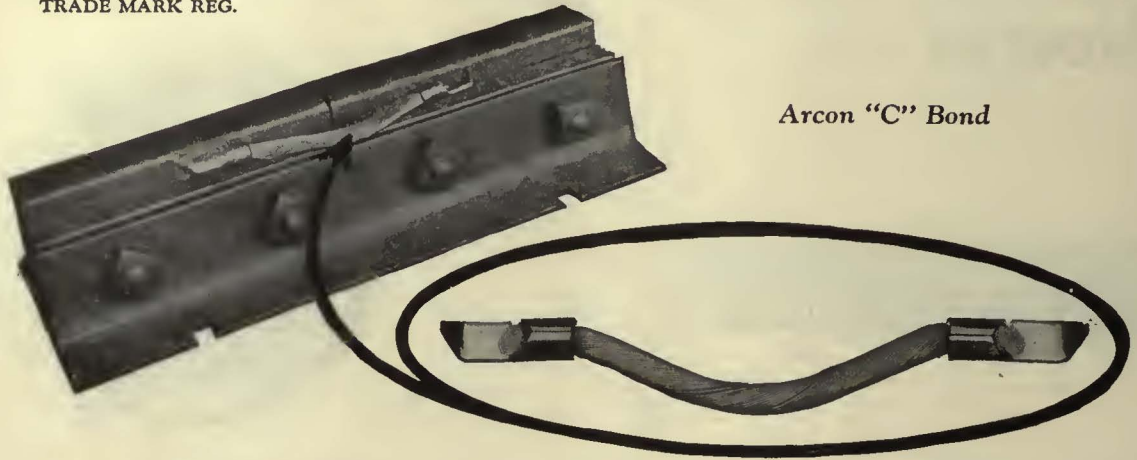
*Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products*

# BETHLEHEM

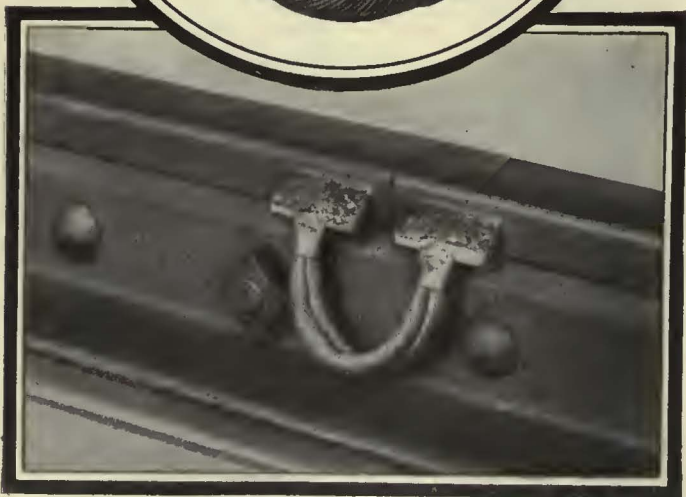
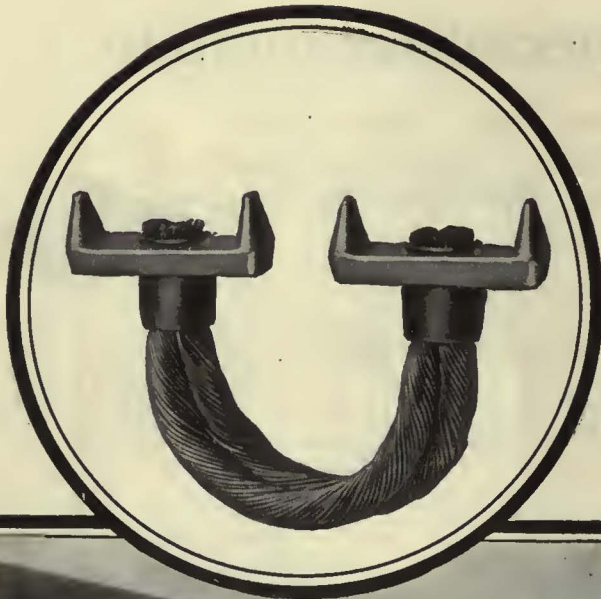


# ARCON RAIL BONDS

TRADE MARK REG.



Arcon "C" Bond



The Arcon "C" Bond in detail, and its application to Weber Joint is shown above.

The application of this bond is simple and effective. All parts of the terminal and rail are accessible. The weld is accomplished easily and quickly.

The open shape of the Arcon "A" terminal is especially desirable since the arc can be directed freely upon the conductor at the junction of the terminal and the rail.

Prices and descriptive literature sent on request.

Arcon "A" Bond



## AMERICAN STEEL & WIRE COMPANY

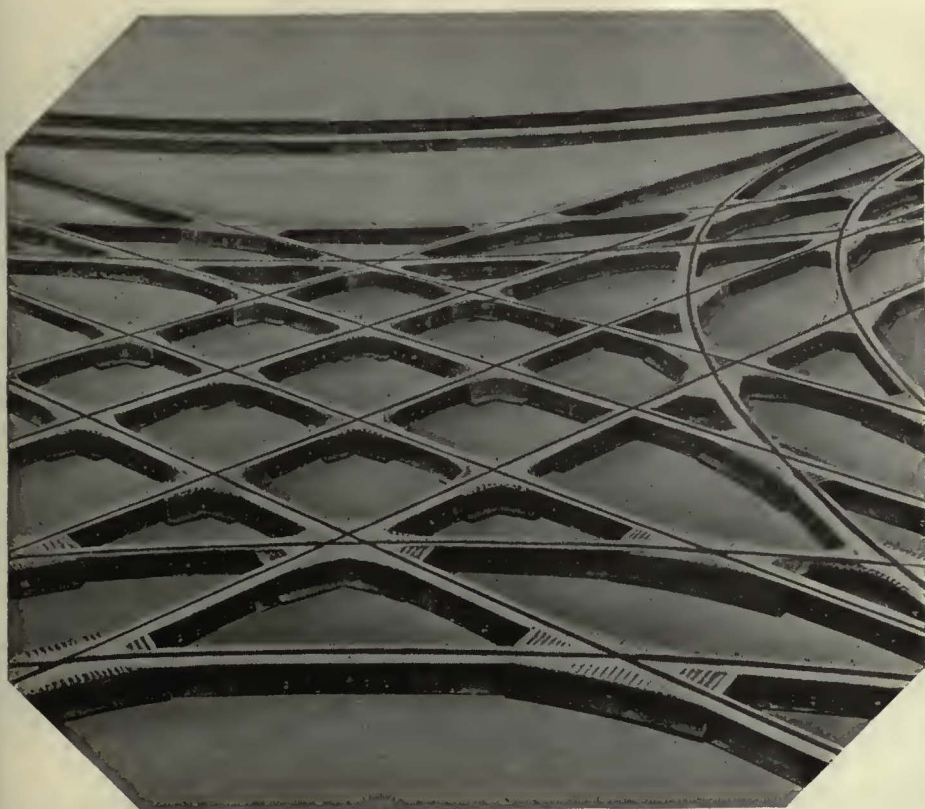
Sales Offices

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore  
 Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Company, San Francisco, Los Angeles, Portland, Seattle





Behind BUDA track work and equipment lies 45 years' experience and the most modern facilities. The name BUDA is your assurance of the highest quality.

THE BUDA COMPANY, Harvey, Illinois



Track and Bonding Drill



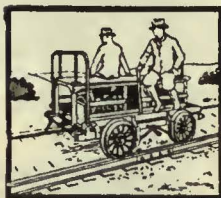
Track Jack



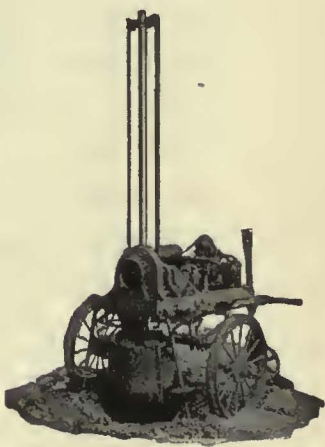
Bus Engines



Crossing Gates



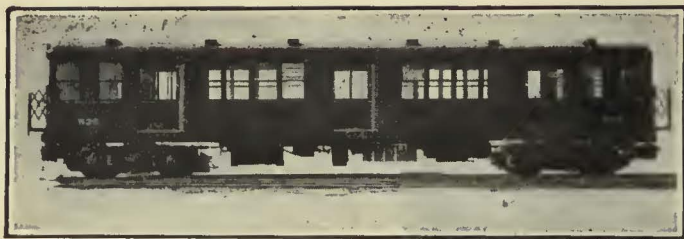
Electric Trucks



Buda Hubron Earth Drill

On the BUDA-HUBRON Earth Drill some companies report cutting their pole hole digging to 1/6 their former cost by hand.





## Some typical STANDARD ROLLER

**L**IGHT-WEIGHT safety cars, typical city cars, subway and elevated cars, heavy interurbans and sturdy work cars, the country over, are running on "STANDARD" Rolled Steel Wheels. Included in this list are cars on some of the foremost electric railways—such as the Interborough Rapid Transit Company, the Philadelphia

Rapid Transit Company, the Southern Pacific Lines, the Chicago North Shore and Milwaukee Railroad, the Brooklyn City Railroad, the Northern Ohio Traction & Light Company—to mention only a few.

Maintenance records of these "STANDARD" Equipped railways prove the economy and reliability of "STANDARD" Products.

*Rolled Steel Wheels  
Coil and Elliptic  
Springs*

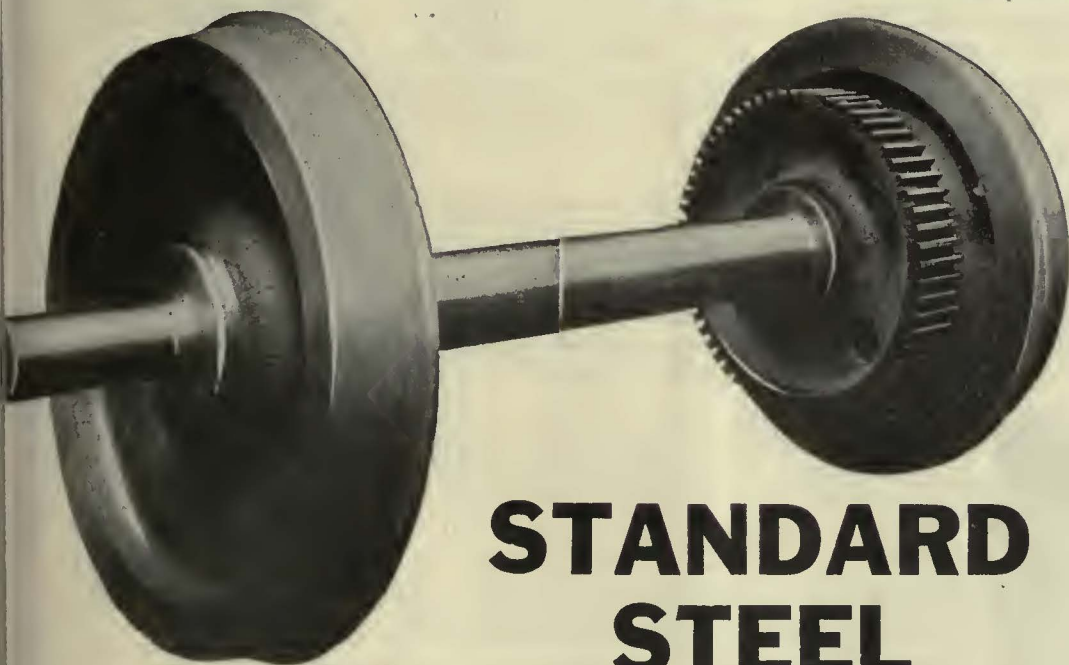


*Quenched and  
Tempered Carbon  
Steel Axles  
Armature Shafts*





rs equipped with  
D STEEL WHEELS



# STANDARD STEEL

**WORKS COMPANY**

PHILADELPHIA, PA.

BRANCH OFFICES:

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ST. LOUIS  
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ST. PAUL, MINN.  
PITTSBURGH, PA.

WORKS: BURNHAM, PA.





## Phoenix Refrigerator Cars for Electric Railways

Among the exhibits of unusual interest at the Cleveland convention was the Phoenix Electric Railway Car which, for three years, has given highly satisfactory service on the Northern Ohio Traction Lines.

The continuous successful operation of this car and the building of five Phoenix Electric Railway Cars by the Chicago, North Shore & Milwaukee Railroad, prove that Phoenix Electric Railway Cars have progressed quite beyond the experimental stage. They now take their place as a necessary part of the equipment of the electric railway which aims to serve its community more widely, and which seeks another source of income.

Phoenix Electric Railway Cars present big opportunities for service and profit in a new field without adding new problems. Automatic in operation, they require no care but that regular crews can conveniently give them, and the installations present no difficult problems to shop men. Icing and other service stations are entirely unnecessary.



The initial cost of a Phoenix Electric Railway Car differs but little from that of a standard ice refrigerator car. Any standard freight or express car can be easily converted into a Phoenix Electric Railway Car in your own shops. Our Service Department will coöperate with your Mechanical Department or with any car builder.

*Write for further particulars.*

THE PHOENIX ICE MACHINE CO.  
Cleveland, Ohio



Phoenix Transportation  
Refrigerating Unit



Laken Indoor SpraTower  
(Patented)







## Do You Buy Pounds of Metal or Foot Pounds of Work?


IT IS miles, not rubber which you purchase when you buy a tire for your motor car and it is really *work*, not iron, which you want in a brake shoe. The price of one is considered on quality alone. The price of the other should be based on quality too. A pound of brake shoe metal is, in fact, of value only when converted into foot pounds of work. If a pound of specially developed shoe can do 50% more work than a pound of ordinary shoe, is it not worth a higher price? American Brake shoes cost a little more per pound of metal, but less per foot pound of useful work.

*"Best by Test"*

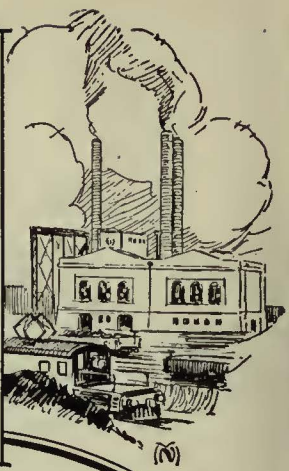
**THE AMERICAN BRAKE SHOE  
AND FOUNDRY COMPANY**

30 CHURCH ST., NEW YORK  
332 S. MICH. AVE., CHICAGO





# Friction and your Profits



EVERY hour that your machinery is running, friction is cutting away the bearings, little by little. The toll of friction, after a single day's operation of the machinery, is so small that it cannot be measured; but as month after month goes by it becomes apparent. A worn bearing that must be repaired, a machine which requires a general overhauling, a piece of machinery so badly worn that it cannot be overhauled, but must be replaced—these tell the story of the ravages of friction.

As friction grinds at the bearings, so it eats into your profits. The new bearing, and the labor cost of replacing it; the expense of a general overhauling; the cost of the fuel required to generate extra power for a machine which runs a little harder than it should—these are only a few of the items which make up the toll that friction takes from your profits.

Of course, friction cannot be eliminated entirely. But it can be reduced to a minimum by the use of oils and greases exactly suited to the machinery.

## Standard Oils and Greases

are made in many grades to suit the requirements of all machinery used in the industrial world today. They are lubricants of the highest quality, and will reduce friction, and friction's drain on your profits, to a minimum.

*Our representative will recommend  
the grades suited to your machinery*

### STANDARD OIL COMPANY

(INDIANA)

910 South Michigan Avenue

Chicago, Illinois





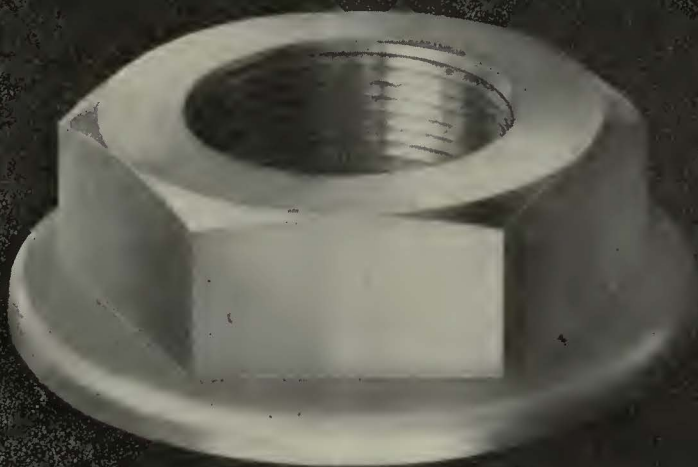
# EMPIRE BOLTS & NUTS

*How often does the newspaper say "The accident was caused by a defective bolt or nut." Think of this the next time you are tempted to buy bolts and nuts on price alone.*



PRECISION  
OF FIT

STRENGTH  
OF  
THREAD



ACCURACY  
OF  
FINISH

PERFECT  
HEX



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**BOLT & NUT COMPANY**  
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District Office  
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*Makers of Bolts, Nuts and Rivets Since 1845*





*Selected  
after  
Definite Tests*

## ROL-MAN PARTS for B. M. T. Cars

Repeated shock under heavy loads. Continual grinding wear under heavy pressure. Little or no lubrication. These are the causes of high mortality among truck and car parts, with a consequent loss of time, labor and profits due to repeated pull-ins for repairs and renewals.

For several years past, the Brooklyn-Manhattan Transit Corporation has used ROL-MAN Manganese Steel Truck and Car Parts for old car replacements such as pedestal guides, journal box guides, bolster and transom chafing plates and similar parts where excessive wear occurs. ROL-MAN Parts have been under rigid scrutiny. They have met definite tests which prove their superior wearing qualities and the savings to be effected through their use.

And now the sixty-seven new articulated cars for the B. M. T. are being completely equipped with ROL-MAN Manganese Steel Truck and Car Parts.

ROL-MAN Parts are long-lived because they resist wear. In fact, their resistance to abrasion actually increases as they become toughened and hardened under repeated impact and wear. Consequently, they last for years and require a minimum of attention. Think what that means to you in keeping your cars out on the lines earning profits rather than in the shops eating up dividends.

You'll notice, too, since the wear on ROL-MAN Parts even over a period of years is almost imperceptible, that cars equipped with them have less vibration and consequently operate with much less noise.

Finally, glance at the physical properties of ROL-MAN (rolled Manganese) Steel. That should convince you.

Now, send us your specifications.

### PHYSICAL PROPERTIES of ROL-MAN ROLLED and FORGED MANGANESE STEEL

Ultimate Tensile.....	140,000 to 160,000 lbs. per square inch
Elastic Limit .....	60,000 to 75,000 lbs. per square inch
Elongation .....	35% to 50% in 2 inches
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Wear Plates

#### ROL-MAN Rolled or Forged Manganese Steel Truck and Car Parts

Journal Box and Pedestal Jaw Gibs  
or Liners  
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Supports  
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Liners  
Draw Bar Parts for Car Bodies  
Forged Swing Hanger Axles and  
Supports

TRADE



MARK





Above Photo, Courtesy  
Denver Tourist Bureau.

## A Mile-High Service Record

Arapahoe Street, Denver, Colorado.

up to the top of the tie. Until 1921 the heavy cars of the Denver Interurban, weighing 62 tons each, were operated on this line.

In May of this year, the track was paved over, as the need for bringing the interurban cars into the center of town had been eliminated. The unretouched photograph above shows one of the Carnegie Ties just as it was dug from the concrete—after eighteen years of service.

The chief engineer of the Denver Tramway Corporation stated that the ties were in an excellent state of preservation and that both clips and ties could have been used for rail renewal.

Service records like this prove the wisdom and economy of laying track on a permanent foundation.

*Booklet—"Steel Cross Ties"—sent at your request.*

# CARNEGIE STEEL COMPANY

General Offices - Carnegie Building - 434 Fifth Avenue

PITTSBURGH

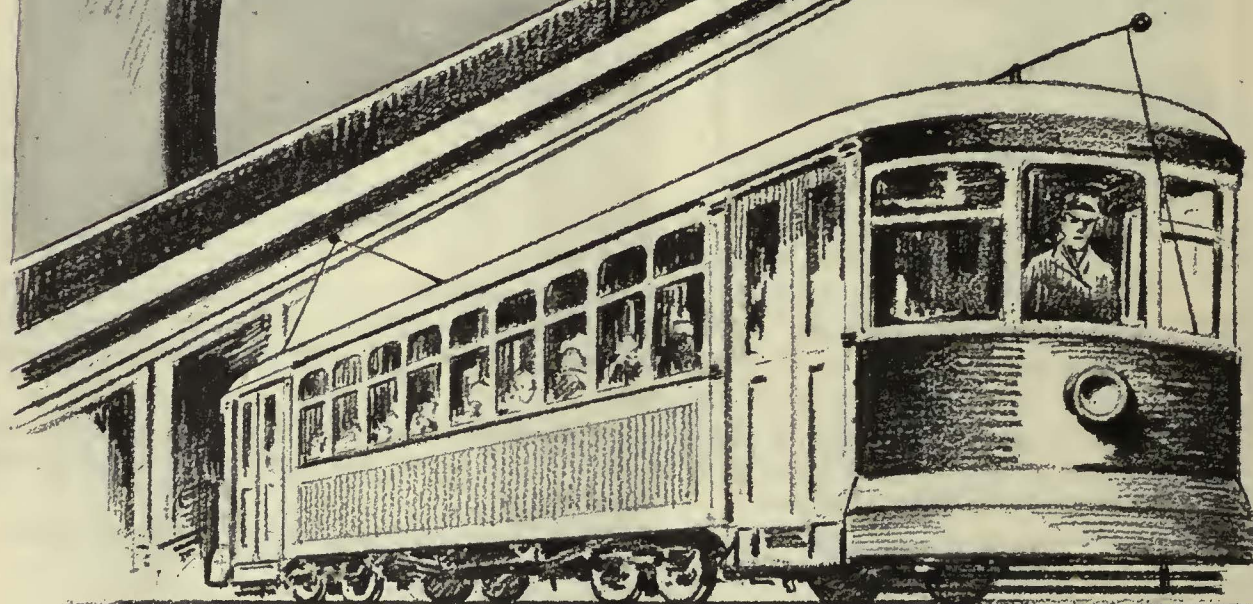


PENNSYLVANIA




*How is advertising educational?  
In telling of new products  
and of new uses for old  
products, and in showing  
how they aid and serve.*

*Barron Collier*



**Collier**  
*Car Card Advertising*





THE modern, attractive, well-designed passenger car was developed from the crude vehicle of generations past through years of effort on the part of experts long experienced in public service.

So too, the artistic, appealing car cards of today are a vast improvement over the advertising posters of yesterday. This change likewise, was made possible only through the effort of those long trained in their own special field.

Modern car cards are the shoppers' and marketers' guide illustrated in full color. They are not only an attractive feature of *your* service to *your* patrons, they are also an active asset. *They stimulate trade—and trade is the basis of traffic.*



**Service**  
*almost everywhere!*



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## Special Trackwork

### FROGS-MATES-SWITCHES CROSSOVERS

*To help create new traffic  
and carry it economically—*

Wharton Special Trackwork performs a double function in the modernization program.

In the first place it helps to create new traffic by providing a more permanently smooth roadbed, over which modern cars may ride easily, quietly and with utmost comfort to passengers.

And at the same time it reduces operating costs through its ability to stand up under continuous heavy traffic conditions, with least possible maintenance and depreciation.

Sixty years of experience in design, composition and manufacture of trackwork, together with the use of the famous TISCO Manganese Steel at points of wear,—these are the guarantees back of Wharton Trackwork economy.

Consult us on any problem of trackwork—special or otherwise.

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*Sales Offices*

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Modern Up-to-date Cars  
*Just received by the*  
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Chilled Wheels

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50 Plants—Daily Capacities 20,000 Wheels





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PATENTED  
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SAFSTEP



In adopting this approved accident-proof safety car step, you will be buying dependable liability insurance at extremely low cost.

Slip-proof, miss-proof, self-cleaning, it minimizes "aisle" accidents as well as "step" and "platform" accidents.

Damages paid for one such accident may cost you more than a "Safkar" Step equipment for every car on your system.

*Let us send Bulletin D 28.*

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LONG ISLAND CITY, N.Y. U.S.A.  
Established, 1902







—also means **FORGED!**

In making track welds that will not “cup,” crack or deteriorate in the hardest kind of service—the steel must be *forged while it is still hot.*

And the only two processes that simultaneously weld and forge the rail joints are

The two  
**Lorain Processes of Electric Welding**  
(*Butt Weld and Bar Weld*)

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Butt-welds on Lorain Rail, 624,600 blows, 1,412,500 blows and 1,497,000 blows.  
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Write our nearest sales office for full particulars of Lorain Processes and Lorain Products.

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### INTERNATIONAL ELECTRICALLY OPERATED FARE REGISTERS

will help make full collection and registration of fares an assured fact.

Do not install a slow and unreliable system of fare registration, just because you have used it for many years. It would be inconvenient with the many modern improvements on your new car.

The International Electrically Operated Fare Register is more quickly and easily operated, and there-

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*Write today for full details.*

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The only trolley catcher or retriever worthy of being used on MODERN cars is the one which embodies EVERY safety feature and possesses EVERY operating advantage that past experience has proved to be desirable.

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1. No-Wear check pawl—short, simple and sturdy—always engages full face on, never strikes point of teeth.
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3. Perfect and automatic lubrication of every part through one oil hole once in three months.
4. Ratchet wind simplifies retriever winding, saves time and trouble.
5. Emergency release permits of trolley being run up again instantly at any speed in case of emergency.

If you were not among those we had the pleasure of talking to at the Convention, please write for our latest bulletin. There is an improved type of Earll Catcher or Retriever for every class of service.



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many times

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You'll find the answer quickly in the  
1926 Edition McGraw Electric Railway  
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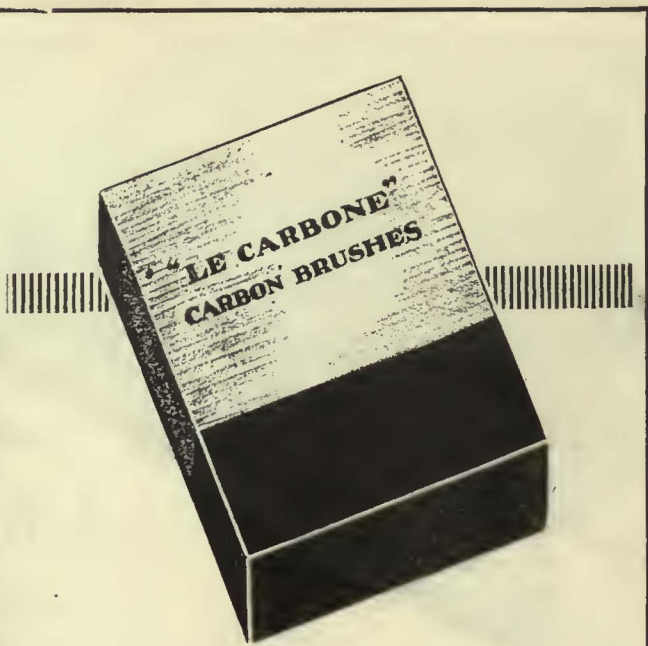
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Company .....

Street .....

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

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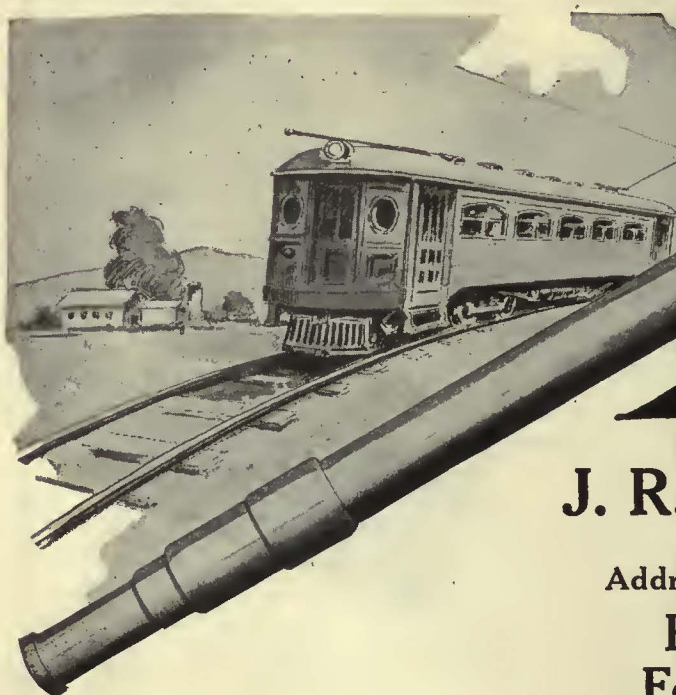
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Keep them running on  
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ROOT SPRING SNOW SCRAPERS will keep the track clear of snow and ice. Assure 90% of summer schedules in the dead of winter through their use. They are pneumatically operated and can be put into instant use by the motorman without leaving his station.

**ROOT SPRING SCRAPER CO.**

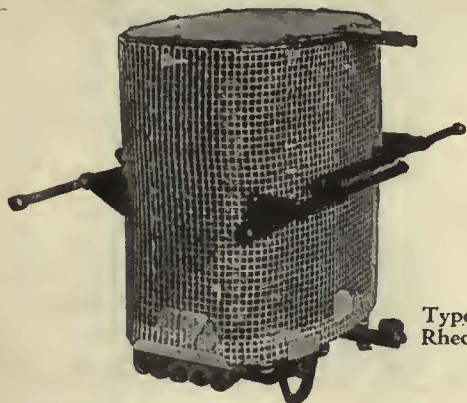
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Rheostat

## ERICO Type SR Portable Welding Outfit is

Easy to  
Weld with

Five current taps provide proper welding currents at all conditions of power from half to full line voltage. All connecting leads are made from flexible rubber covered cable.

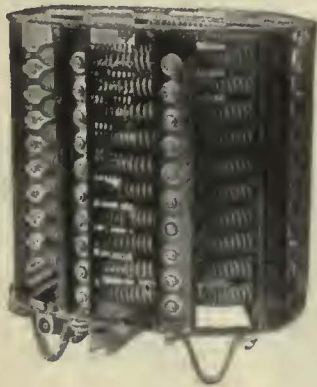
Easy to  
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Light weight—only 150 lbs.—and compact shape assure easy transportation of the rheostat. The carrying handles slide in beside the rheostat when not in use. For extended bonding or welding a light weight, easy running Larry can be furnished.

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Ask for Circular 17



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Sullivan Busters and Sullivan Portable Compressor breaking concrete in Philadelphia. Mazzola-Marano, who were contractors on this job, ran 4 "DW-221" Heavy Busters at a time with the "WK-314."

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Good will of the Public has cost you years of effort—why risk that good will by keeping streets blocked longer than necessary—by using slow, expensive methods to tear up concrete.

### Sullivan Busters

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Portable Compressors.....Booklet 3283-D  
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who calls the tune"

But if the "tune" is  
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Usually the railroad gets "stung." Unless it can be proved such warning was given as only sheer foolhardiness could have ignored. Such warning in fact as that given by a Nachod Highway Crossing Signal. It rings, it flashes, it even wig-wags. And it shows to the motorman if by any chance it should fail to work.

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The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

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The slight outlay involved by having rolling stock equipped with an Improved Pyrene (one-quart) Fire 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.

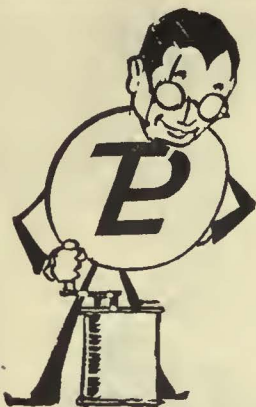
Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene Fire Extinguishers—they know a burning car or bus need not be abandoned if a Pyrene Fire Extinguisher is at hand.

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

**PYRENE MANUFACTURING CO.**  
 NEWARK, N. J.

**"Fortify for Fire Fighting"**





## There's more to a car than the Controller

Every part that goes into the assembly of your electric cars should be carefully inspected and tested to make sure they function properly and meet your exacting specifications. P. T. L. Inspectors, located in the large industrial centers, are thoroughly familiar with your service requirements and guarantee a rigid inspection and test of every item entering into the manufacture and assembly of your purchases.

*Bulletin No. 28 tells how we do it in detail. Write to-day.*

### PITTSBURGH TESTING LABORATORY

PITTSBURGH

Inspecting Engineers and Chemists  
Branch Offices in the Principal Cities

PENNA.

### ELRECO TUBULAR POLES



THE "WIRE LOCK" / THE CHAMFERED JOINT

#### COMBINE

Lowest Cost  
Least Maintenance

Lightest Weight  
Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.  
CINCINNATI, OHIO

New York City, 30 Church Street

### The DIFFERENTIAL CAR



Standard on  
60 Railways for

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

*Use These Labor Savers*

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

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

### Kalamazoo Trolley Wheels

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



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



Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS  
BARE COPPER WIRE AND CABLE  
TROLLEY WIRE  
WEATHERPROOF WIRE  
AND CABLE  
PAPER INSULATED  
UNDERGROUND CABLE  
MAGNET WIRE

AMERICAN ELECTRICAL WORKS  
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 20-32 West Randolph Street;  
Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

### Waterproofed Trolley Cord



Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER  
SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE** and **ECONOMY**.

*Sold by Net Weights and Full Lengths*

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.  
Newtonville, Massachusetts

### Advertisements for the Searchlight Section



Can be received at the New  
York Office of Electric  
Railway Journal  
until 10 a. m.

## Wednesday

For issue out Saturday



# SEARCHLIGHT SECTION

## USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

### UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.  
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.  
Proposals, 40 cents a line an insertion.

### INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.  
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

### DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$1.50 an inch  
4 to 7 inches.....4.30 an inch  
8 to 14 inches.....4.10 an inch  
Rates for larger spaces, or yearly rates, on request.  
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

### POSITIONS VACANT

MASTER mechanic wanted—familiar with electrical motor equipment and cars, preferably one who has had experience with mining locomotives and cars. Give age, experience, salary expected, and references. P-938, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

### POSITIONS WANTED

OPERATING executive, now employed desires change, twenty-five years' practical electric railway transportation experience, familiar with making schedules, public relations, labor and traffic problems, and requirements for successful and efficient operation. PW-935, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

YOUNG man, age 27, now employed as statistician, over five years' experience in street railway and bus operation, familiar with transportation, commercial, traffic and research work, desires position as Commercial manager on small property that needs modern methods of selling rides to convert red figures into black; would also consider position with bus manufacturer in the sales department. PW-937, Electric Railway Journal, Guardian Bldg., Cleveland, O.

### SALESMEN WANTED

Wanted Salesmen covering telephone, electric power, electric railway or sub-stations to take on our product as a side line. State references and territory covered. Page Engineering Co., 1305 S. Townsend, Syracuse, N. Y.

### LEGAL NOTICE

#### STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1926, State of New York } as,  
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of McGraw-Hill Publishing Company, Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Charles Gordon, 10th Ave. at 36th St., New York, N. Y. Managing Editor, Morris Buck, 10th Ave. at 36th St., New York, N. Y. Business Manager, L. F. Stoll, 10th Ave. at 36th St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of

### FOR SALE

#### 14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors  
Cars Complete—Low Price—Fine Condition  
ELECTRIC EQUIPMENT CO.  
Commonwealth Bldg., Philadelphia, Pa.

### LEGAL NOTICE

total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. L. D. & A. J. Baldwin, Trustees, 27 Pine St., New York, N. Y. A. J. & L. D. Baldwin, Trustees, 27 Pine St., New York, N. Y. The Grosvenor, Inc., 27 Pine St., New York, N. Y. H. W. Blake, 10th Ave. at 36th St., New York, N. Y. F. R. Low, 10th Ave. at 36th St., New York, N. Y. Mason Britton, 10th Ave. at 36th St., New York, N. Y. Anne Hugus Britton, Hill Building, New York, N. Y. Grace W. Mehren, 53 Fairview Ave., So. Orange, N. J. J. Malcolm Muir, Trustee, 10th Ave. at 36th St., New York, N. Y. D. C. McGraw, 10th Ave. at 36th St., New York, N. Y. J. H. McGraw, 10th Ave. at 36th St., New York, N. Y. J. H. McGraw, Jr., 10th Ave. at 36th St., New York, N. Y. C. W. McGraw, 370 Seventh Ave., New York, N. Y. H. W. McGraw, 10th Ave. at 36th St., New York, N. Y. J. H. McGraw, J. H. McGraw, Jr., and Malcolm Muir, Trustees, 10th Ave. at 36th St., New York, N. Y. F. S. Weatherby, 271 Clinton Road, Brookline, Mass. E. S. Wilsey, 10th Ave. at 36th St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

McGraw-Hill Publishing Company, Inc.

C. H. THOMPSON, Secretary.  
Sworn to and subscribed before me this 29th day of Sept., 1926.

[Seal.] MARTIN J. WIEMER.  
Notary Public Queens County Certificate No. 1819. Certificate filed in New York County No. 272.  
(My Commission expires March 30, 1928.)

Over  
6000  
other  
men  
in the  
Electric  
Railway  
Field  
will see  
this page-

Then isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, Etc., Etc., Etc.



# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry  
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car  
Collier, Inc., Barron G.

## Air Brakes

Christensen Air Brake Co.  
Westinghouse Air Brake Co.  
Air Receiver & Aftercoolers  
Ingersoll-Rand Co.

## Anchors, Guy

Elec. Service Supplies Co.  
Graybar Electric Co., Inc.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

## Appraisals

American Appraisal Co.  
Armature Shop Tools  
Columbia Machine Works  
Elec. Service Supplies Co.

## Automatic Return Switch

Stands  
Ramapo Ajax Corp.

## Automatic Door Equipment

Manganese Steel Forge Co.  
Automatic Regulators Volt-  
age Current Synchroniz-  
ing  
American Brown Boveri  
Elec. Corp.

## Automatic Safety Switch

Stands  
Ramapo Ajax Corp.

## Axles

Bemis Car Truck Co.  
Bethlehem Steel Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Illinois Steel Co.  
Johnson & Co., J. R.  
National Ry. Appliance Co.  
St. Louis Car Co.  
Standard Steel Co.  
Westinghouse E. & M. Co.

## Axles, Carburized Vanadium

Johnson & Co., J. R.  
Axles, Front  
Shuler Axle Co.

## Axles, (Front & Rear) Motor

Truck & Passenger Car  
Timken-Detroit Axle Co.,  
The

## Axles, Steel

Carnegie Steel Co.  
Johnson & Co., J. R.

## Axles, Trailer & Motor Bus

Timken-Detroit Axle Co.,  
The

## Babbitt Metal

Ajax Metal Co.  
Johnson & Co., J. R.  
More-Jones Brass and  
Metal Co.

## Badges and Buttons

Elec. Service Supplies Co.  
International Register Co.

## Baggage Checks

Globe Ticket Co.

## Batteries, Dry

National Carbon Co.

## Bearings and Bearing Metals

Ajax Metal Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
General Electric Co.  
More-Jones Brass and  
Metal Co.  
St. Louis Car Co.  
Westinghouse E. & M. Co.

## Bearings, Ball

Norma Hoffman Bearing  
Corp.

## Bearings, Center and Roller

Slide  
Columbia Machine Works  
Stucki Co., A

## Bearings, Roller

Norma Hoffman Bearing  
Corp.  
Timken Roller Bearing Co.

## Bells & Buzzers

Consolidated Car Heating Co.

## Bells and Gongs

Brill Co., The J. G.  
Elec. Service Supplies Co.  
Graybar Electric Co., Inc.  
St. Louis Car Co.

## Benders, Rail

Railway Trackwork Co.

## Bodies, Bus

Baker-Raulang Co., The  
Cummings Car Coach Co.

## Bodies, Passenger Car

Baker-Raulang Co., The  
Body Material, Haskellite and  
Plymet  
Haskellite Mfg. Corp.

## Rollers

Rabeck & Wilcox Co.  
Bolts, Nuts, Rivets  
Russell, Burdell & Ward  
Bolt Nut Co.

## Bolts-Nuts Track

Illinois Steel Co.

## Bolster Hanger Wire Plates

Manganese Steel Forge Co.

## Bond Testers

American Steel & Wire Co.  
Electric Service Supplies Co.

## Sending Apparatus

American Steel & Wire Co.  
Electric Railway Improve-  
ment Co.

Elec. Service Supplies Co.  
Graybar Electric Co., Inc.  
Ohio Brass Co.

Railway Trackwork Co.  
Una Welding & Bonding Co.

## Sends, Rail

Amer. Steel & Wire Co.  
Electric Railway Improve-  
ment Co.

Elec. Service Supplies Co.  
General Electric Co.  
Graybar Electric Co., Inc.  
Ohio Brass Co.

Railway Trackwork Co.  
Una Welding & Bonding Co.  
Westinghouse E. & M. Co.

Trackets and Cross Arms  
(See also Poles, Ties,  
Posts, Etc.)  
Bates Expanded Steel Truss  
Co.

Columbia Machine Works  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
Graybar Electric Co., Inc.  
Hubbard & Co.  
Ohio Brass Co.

## Trake Adjusters

Brill Co., The J. G.  
National Ry. Appliance Co.  
Westinghouse Tr. Br. Co.

## Trake Blocks (Bns)

American Brake Material  
Corp.

## Trake Shoes

American Brake Shoe &  
Foundry Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
St. Louis Car Co.

## Trakes, Brake Systems and

Brake Parts  
Bemis Car Truck Co.  
Brill Co., The J. G.  
General Electric Co.  
National Brake Co.  
Safety Car Devices Co.  
St. Louis Car Co.  
Westinghouse Tr. Br. Co.

## Brushes, Carbon

General Electric Co.  
Jeandron, W. J.  
Le Carbone Co.  
National Carbon Co.  
Westinghouse E. & M. Co.

## Brushes, Graphite

National Carbon Co.

## Brushes, Metal Graphite

National Carbon Co.

## Brushes, Wire Pneumatic

Ingersoll-Rand Co.

## Brushholders

Columbia Machine Works  
Haskellite Mfg. Corp.

## Bus Seats

Hale-Kilburn Co.  
Heywood-Wakefield Co.

## Bus Wheels, Steel

Heywood-Wakefield Co.

## Buses, Motor

Brill Co., The J. G.  
Cummings Car & Coach Co.  
Graham Bros.  
International Harvester Co.  
St. Louis Car Co.  
Studebaker Corp. of  
America

## Brushings, Case Hardened

and Manganese  
Bemis Car Truck Co.  
Brill Co., The J. G.  
Columbia Machine Works  
St. Louis Car Co.

## Cables (See Wires and

Cables)

Cambrie Tapes, Yellow and  
Black Varnish  
Irvington Varnish & Ins.  
Co.

## Carbon Brushes (See

Brushes, Carbon)

## Carbon Paste, Welding

National Carbon Co.

## Carbon Plates, Welding

National Carbon Co.

## Carbon Rods, Welding

National Carbon Co.

## Car Lighting Fixtures

Elec. Service Supplies Co.

## Car Panel Safety Switches

Consolidated Car Heat. Co.  
Westinghouse E. & M. Co.

## Car Steps

Irving Iron Works

## Car Wheels, Rolled Steel

Bethlehem Steel Co.

## Cars, Dump

Brill Co., The J. G.  
Differential Steel Car Co.  
St. Louis Car Co.

## Cars, Gas, Rail

Brill Co., The J. G.  
St. Louis Car Co.

## Cars, Passenger, Freight,

Express, etc.  
American Car Co.  
Brill Co., The J. G.  
Cincinnati Car Co.  
Cummings Car and Coach  
Co.

Kuhman Car Co., G. C.  
National Ry. Appliance Co.  
St. Louis Car Co.  
Wason Mfg. Co.

## Cars, Second Hand

Electric Equipment Co.

## Cars, Self-Propelled

Brill Co., The J. G.  
General Electric Co.  
Cash Fare Receipts  
Globe Ticket Co.

## Castings, Brass Composition

or Copper  
Ajax Metal Co.  
More-Jones Brass & Metal  
Co.

## Castings, Gray Iron and

Steel  
American Brake Shoe &  
Foundry  
American Steel Foundries  
Bemis Car Truck Co.  
St. Louis Car Co.  
Standard Steel Works

Castings, Malleable and Brass  
American Brake Shoe &  
Foundry  
Bemis Car Truck Co.  
St. Louis Car Co.

Castings, Nichrome  
Driver-Harris Co.

## Catchers and Retrievers,

Trolley  
Earl, C. I.  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Wood Co., Chas. N.

## Catenary Construction

Archbold-Brady Co.  
Graybar Electric Co., Inc.

## Ceiling Car

Haskellite Mfg. Corp.  
Pantastote Co., Inc.

## Collings, Plywood, Panels

Haskellite Mfg. Corp.

## Chaffing Plate

Manganese Steel Forge Co.

## Chairs, Parlor Car

Heywood-Wakefield Co.

## Change Carriers

Cleveland Fare Box Co.  
Electric Service Supplies Co.

## Circuit-Breakers

General Electric Co.  
Westinghouse E. & M. Co.

## Circuit Breakers (Oil)

American Brown Boveri  
Elec. Corp.

## Clamps and Connectors for

Wires and Cables  
Columbia Machine Works  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

## Cleaners and Scrapers Track

(See also Snow-Plows,  
Sweepers and Brooms)

## Brill Co., The J. G.

Cincinnati Car Co.  
Ohio Brass Co.  
Root Spring Scraper Co.  
St. Louis Car Co.

## Clusters and Sockets

General Electric Co.

## Coil Bending and Winding

Machines  
Elec. Service Supplies Co.  
Westinghouse E. & M. Co.

## Colls, Armature and Field

Economy Electric Devices  
Co.  
General Electric Co.  
Westinghouse E. & M. Co.

## Colls, Choke and Kieking

Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.

## Coin Counting Machines

Cleveland Fare Box Co.  
International Register Co.  
Johnson Fare Box Co.

## Coin Sorting Machines

Cleveland Fare Box Co.

## Coin Wrappers

Cleveland Fare Box Co.

## Commutator Slotters

Columbia Machine Works  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.

## Commutator, Truing Devices

General Electric Co.

## Commutators or Parts

Cameron Electrical Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.

## Compressors, Air

General Electric Co.  
Graybar Electric Co., Inc.  
Ingersoll-Rand Co.  
Sullivan Machinery Co.  
Westinghouse Tr. Br. Co.

## Compressors, Gas

Sullivan Machinery Co.

## Compressors, Air, Portable

Ingersoll-Rand Co.

## Compressors, Portable

Sullivan Machinery Co.

## Condensers

General Electric Co.  
Ingersoll-Rand Co.  
Westinghouse E. & M. Co.

## Condenser Papers

Irvington Varnish & Ins.  
Co.

## Connectors, Solderless

Westinghouse E. & M. Co.

## Connectors, Trailer Car

Columbia Machine Works  
Consolidated Car Heat. Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.

## Controllers or Parts

American Brown Boveri  
Elec. Corp.  
General Electric Co.  
Westinghouse E. & M. Co.

## Controller Regulators

Elec. Service Supplies Co.

## Controlling Systems

General Electric Co.  
Westinghouse E. & M. Co.

## Converters, Rotary

American Brown Boveri  
Elec. Corp.  
General Electric Co.  
Westinghouse E. & M. Co.

## Copper Wire

American Brass Co.  
Amer. Steel & Wire Co.  
Anaconda Copper Mining  
Co.

## Copper Wire Instruments,

Measuring, Testing and  
Recording  
American Brass Co.  
American Steel & Wire Co.  
Anaconda Copper Mining Co.

## Cord, Ball, Trolley, Register

Amer. Steel & Wire Co.  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
International Register Co.  
Roebling's Sons Co.,  
John A.

## Cord Connectors and

Couplers  
Elec. Service Supplies Co.  
Samson Cordage Works  
Wood Co., Chas. N.

## Coupon Books

Globe Ticket Co.

## Couplers, Car

American Steel Foundries  
Brill Co., The J. G.  
Cincinnati Car Co.  
Ohio Brass Co.  
St. Louis Car Co.  
Westinghouse Tr. Br. Co.

## Cranes, Hoists & Lifts

Electric Service Supplies Co.

## Cranes, Electric, Industrial

Truck Mounted  
Baker-Raulang Co., The

## Cross Arms (See Brackets)

Crossing Foundations  
International Steel Tie Co.

## Crossings

Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

Crossings, Frets & Switches  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

Crossings, Manganese  
Bethlehem Steel Co.  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track  
Special Work)

Crossings, Trolley  
Ohio Brass Co.

Westinghouse E. & M. Co.

Curtains & Curtain Fixtures  
Brill Co., The J. G.  
Pantastote Co., Inc.  
St. Louis Car Co.

Dealer's Machinery & Second  
Hand Equipment  
Elec. Equipment Co.

Dealer Second Hand Rails  
Electric Equipment Co.

Deruling Devices (See also  
Track Work)

Deruling Switches  
Ramapo Ajax Corp.

Destination Signs  
Elec. Service Supplies Co.

Detective Service  
Wish-Servic, P. Edward

Door Operating Devices  
Brill Co., The J. G.  
Consolidated Car Heating Co.  
Safety Car Devices Co.

Doors & Door Fixtures  
Brill Co., The J. G.  
General Electric Co.  
Hale-Kilburn Co.  
St. Louis Car Co.

Doors, Folding Ventilator  
Safety Car Devices Co.

Drills, Track  
Amer. Steel & Wire Co.  
Electric Service Supplies Co.  
Ingersoll-Rand Co.  
Ohio Brass Co.

Dryers, Sand  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.

Ears  
Columbia Machine Works  
Electric Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.





## This Silver Strand (Reg.) now marks the shunts of all National Pyramid Brushes

ON ANY brush-equipped electrical machine, look at the brush shunts. Look for the Silver Strand. It is the visible identifying mark on all National Pyramid Brushes—your guarantee of satisfactory brush performance.

All shunts of National Pyramid Brushes now bear this Silver Strand as an identifying mark, visible to the most casual glance. The familiar letters NCC, the three pyramids and the grade number will still be found on the brush itself for your guidance in purchasing

and installing. When the brush is in service, the Silver Strand in the shunt is a visual sign to all that here is a National Pyramid Brush, supremely suited for the work for which it is designed.

Thousands of brushes are now in use bearing this shunt, which has the same conductivity as the former unmarked shunts. The Silver Strand is a mark that indicates, but does not affect, the perfection of performance you have learned to expect from National Pyramid Brushes. Look for the Silver Strand.

# National Pyramid Brushes

*Manufactured and guaranteed by*

NATIONAL CARBON COMPANY, INC.

Cleveland, Ohio

*Carbon Sales Division*

San Francisco, Cal.

Canadian National Carbon Co., Limited, Toronto, Ontario

*Emergency Service Plants*

CHICAGO, ILL.  
551 West Monroe St.  
Phone: State 6092

PITTSBURGH, PA.  
7th Floor, Arrott Power Bldg. No. 3, Barker Place  
Phone: Atlantic 3570

NEW YORK, N. Y.  
357 West 36th St.  
Phone: Lackawanna 8153

BIRMINGHAM, ALA.  
1824 Ninth Ave., N.  
Phone: Main 4016



**Flaximum Insulators**  
National Railway Appliance Co.

**Floors**  
Electric Service Supplies Co.  
Haskelite Mfg. Corp.

**Flooring, Fireproof**  
Irving Iron Works

**Flooring, Non-Slipping**  
Irving Iron Works

**Flooring, Open Steel**  
Irving Iron Works

**Flooring, Steel, Subway**  
Irving Iron Works

**Flooring, Venting**  
Irving Iron Works

**Floors**  
Haskelite Mfg. Corp.

**Furnaces**  
Brill Co., The J. G.  
Standard Steel Works

**Frogs & Crossings, See Rail**  
Bethlehem Steel Co.  
Ramapo Ajax Corp.  
Wm. Wharton, Jr. & Co.

**Frogs, Track (See Track Work)**

**Frogs, Trolley**  
Electric Service Supplies Co.  
Westinghouse E. & M. Co.

**Furnaces, Electric, Steel**  
Melting  
American Brown Boveri Elec. Corp.

**Fuses and Fuse Boxes**  
Consolidated Car Heating Co.  
General Electric Co.  
Graybar Electric Co., Inc.  
Westinghouse E. & M. Co.

**Fuses, Remittable**  
General Electric Co.

**Gaskets**  
Westinghouse Tr. Br. Co.

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Lorain Steel Co.

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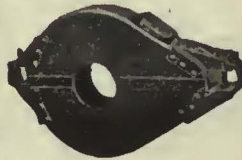
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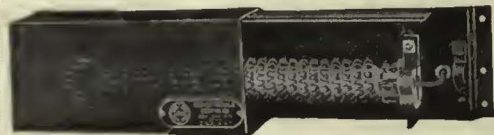
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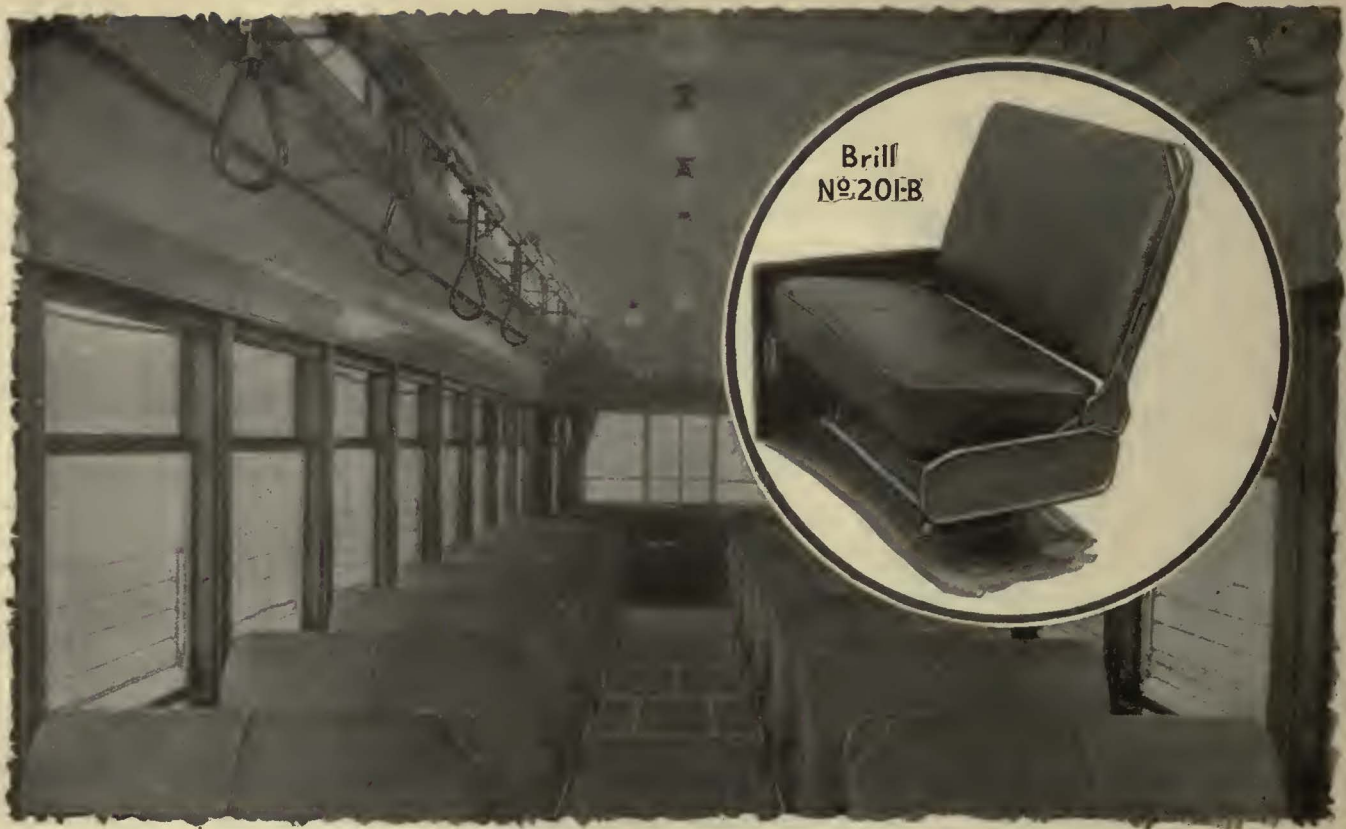
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Steps	Railway Utility Co.	Graybar Electric Co., Inc.	Truss Planks	Welding Steel
Irving Iron Works	Smith Heater Co., Peter	Westinghouse E. & M. Co.	Haskelite Mfg. Corp.	Electric Railway Improve-
Steps, Car	Ticket Cases	Treads, Safety, Stair, Car	Tubing, Yellow & Black	ment Co.
Brill Co., The J. G.	Globe-Ticket Co.	Step	Flexible Varnish	Railway Trackwork Co.
Stokers, Mechanical	Ticket Dealers	Irving Iron Works Co.	Irvington Varnish & Ins.	Una Welding & Bonding Co.
Babcock & Wilcox Co.	Globe Ticket Co.	Trolley Buses	Co.	Welding Wire
Westinghouse E. & M. Co.	Ticket Choppers and Destroyers	General Electric Co.	Turbines, Steam	American Steel & Wire Co.
Storage Batteries (See Batteries, Storage)	Electric Service Supplies Co.	More-Jones Brass & Metal Co.	American Brown Boveri Elec. Corp.	General Electric Co.
Storage Tanks	Ticket Punches	National Railway Appliance Co.	General Electric Co.	Railway Trackwork Co.
S. F. Bowser Co.	Globe Ticket Co.	Nuttall Co., R. D.	Westinghouse E. & M. Co.	Roebbling's Sons Co., J. A.
Strain Insulators	Tickets & Transfers	Ohio Brass Co.	Co.	Railway Wire and Rods
Electric Service Supplies Co.	Globe Ticket Co.	Trolley Buses, Retriving	Turnstiles	Railway Trackwork Co.
Ohio Brass Co.	Tie Pistes	General Electric Co.	Electric Service Supplies Co.	Wheel Guards (See Treaders and Wheel Guards)
Westinghouse E. & M. Co.	Illinois Steel Co.	National Railway Appliance Co.	Perey Mfg. Co., Inc.	Wheel Presses (See Machine Tools)
Strad	Ties and Tie Rods, Steel	Co.	Turntables	Wheels, Car, Cast Iron
American Steel & Wire Co.	Carnegie Steel Co.	Nuttall Co., R. D.	Valves	Asso. of Mfrs. of Chilled Car Wheels
Roebbling's Sons Co., J. A.	International Steel Tie Co.	Ohio Brass Co.	Ohio Brass Co.	Bemis Car Truck Co.
Street Cars (See Cars, Passenger, Freight, Express)	Dayton Mechanical Tie Co.	Trolley Buses	Westinghouse Tr. Br. Co.	Griffin Wheel Co.
Structural Steel	Ties, Wood Cross (See Poles, Ties, Posts, etc.)	Brill Co., The J. G.	Varnished Papers & Silks	Wheels, Car, Steel & Steel Tire
American Brown Boveri Elec. Corp.	Tires	General Electric Co.	Co.	American Steel Foundries
Superheaters	Firestone Tire & Rubber Co.	Westinghouse E. & M. Co.	Ventilators, Car	Carnegie Steel Co.
Babcock & Wilcox Co.	General Tire & Rubber Co.	Co.	Brill Co., The J. G.	Illinois Steel Co.
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)	Goodyear Tire & Rubber Co.	Trolley Material, Overhead	Cincinnati Car Co.	Standard Steel Works
Switch Stands and Fixtures	India Tire & Rubber Co.	Electric Service Supplies Co.	Consolidated Car Heating Co.	Wheels, Steel Disc
Ramapo-Ajax Corp.	Wm. Wharton, Jr. & Co.	More-Jones Brass & Metal Co.	Natl. Ry. Appliance Co.	Budd Wheel Co.
Switches and Switchboards	Toola, Track & Miscellaneous	Ohio Brass Co.	St. Louis Car Co.	Wheels, Trolley
American Brown Boveri Elec. Corp.	American Steel & Wire Co.	Westinghouse E. & M. Co.	Railway Utility Co.	Elec. Ry. Equipment Co.
Consolidated Car Heating Co.	Electric Service Supplies Co.	Co.	Vealhills Linings	Elec. Service Supplies Co.
Electric Service Supplies Co.	Hubbard & Co.	Star Brass Works	Haskelite Mfg. Corp.	General Electric Co.
General Electric Co.	Railway Trackwork Co.	Trolley Wheels & Harps	Welded Rail Joints	More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.	Torches, Acetylene (See Cutting Apparatus)	Electric Service Supplies Co.	Electric Railway Improvement Co.	Nuttall Co., R. D.
Co.	Tower Wagon & Auto Trucks	More-Jones Brass & Metal Co.	Metal & Thermit Corp.	Star Brass Works
Switches, Tie Rail	J. R. MacCardell Co.	Co.	Ohio Brass Co.	Railway Trackwork Co.
Ramapo Ajax Corp.	Towers and Transmission Structures	Star Brass Works	Railway Trackwork Co.	Una Welding & Bonding Co.
Switches, Track (See Track Special Work)	Archbold-Brady Co.	Trolley Wheels (See Wheels Trolley)	Una Welding & Bonding Co.	Westinghouse E. & M. Co.
Tampara, Tie	Bates Expanded Steel Truss Co.	Trolley Wire	Welders, Portable Electric	Westinghouse Traction Brake Co.
Ingersoll-Rand Co.	Westinghouse E. & M. Co.	Amer. Electrical Works	Electric Railway Improvement Co.	Wire Rope
Railway Trackwork Co.	Track Grinders	Amer. Steel & Wire Co.	Ohio Brass Co.	American Steel & Wire Co.
Tapes and Cloths (See Insulating Cloth, Paper and Tape)	Metal & Thermit Corp.	American Brass Co.	Railway Trackwork Co.	Roebbling's Sons Co., J. A.
Tie Rail Special Track Work	Railway Trackwork Co.	Anaconda Copper Min. Co.	Una Welding & Bonding Co.	Wires and Cables
Ramapo Ajax Corp.	Ramapo Ajax Corp.	Graybar Electric Co., Inc.	Westinghouse E. & M. Co.	Aluminum Co. of America
Telephones and Parts	Track, Special Work	Roebbling's Sons Co., J. A.	Welders, Rail Joint	American Brass Co.
Elec. Service Supplies Co.	Buda Co.	Rueck & Body Bolster Center Plate	Ohio Brass Co.	American Electrical Works
Graybar Electric Co., Inc.	Ramapo Ajax Corp.	Manganese Steel Forge Co.	Railway Trackwork Co.	American Steel & Wire Co.
Telephone and Telegraph Wire	Trackless Trolley Cars	Trucks, Car	Welding Processes and Apparatus	Anaconda Copper Min. Co.
American Steel and Wire Co.	Brill Co., The J. G.	Brill Co., The J. G.	Electric Railway Improvement Co.	General Electric Co.
Testing Instruments (See Instruments, Electrical Measurement, Testing, etc.)	St. Louis Car Co.	Bemis Car Truck Co.	General Electric Co.	Graybar Electric Co., Inc.
Transformers	Tractors, Industrial, Electric	Cincinnati Car Co.	Metal & Thermit Corp.	Okonite Co.
Consolidated Car Heating Co.	Baker-Rauling Co., The	Cummings Car & Coach Co.	Natl. Ry. Appliance Co.	Okonite-Callender Cable Co., Inc.
Gold Car Heating & Lighting Co.	Transfer Issuing Machines	St. Louis Car Co.	Ohio Brass Co.	Roebbling's Sons Co., J. A.
	Ohmer Fare Register Co.	Trucks, Industrial, Electric	Railway Trackwork Co.	Westinghouse E. & M. Co.
	Transformers	Baker-Rauling Co., The	Una Welding & Bonding Co.	Wood Preservatives
	American Brown Boveri Elec. Corp.	Trucks, Motor	Welding and Cutting Tools	American Creosoting Co.
	General Electric Co.	Graham Bros.	International Oxygen Co.	
		International Motor Co.		





*The fifteen new cars recently furnished the Washington Ry. & Elec. Co. were equipped with Brill No. 201-B Seats.*

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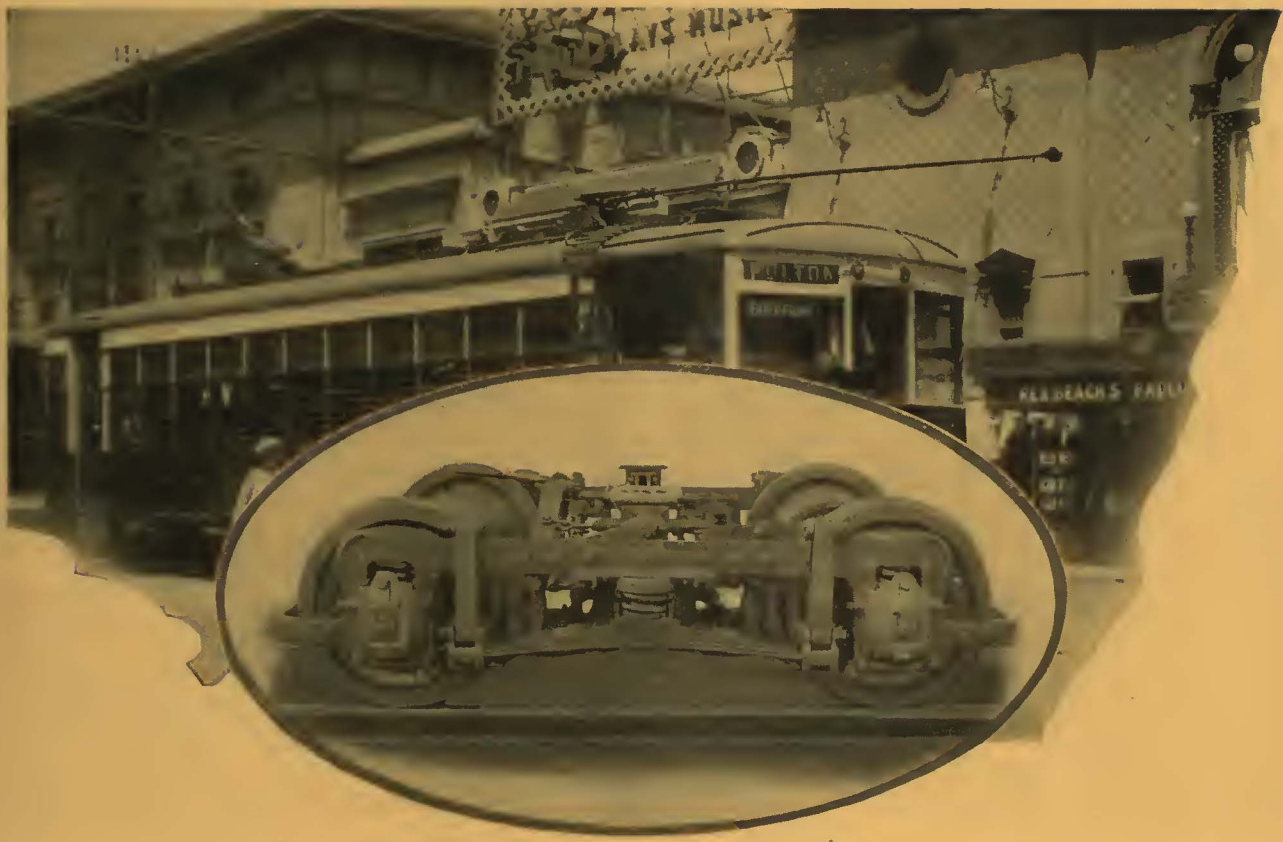
An improved type reversing mechanism, which permits a slope of the cushion and pitch to the back affording unusual comfort was specially designed for this Brill No. 201-B type seat for double-end modern cars. Deep spring genuine leather upholstered cushion and back add to its attractiveness, a factor in stimulating increased passenger revenue. Sturdily built, like all Brill seats.

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Cars*

Write for Seat Catalog No. 284.

 **THE J. G. BRILL COMPANY**   
PHILADELPHIA, PA.  
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The fifteen double truck safety cars, built by the American Car Co. for Virginia Elec. & Power Co., were mounted on Brill 177-E-1 trucks equipped with Twin Links.

*Modern Cars*

# require trucks—the result of progressive development

Solid-forged sideframes have been the foundation of the Brill truck system for years. They impart strength and durability to the truck's construction and result in long life and low maintenance. In designing the No. 177-E type for light-weight modern car service a type of solid-forged frame was developed which, while light in weight, lacks none of the strength for which the heavier sideframes are noted.

With this foundation and other important features such as the Graduated Spring System, Bolster Guide, Half-ball Brake Hangers, and Twin Links, this type truck represents years of progressive development, and provides that smooth and comfortable riding action in keeping with modern electric car requirements.



# Only Gas-Electrics have this extra brake

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*Operation of the Gas-Electric Bus is more simple, and much less fatiguing than any mechanically-driven bus. Arrow shows the convenience of electric braking controller*

In addition to the regular pedal-operated service brake, and a hand-lever emergency brake, Gas-Electric Buses have the unique advantage of electric braking, which is effected by the simple operation of a controller handle. On long, steep grades this method saves wear on brake bands, and provides a positive uniform retarding force, against which the bus cannot get out of control. It is also available as

an emergency brake under any operating condition.

Consider this, together with the many other demonstrated advantages of electric drive—simplicity, faster acceleration, smoother operation, and elimination of transmission gears and clutch.

General Electric Equipment for gas-electric buses has been developed to practical perfection, as is attested by numerous installations from coast to coast.



*(At right) One of the fifteen Gas-Electric Buses, all G-E equipped, which are operated by the Atlanta Coach Company*



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