# ELECTRIC RAILWAY JOURNAL

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# ELECTRIC RAILWAY JOURNAL

HENRY W. BLAKE, Editor

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Circulation of this Issue, 5,900

# Why?

**Once having tried WABCO you will *know* why thousands of railway men throughout the country are proclaiming this the greatest brake cylinder packing cup ever offered. It is a new thought in packing cup construction—and is setting an entirely new standard for packing cup performance.**

## WABCO

**WABCO** is a new packing cup material developed for the express purpose of eliminating brake cylinder leakage.

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**WABCO** possesses just the right "body" and resiliency to hold itself always firm against the cylinder wall, thus maintaining a permanent air-tight seal.

**WABCO** is non-porous; air cannot penetrate its surface.

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IN the interests of economy and efficiency, specify WABCO when placing your next order for brake cylinder packing cups. The results you get will be surprising. There is nothing comparable to WABCO for general, all-around utility and serviceability. WABCO is made in all standard brake cylinder sizes and can also be furnished in special sizes and designs for special uses if ordered in sufficient volume.

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# WESTINGHOUSE TRACTION BRAKES

# O-B Lock Trolley Hangers— A tighter, smoother line of longer life

Every ear fits up tightly to every O-B Lock Hanger. The drawings below show how ear and hanger become a rigid unit—weather-tight and time-proof. All the threads are protected. There is no vibration between ear and hanger.

The good features of the cap-and-cone and of the round top suspension are combined in the O-B Lock Hanger. It has alining feature of the first, it is as easy to install as the latter.

O-B Lock Hanger is a self-contained unit, protected by O-B Sherardizing, insulated with Dirigo Composition.

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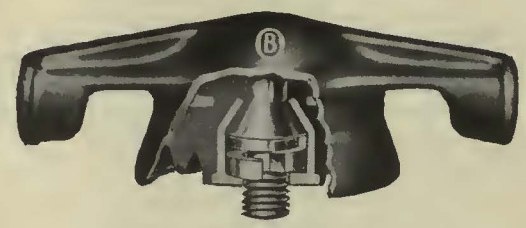
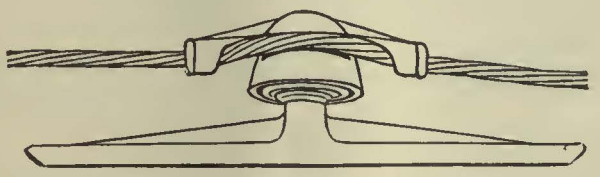


O-B Type F Lock Hanger

When the ear is tightened it pulls the stud down against the heavy spring. The hanger is self-contained, with no loose parts.

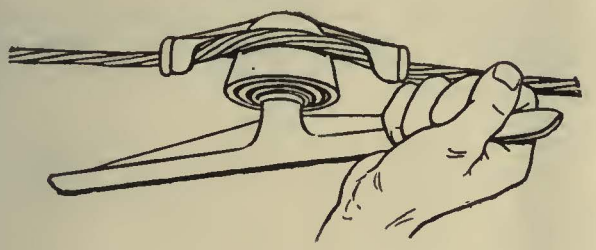
## This is the way O-B Lock Hanger works—

Usually the ear is out of line with the trolley wire when it first makes contact with the hanger:



### With Ordinary Hanger—

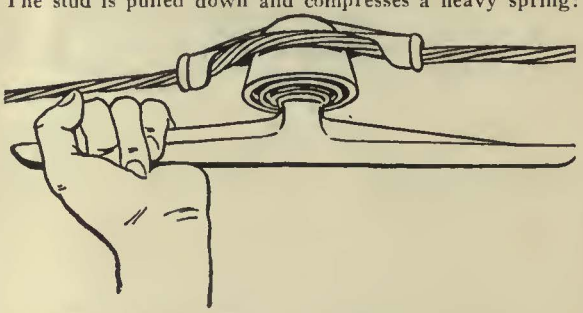
The ear must be backed off,



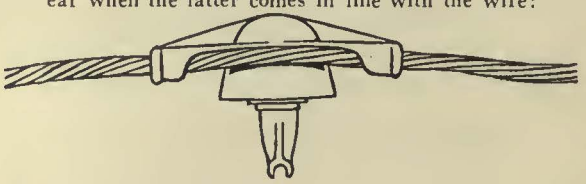
which leaves a loose joint between ear and hanger:

### With O-B Lock Hanger—

After first contact, the ear is rotated still further. The stud is pulled down and compresses a heavy spring:



The result is a tight, solid joint between lock hanger and ear when the latter comes in line with the wire:



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IN the course of experience an Engineer develops unconsciously a faculty of measuring the strength of materials with his eye—of checking without calculation by his visual preception the correctness of any construction—always when faced with this test Steel Twin Ties get the nod of approval.

THEY'RE big enough for the work they have to do—140 pounds of steel—156 square inches of bearing per track foot and this at no greater cost than wood ties in ballast—in many localities at a large first cost savings over wood ties in concrete.

***See them in your 1923 construction***

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# Steel Twin Tie Track


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## Safety Car Specialties

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Standard Trolley Wheels
Automatic Door Signals
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# Keep the Good Will of Your Riders With You—

(1) By making it easy for them to recognize the destination points of your cars—with Keystone-Hunter Illuminated Signs.

(2) By making it convenient for them to signal the motorman—with the reliable Faraday Car Signal System.

(3) By keeping your cars invitingly illuminated—with Safety Lighting Fixtures that do not rattle or break the glassware.

(4) By giving them the protection afforded by the non-blinding but penetrating beams of "Golden Glow" light.

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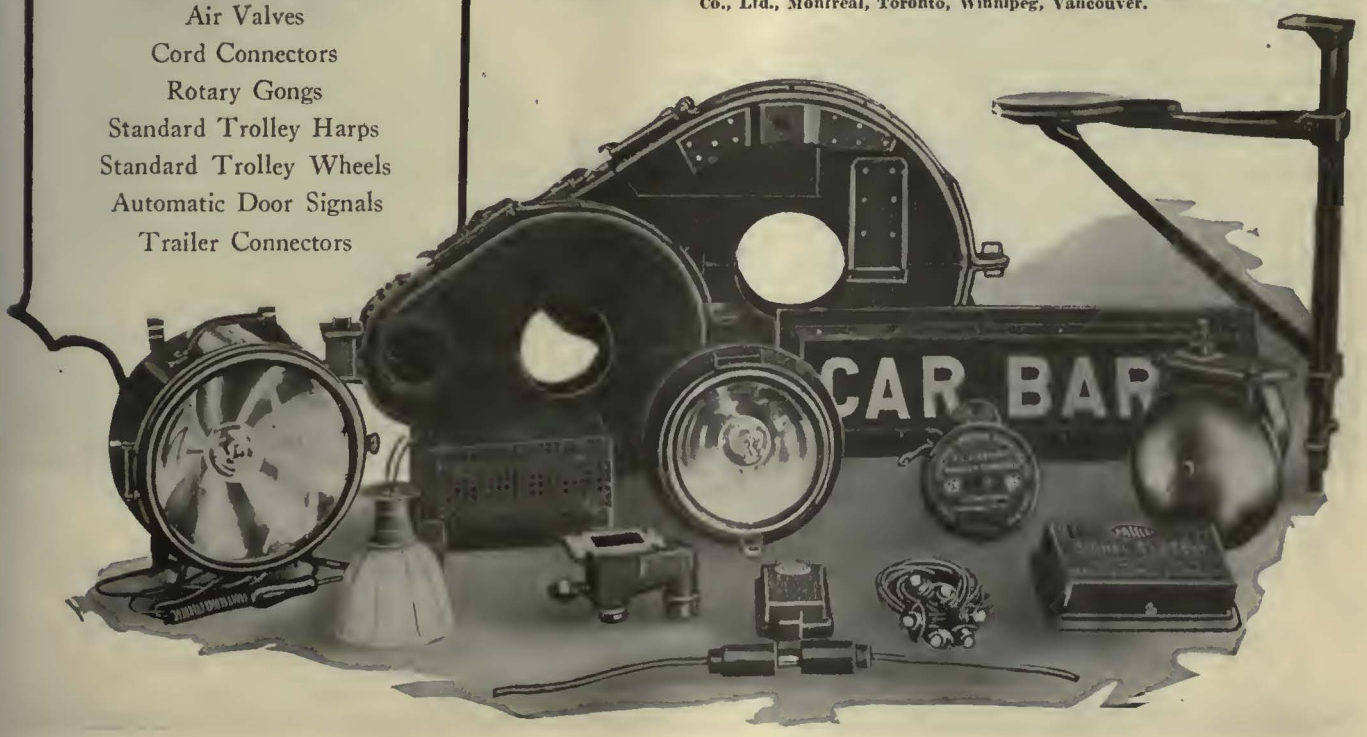


# Lay the Foundations Now for Future Economies

*The Tie that lasts longest is least expensive.*

SUCCESSFUL railroad operation comprises foresight and discrimination in the selection of construction materials that promote efficiency and economy.

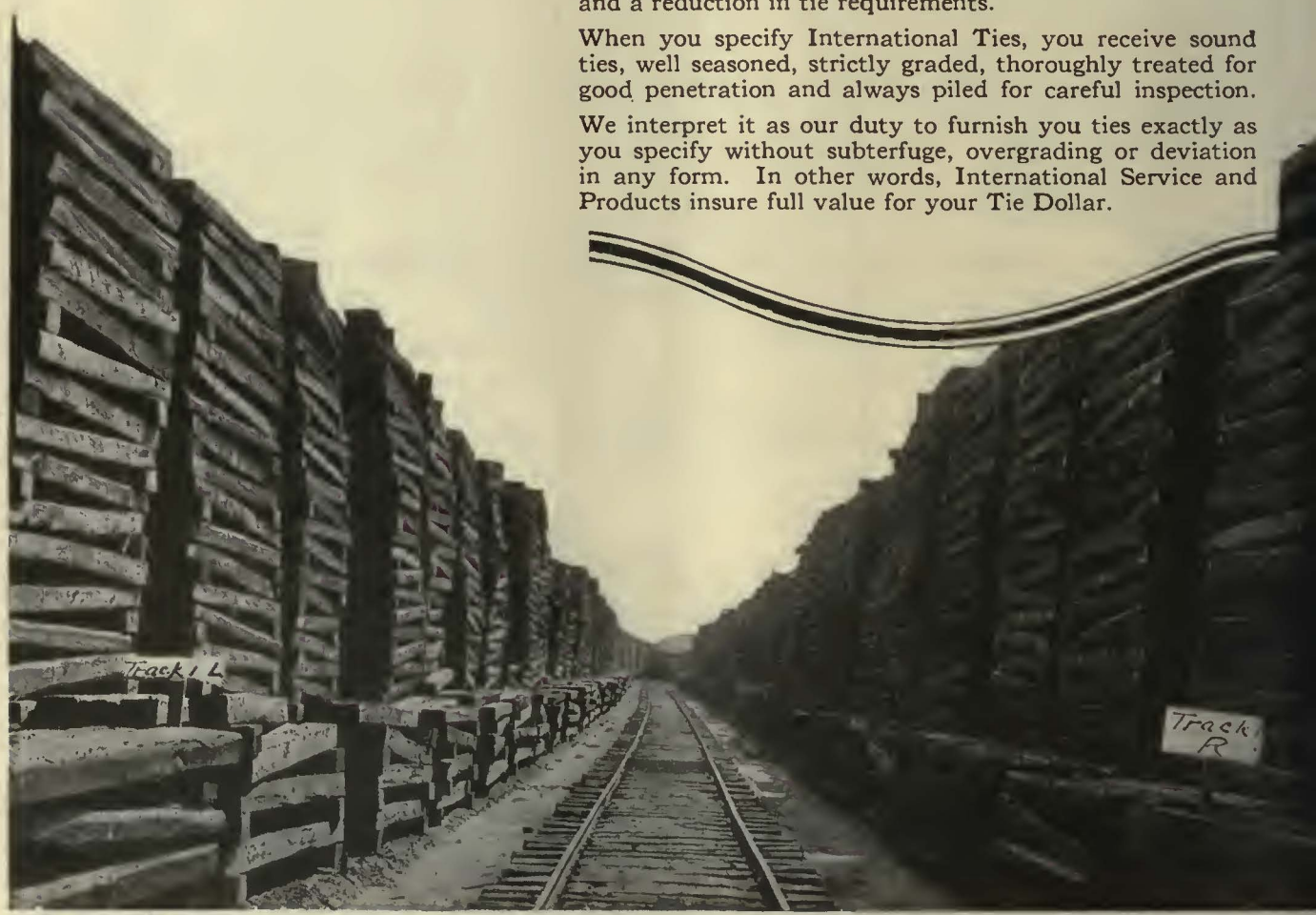
The Creosoted Tie has been developed to the point where it is now recognized as necessary for the efficient, permanent maintenance of modern railroad tracks.

Sound ties, well treated, have a life in track of two to several times that of untreated ties. This means an annual *saving of 10 or more cents per tie per year.* This yearly economy increases as more treated ties are put in service, because their use decreases the cost of maintenance and lessens the necessity for frequent track disturbance.

It is true that the first cost of preserving ties is reflected in present operating costs, but the *ultimate saving* accrues as a benefit to future years, due to longer tie life, fewer renewals and a reduction in tie requirements.

When you specify International Ties, you receive sound ties, well seasoned, strictly graded, thoroughly treated for good penetration and always piled for careful inspection.

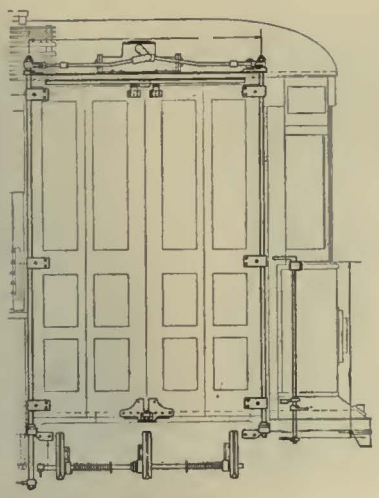
We interpret it as our duty to furnish you ties exactly as you specify without subterfuge, overgrading or deviation in any form. In other words, International Service and Products insure full value for your Tie Dollar.




## International Creosoting and Construction Co.

General Office—Galveston, Tex.

Plants: Texarkana, Texas Beaumont, Texas Galveston, Texas



# *Inside or Out!*

## No Half-Way Business About It

Accident reduction in recent years has been chiefly among that class of cases known as the "boarding and alighting" kind. And more responsible for the improvement than any other single thing, has been the enclosed platform where doors and steps are interlocked with starting signals or control. This means that when the car is started there are no passengers left in dangerous positions, half way on or off the car.

National Pneumatic Devices have consistently lead the way and filled the bill in this development. They are widely used because on purely economic ground alone they save their cost in damage claims.

## NATIONAL PNEUMATIC

Door and Step Control — Door and Step Operating Mechanism
Motorman's Signal Lights — Safety Interlocking Door Control
Multiple Unit Door Control

*Manufactured in Canada by*
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*Off and on again—it's done in a jiffy!*

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## Does Not Delay the Cars

It is built by practical railway men who know the value of seconds in operating passenger cars. Therefore, it is so constructed that it can be instantly and easily de-railed, rolled off the track to one side, and then re-placed and set at work again. It saves time of cars, and it saves its own time.

The Reciprocating Track Grinder is used by hundreds of roads, many companies having ten or more in their track department. By constantly keeping up with corrugated rail, and smoothing out the wrinkles when they first appear, great savings are made and the life of the track and cars is prolonged.

### Track Welding and Grinding Equipment

**AJAX**
**Electric Arc Welders**
**UNIVERSAL**
**Rotary Track Grinders**
**ATLAS**
**Rail Grinders**

Like the Reciprocating Track Grinder, the other welding and grinding equipment listed at the left is all the result of practical knowledge of actual railway operating and maintenance conditions. It is designed for fast, efficient work, at reasonable cost.

*Write for further information.*

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## COMBINATION POLES

## *Ornamental and Economical*

To put the finishing touches of adornment on that new bridge or highway, install Elreco Combination Railway and Lighting Poles. Avoid the mistakes of former years, whereby otherwise fine-appearing streets and avenues have been cluttered up with a veritable forest of wooden poles and a maze of electric wires. Combine your railway and lighting poles in one—Elreco Poles. It is an artistic as well as a sound economical policy to follow.

Elreco Poles are provided with the finest G. E. Novalux lighting fixtures. Elreco Poles are strongly built, yet light in weight. Their initial cost is reasonable, their maintenance cost a minimum.

***Let us send you all the data.***

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# *Overhead as nearly Everlasting as Possible*

Bates Steel Poles for electric railway overhead have a conservatively estimated life of fifty years. In your own experience, what other pole can approach this length of useful life, even at a generous estimate?

Added to this life advantage is the fact that Bates Steel Poles require the very simplest of maintenance and will go longer, safely, without any maintenance than any other pole. This is due to their distinctive one-piece, expanded construction. Every inch of surface is exposed, easily reached by a paint brush for cheap easy maintenance. There are no hidden surfaces, no places for rust to eat away the pole without being seen.

With ample strength for any type of overhead construction, with strength that withstands the severest storms of winter, with their endurance based upon the strength of steel, Bates Poles provide the most permanent pole line construction known today.

The fact that this kind of construction costs less than other types is a most important consideration.

## *They Outlive the Bond Issues that Buy Them*

Ask us for the complete story, and engineering data if you wish it.

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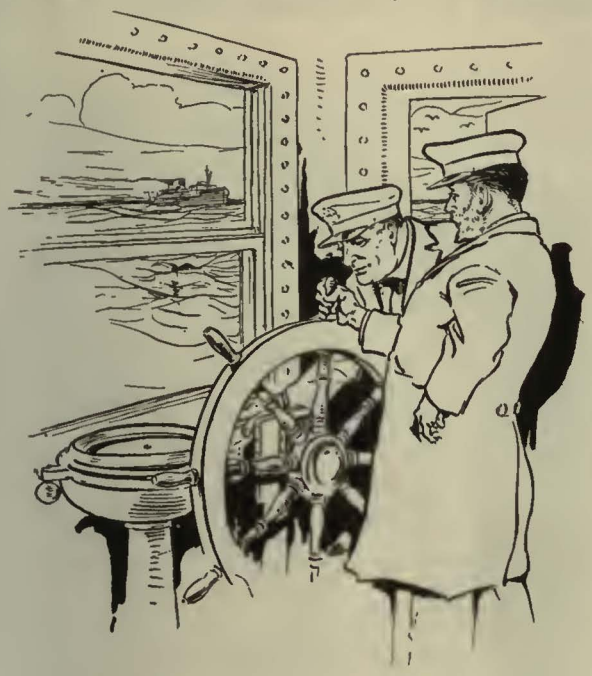

# Where Are We Headed?

Industry relies less on guesses than it did in the days when it was easy to roll up a surplus.

The electric railway industry in particular has learned the lesson of watching its step.

Electric railway men as a whole will do their 1923 buying on the basis of the industry's fundamental statistics.

They will want to know just where the industry is headed before they plunge with their newly developed net profits.

Their guide will be the annual compilation of facts for which they rely on the Statistical issue of the *Electric Railway Journal.*

Its text pages are their well known data book.

Its advertising pages are their well used buying guide.

What have you to say to these men at that time?

## January 6, 1923

Added circulation. Added attention. Added value.

Enter your space reservation early. Help in writing a resultful piece of copy is part of our service.

Forms close December 30.

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*(A McGraw-Hill Publication)*

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# Use Joint Boosters and Forget

# About Low Joints For Years To Come—Place Your Order Now

## No Single Installation Has Ever Required Replacement

The greatest wear of all—on ties, on rails and on rolling stock—comes at the rail joints.

Right here the principle of resiliency obtains its greatest justification.

For in the Dayton **Resilient** Joint Booster fallen joints may be **permanently** built up, in old track, at an initial expense, only slightly greater than the expense of making temporary repairs, with shims.

The Dayton Resilient Joint Booster is simply a section of the Dayton Mechanical Joint Tie, strengthened throughout for the exceptional service to which it is adapted.

It permits the use of concrete under the Booster and provides for a shock absorber in the Booster itself, which saves the concrete from breaking up under the hammer blows of traffic; moreover, it can be installed without any interruption to traffic. Send an order for a small number and become a Booster.

***Resilient***
**JOINT BOOSTER**

**THE DAYTON MECHANICAL TIE CO.**
**707 Commercial Building, Dayton, Ohio**

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*Industrial Engineer* (Published in Chicago)

*Engineering and Mining Journal-Press*

*American Machinist* European Edition (London)

# THE PLACE OF THE ENGINEER

WITHIN the memory of the elders of today this nation has turned from a land of scattered agriculturists to a compact unit of industrial production. And this in the face of a multiplying population with multiplying food requirements; in the face of increased acreage with increase output per acre.

¶ The change has come through the coming of a body of men known as engineers, who have delivered us from the consuming losses of chance by giving us the science of controlled and directed effort.

¶ These engineers have reduced the proportionate population of the farms through providing the farmer with mechanical means of replacing human labor.

¶ They gave industry impetus through providing it with equipment designed to construct the machinery and other devices required by the farmer, as well as to meet the enlarged needs of a congesting urban population.

¶ They have put machinery to do the drudgery of detail in office, store, factory, farm and home. They have put methods into management, facts where guess-work had been, knowledge where ignorance had taken toll.

¶ These engineers, of whom we hear so little and upon whom we are daily becoming more dependent, have carried out a successful and constructive revolution which has turned this country into the greatest of industrial nations.

¶ Today they are making themselves felt in the reconstruction of our standards of intercourse, in the improvement of both social and industrial laws, in the betterment of ethical and moral principles.

¶ They have earned this position of influence through having analyzed the purpose of life and through the evolution of a science of progress founded upon fact.

¶ You will do well to follow the activities of the engineer. Your future depends upon him, not merely your financial success but the revaluation of our world and its progress out of chaos into sound prosperity.

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*Engineering News-Record*

*Bus Transportation*

*Electric Railway Journal*

*Ingenieria Internacional* (Printed in Spanish)

*Chemical and Metallurgical Engineering*

*Journal of Electricity and Western Industry* (San Francisco)

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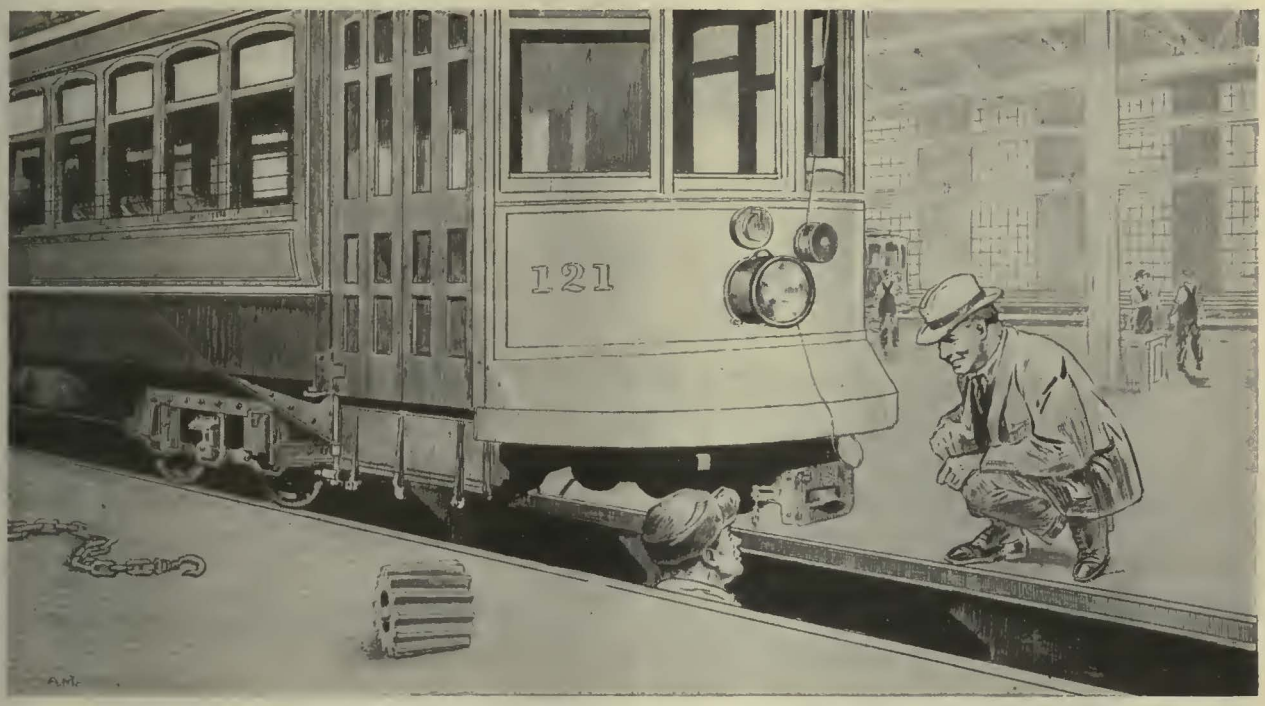


# Jimmy, what are you doing down there?

The boss had this car run in. Said it was time to change the Pinions. They have run 72,000 miles, but I can't find one that's worn more than smooth, and the Motorman says it runs so easy that the Policeman at the crossing swears at him for creeping up on him so quietly.

I told the boss they didn't need changing, but he must see them himself before he would believe me, and even then he must see the record, and all he could say was, what do you know about that, these Nuttall Helicals have certainly made good.

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PITTSBURGH PENNSYLVANIA

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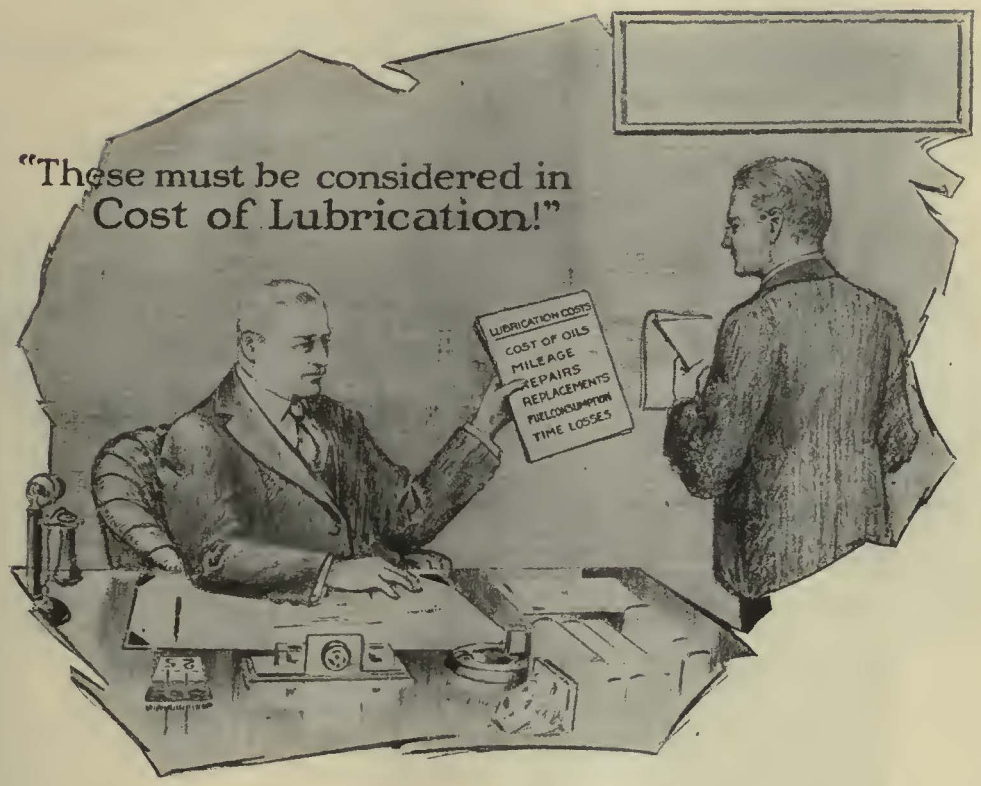


# The Wisdom of Experience

Practical executives know that lubrication means something more than the purchase of so many gallons of oil.

Likewise that the "cost of lubrication" may not be limited to the purchase price of the oil, but must be found by checking the service results obtained.

Every dollar of expense in repairs, extra labor or depreciation in equipment that becomes necessary through inability of the oil to furnish proper and adequate lubrication, must in justice be added to the first cost of the oil to ascertain final, or true cost of lubrication.

An analysis of actual service results has often revealed the fact that the supposed saving made through the buying of cheaper oil has been lost many times over in expenses incurred through the oil's shortcomings.

Galena Lubrication Service has never failed to demonstrate its ultimate economy in mileage, reduction of repairs and time losses, preservation of bearing parts and all 'round lubricating efficiency. The matchless service it is now furnishing to more than five hundred electric properties is convincing proof of its ability to deliver the most lubricating value for the dollar of cost.

*"More miles to the pint;*
*Better service to the mile!"*

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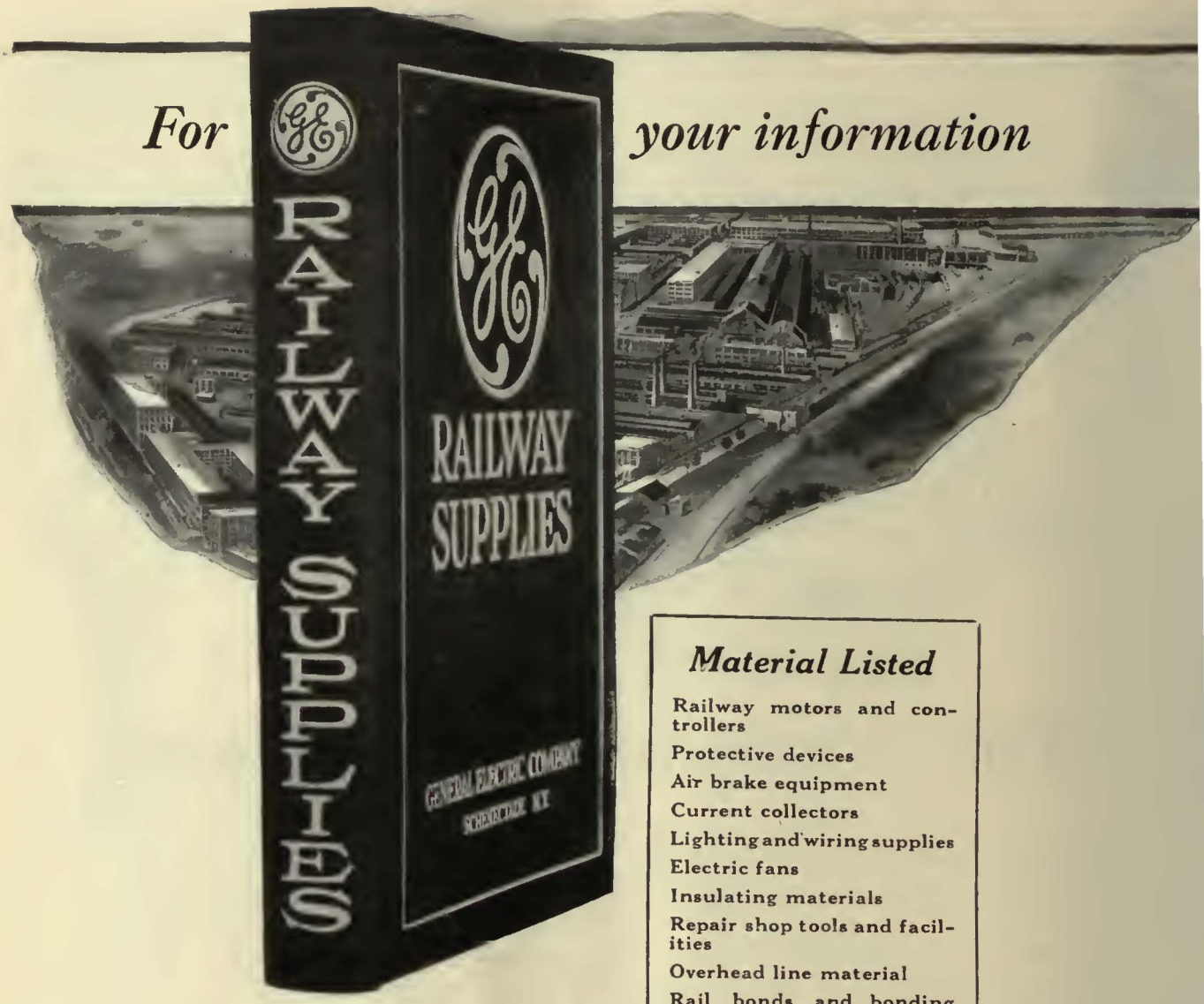


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# ELECTRIC RAILWAY JOURNAL

*Consolidation of Street Railway Journal and Electric Railway Review*
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*Volume* 60 New York, Saturday, Dec. 2, 1922 *Number* 23

## Some Real Progress Is Being Made in Standardization

PRESIDENT L. C. DATZ of the Engineering Association has placed standardization at the head of the list of important activities of that organization for the coming year. This is a wise thing to do, particularly in view of the fact that during 1923 those standards which are put up to the American Engineering Standard Committee for ratification can be approved by a much simpler procedure than will be possible later.

But the situation regarding A. E. S. C. procedure is of minor importance compared with that of standardization itself. There must be a consistent and persistent effort to standardize everything inherently standardizable, in the interest of ultimate economy. This is especially necessary now, because there is an increasing "urge to invention" strongly manifest all along the line. This urge is a natural accompaniment of the revival of electric railway activity and should in no way be discouraged. At the same time it needs to be directed along a safe and sane course, otherwise it will result in dissipation of effort and increased costs.

Every time a new device or design comes out, it looks as if the present standards were getting a setback. This is not necessarily so, because in competition each new idea must show its superiority to the cumulative wisdom of the past in its particular field. Hence the present condition of flux in details and even principles of car design, track structure, etc., need not blind any one to the substantial progress that has been made in standardization from year to year. It will be necessary, however, patiently to examine the merits of each proposed advance, and carefully to modify present codes to conform them to modern thought and practice. President Datz and his constituency will have earned the plaudits of the industry if next fall, at the convention, they can show that they have accomplished this.

## Bus Men Have Organized a National Association

IT IS but a year ago that the American Electric Railway Association debated and decided against taking bus companies into membership. Prior to that action this paper had urged the wisdom of admitting well-established bus companies to the sobering counsels of the association and commented that if bus men were barred from membership they would sooner or later form an organization of their own, which, having none of the benefits of the experience of the electric railway men, and because of the cold-shoulder attitude of the railway men, would probably tend toward the competitive and belligerent line of endeavor. The association reorganization committee and many individual members also urged that bus companies be admitted.

Week before last the National Motor Transport Association was formed. What the future strength and attitude of this association will be is yet a matter of conjecture, but it wouldn't be hard to guess the kind of thinking a majority of the bus members will get behind. Of course there is some real reason for a separate association of the kind of transportation companies that employ buses, but this could have been very largely satisfied by a friendly and progressive offering on the part of the railway association, such as the formation of an active bus section or even an affiliated association. The bus people would then have been "in the family," where they could have been more quickly taught the true economies of transportation and also the advantages to all concerned of co-ordinated rather than competitive systems. As things are, the same end must ultimately obtain, because it is the only economically sound basis, and because the commissions are going to direct co-ordination. But the process will be slower and the damage to the railways greater. Perhaps much good could be done even yet if the railway association were to take the initiative in establishing friendly relations with the new bus association and in endeavoring to work with the latter to reconcile interests.

## Sound Commission Thinking Improves Railway Outlook

THAT the obvious injustice of permitting bus operation to come into destructive and uncontrolled competition with the closely regulated electric railway is not going to prevail becomes daily more certain as commission decisions on the subject accumulate. Within the last two weeks two utilities commissions have spoken very clearly on this important matter. The Illinois Commerce Commission, in granting a certificate for a large bus undertaking in Chicago, was careful that the operation of buses should be confined to routes that would provide a needed service and not jeopardize the earnings of the street railway, on which the transportation of the city must primarily depend. During the present week the commission of the District of Columbia declined to grant even a small extension to the routes served by the Washington Rapid Transit Company, on the ground that the bus operation already permitted had so eaten into the revenues of the Washington Railway & Electric Company as to take the cream of the business, whereas bus operation should be authorized only where it will create a new traffic of its own without materially affecting that of existing rail routes. The commission explains the granting of the certificate for the initial bus operation in the capital city by saying that, at the time, the traction company was unable to handle the business in the rush hours and that the service was really inadequate. But this condition has changed and the commission seems fully aware that the service is at present of a competitive nature and for that reason does not improve the local transportation situation.

At the recent convention of the national association of utilities commissioners there was a remarkable

unanimity of opinion as to the place of the bus in the scheme of transportation. There was general agreement that taxes must be more equitably distributed as between railway and bus and that certificates should be granted to bus companies only where the operation would be permanent and not in competition with a rail line that was already giving adequate transportation service.

So the competitive situation is steadily improving and there would seem to be little to fear where the utilities commission has jurisdiction over the buses. Unfortunately there are only twenty-one states where the commission does have jurisdiction now, but the bus line is a utility and the tendency is distinctly to put it under the commission. Where railway men can do their most effective work is to push the revision of the state utilities act so that the commission's authority will comprise regulation of all common carriers to the same extent that it does the railway.

But legislative processes are a little slow sometimes. Meanwhile, bus competition unregulated and destructively competitive is going on and something ought to be done right now. The answer is for the railway to get into the bus business itself in self-defense, if for no better reason. Is it anything but just plain common sense to invest a few thousand dollars in buses to protect an investment of several millions in the railway? Or is it better just to sit by, lamenting the great unfairness of it all and damning the bus fellow who is pirating the business, while waiting for the traction funeral?

## There Must Be Some Way to Control the Vehicle-Collision Situation

THE alarming increase in annual numbers of collisions between cars and vehicles on many properties necessitates prompt and vigorous action by municipalities and electric railways, as well as vehicle owners and drivers. At the recent meeting of the T. & T. Association committee on accident prevention this topic was considered as the most pressing one now before the railway operator.

It appears that as soon as one source of danger in car operation is eliminated another takes its place. Years ago street vehicle and pedestrian traffic presented operating difficulties which were largely overcome through the use of the air brake, through improvement in traffic rules and through skill in car manipulation. Then came boarding and alighting accidents, now under control due to the widespread use of folding steps and inclosed platforms. Next comes the phenomenal spread in the use of the automobile, frequently operated by drivers with indifferent training, and the furious driving of the taxicabs, to the chauffeurs of which applies the statement of the watchman, recorded in Kings II, chap. IX.: "The driving is like the driving of Jehu the son of Nimshi; for he driveth furiously." No wonder the transportation superintendent and the claims attorney spend much energy in racking their brains for ways to get cars through the traffic with less loss of life, limb and property.

There is not going to be found any royal road to accident mitigation. It is coming by way of attention to detail and by arousing some kind of a spirit of co-operation The responsibility of the management of electric railways is to see that neither motorman nor vehicle driver has any excuse for a smash between a car and an automobile.

## Washington a Good Place for a Midyear Meeting

EVERY one able to have gone to San Francisco for a midyear meeting next spring will regret that that city was not selected at the meeting of the executive committee last week. Nevertheless the choice of Washington was a wise one. Only thirty-one railway delegates living east of the Mississippi River had agreed to go to San Francisco, and this with the smaller number who could have attended from west of the Mississippi was admittedly insufficient for a representative meeting. The fact is that the spring is a very busy time on most railway properties, and while the thought of a trip to California is alluring, not many can arrange to take the two or three weeks necessary, or at least to decide definitely three months in advance that they can get away by a certain date.

Washington not only has the advantage of being near at hand for the great majority of the membership but will make a good convention city for many reasons. A trip to Washington can often be combined with other business, and the growing interest of electric railways in national government affairs makes the selection of Washington particularly appropriate.

The last convention which the association held in Washington was on Jan. 29, 1915, and was one of the most largely attended in the history of the association. One of the speakers was President Wilson, who, in an address of more than 4,000 words, impressed upon the delegates his interest in the success of the electric railway as an important social and economic force in every community. The sympathy expressed in this speech was later shown in more tangible form by the appointment of the Federal Electric Railways Commission, which was instructed to investigate the condition of the electric railways, at that time admittedly serious, and recommend a remedy.

Since the 1915 meeting the relations of the electric railways with the federal government have become even closer than they were at that time—nearly eight years ago. This is particularly true in connection with such branches of the government as the Interstate Commerce Commission on the question of rates, the Department of the Treasury on the matter of federal income taxes, the Department of Commerce, particularly as the latter is represented in its statistical department and the Bureau of Standards, and the Department of Labor as regards its studies on the cost of living and labor statistics in general. In addition, of course, the electric railway industry is often very closely affected by Congressional action. In fact, so much is this the case that during the past few years the committee on national relations of the association has kept a representative in Washington through whom testimony on bills in Congress affecting electric railway operation may be presented to the appropriate Congressional committee.

This means that a meeting at Washington will accomplish two results, outside of those which would be obtained if the meeting were held elsewhere. One of these is that it will draw the attention of the delegates to affairs at Washington to a greater extent and awaken their interest in the very important work of the committee on national relations. The second is the converse of that just mentioned and is that the attendance of a large body of important railway men in Washington will help to establish the importance of the industry in the minds of many members in Congress and other representatives of the national government.

# Keep Ahead of the Procession

Anticipate the Desires of the Public—Speed, Comfort, Cleanliness and Courtesy Necessary—A High Class of Platform Men Needed—Lighter Equipment a Certainty—The Bus a Transportation Tool

## *An Interview with*
## C. D. Emmons

President American Electric Railway Association
President United Railways & Electric Company, Baltimore, Md.

*By Harold V. Bozell*
Consulting Editor *Electric Railway Journal*

"KEEP ahead of the procession—lead not only by your own ideas, but see what the other fellow is doing that is good and fit the good things together. But most important, find out what the right thing to do is and do it just a little before it may be expected of you." The foregoing quotation might well epitomize the leading idea which Mr. Emmons, the new president of the American Electric Railway Association and president of one of the most progressive electric railway properties in the United States, expressed recently in a most interesting visit I had with him to discuss the outstanding electric railway problems of today and to get his ideas, as a leader of the industry, as to what the railways could most advantageously do. We have all of us been saying for some time that the industry is coming back—the saying is getting trite, truthful though it may be. But Mr. Emmons points out that the industry must know how to take advantage of this returning prosperity and that the degree with which the "come-back" is accomplished depends upon those who are operating the railways today.

"We have to tackle the problem of keeping public good will with this coming back," said Mr. Emmons. "We must put ourselves out a little to keep ahead of the procession, so that the public may know we are progressive and ever on the alert to provide the very best transportation to suit the community's needs.

"There are lots of fine ideas floating around—each one of us is thinking out new things and we are exchanging information at conventions and through the technical press. Managers must see that their companies get the benefit from ideas which have already been given to them and to their men on the properties. No man can do his duty by his company if he does not apply practices which he has learned are to the advantage of both the public and the company."

Those who know Mr. Emmons know that he is what he is because he has lived and acted according to the precepts which he outlined as above. Every step up that he has taken has been because some one has recognized that he was doing the job he had so well that there must be greater possibilities in him; every step he has taken has been without any pull or due to influential acquaintanceship.

There is another point which ought to be mentioned in connection with Mr. Emmons' becoming president of the association, and that is that this practically marks the coming of the third generation in the electric railway industry. Previous presidents in the association will not misunderstand this statement, which originated, I believe, with the veteran reporter T. E. Crossman, whom the association presented with a monogrammed fob at Chicago in commemoration of the fact that that convention was the fortieth consecutive railway convention that Mr. Crossman had reported. Two twenty-year periods had passed, Mr. Crossman pointed out, and this is the first year of the third twenty-year period. The first generation consisted of the men who were leaders of the industry at the start—men who are executives of the early street railways when the association began its life. The second generation consisted of executives who had started as younger men during the administration of the first generation. Now, the third generation takes hold—men who entered an industry which was already in full swing and who have risen to executive positions on account of their progressive ability. Mr. Emmons marks the first of these men to become the head of the industry for an administrative year.

But to return for a little more analysis of what Mr. Emmons means by keeping ahead of the procession. "Take transportation service furnished, for example. The man behind the procession will wait for traffic to increase 5 per cent before he increases his mileage even 2 per cent. There is a lag in furnishing service, which is noticeable to the community. When one is ahead of the procession he knows it is coming, or at least he can keep his car mileage abreast of the traffic and maintain a satisfied public. Furthermore, keep on good terms with the public through real service, through courtesy, and almost above all through the handling of complaints."

I found out that Mr. Emmons lives up to what he preaches on the question of complaints. Records of the company show that it was not so long ago that com-

plaints averaged eighteen to twenty per day in the offices of the United Railways in Baltimore, whereas the records for October, 1922, showed eighty-three complaints for the whole month, and at the same time there were more than eighty-three commendatory letters of the service and courtesy on the Baltimore lines.

"Courteous employees and clean cars—I wish we could keep our own cleaner than we actually do—go a long way in keeping public good will. *Dirt grates on the public.*

"And we must study intensively this question of greater speed. Not only is greater speed a question of more car-miles per car-hour, but it is a very important question in the selling of transportation for people to want to get where they are going as quickly as possible. The question today of speeding up cars is of course very difficult on account of automobile occupancy of the streets, and yet I hate to object to the automobile because it is popular. We must find our solution in spite of the automobile or, more properly put, in co-operation with the automobile and with the traffic authorities of the city.

"Then, too, there is quite a revolution in reducing the weight of cars. We all overdid the question of heavy cars in the earlier days. Our equipment was too heavy, and as a consequence at times our speed was too low or we had to carry excessive motor equipment. Today the industry is showing progress in reducing the weight of cars, and the manufacturers have assisted materially in producing light-weight cars and also light-weight equipment to replace the heavier equipment. All this results in lower operating costs and faster, more comfortable service.

"All these things are a part of keeping just a little ahead of what the public may demand—it is first-class operation and first-class public relations which win out and make a property not only a financial success but a success in its service to the community and therefore recognized as an asset to the community.

"Of course there are problems—it is not all easy sailing. And one of the elements which is militating against the most economical street car ride for the car rider is still the burden of paving and its maintenance which is imposed on so many railways. I notice that this question is a very live one in England today as well as in this country. In certain places the community has recognized the situation and has given some relief. It is also interesting to note that as soon as municipalities take over electric railways, in those cases where municipal ownership now exists, the municipal authorities quickly recognize the injustice or the absurdity of loading paving maintenance charges upon car riders. Witness the recent attempt of Mayor Couzens of Detroit to have the Department of Street Railways relieved of the paving charge."

I found Mr. Emmons naturally hesitant to discuss the question of wages of electric railway employees, because this is a subject which it is so easy to misunderstand. His expression on the subject, however, showed the same keen sense of proportion that one has come to expect always from Mr. Emmons. His analysis of the situation is that for a good many years previous to the disturbed economic situation of the past five or six years the wage level of car men was too low as a consequence of the level of the car fare, which was itself too low. The public has come to recognize, in large part, both situations, and so long as car men's wages are at the level, relatively, of wages in other comparable lines, the railways should maintain the wage and also the fare. "I doubt," said Mr. Emmons, "if wages in general industries will go much lower very soon, if ever. Managements of railway properties owe it to their men to maintain wage levels commensurate with character of employment. It is so easy to be misunderstood on this that I would not wish my remarks to be interpreted as meaning that there are no places in which wages of car men should be reduced. I am discussing merely the general philosophy of wage levels and street car fare as compared with general wage levels and economic conditions."

I asked Mr. Emmons what effect he thought there would be on both traffic and necessity for higher fares if there were no further liquidation in general labor. He said he thought that the effect of high wage levels on traffic would not be much, because on the whole there was a higher living level and the cost of other commodities would retain the same relative level. There is this effect, however, and that is that the numerous very cheap automobiles are having an effect on street car traffic—not only as to the actual riding but also upon the problem of getting cars through congested districts. Mr. Emmons sees some very difficult problems to work out with reference to the large numbers of automobiles in downtown districts, in connection with street car traffic. As to the need of higher fares with the exception of certain places where the political situation has clouded all fare adjustments during the past period, his attitude is that the railways are in duty bound to work the problem out on present increased fares, in those places where fare increases were granted during the adjustment period.

"How about municipal ownership? Will other cities follow Detroit, Seattle and San Francisco, or will they attempt to follow Mayor Hylan's lead and encourage bus competition?"

"I don't think there is much of a tendency toward municipal ownership. There are too many cases both abroad and at home of municipally or government owned public utilities being made into political footballs with slow or inefficient operation, and these examples tend on the whole to keep people away from the idea unless it is forced upon them. As to bus competition by municipalities to weaken the railway transportation systems, in the end the people must and will see that the transportation system of a community must be protected for public service. Investors will not put their money into transportation systems unless they see that they are sound and have the community behind them. There is a double responsibility here, of course on the management and the public, but the public must and will realize also that persons with money to invest will not invest in any enterprise in a community unless there is a dependable transportation system and unless money invested in utilities is recognized and protected. The people can be made to see that those communities which are successful have successful utilities, and all that statement signifies.

"I think neutral agencies, such as the *Electric Railway Journal,* can do much to assist the industry as a whole, whether under private ownership or municipal ownership, to make impartial analyses of the operation of municipally owned systems, because facts, of course are what we want."

I asked Mr. Emmons if he thought the railway association should continue to exclude municipal railway

from membership, and he answered that he was on record as being in favor of having them in the association. He thought that was the best way to work out the answer to the question of municipal ownership. He also thought that bus companies should be admitted. Otherwise they would form an association of their own. This would mean that the bus question would have to be worked out through associations which would tend to be competitive and antagonistic rather than through one transportation association where the problems could be worked out on a co-operative basis. (Since this interview with Mr. Emmons a national bus association has actually been formed, as already noted in these columns, with E. B. Burritt, former secretary of the American Electric Railway Association, as its executive manager.)

Continuing, Mr. Emmons said: "What we do need is the education of communities and public service commissions that there is only room for one transportation facility for one community, and that this transportation facility must be protected against wastage. The railways—and we have tried to do this in Baltimore—can educate the communities in this way by showing the communities that they are ready to supply any necessary bus service in a community. The National Association of Railway & Public Utilities Commissioners can do, and as a matter of fact is doing, a great deal in this direction and the individual state commissions can do much more. In fact it is difficult without the co-operation of the public service commissions to do very much in this line. A railway company which sees the necessity of auxiliary bus lines should be protected, when it installs them, against jitney competition there as well as against rail lines. There are certain places where auxiliary bus lines are warranted, and I think it is unfortunate for the railway in any such locality, as well as for the industry as a whole, if the railway does not recognize this and get there first.

"I think the same philosophy applies to the trackless trolley, which has its place in certain kinds of traffic and under certain situations and, when carried to an electric railway property, will prove, I believe, less expensive to operate than buses, vehicle for vehicle. I don't mean to get into any debate with reference to the place of the trackless trolley and the place of the gasoline bus, realizing that the fixed investment of the trackless trolley is a factor dependent upon the amount of traffic to be handled. But the trackless trolley does have a definite place—or I believe it will be found to have a definite place in local transportation activities."

I ventured to ask Mr. Emmons if he would express an opinion as to the usefulness of or the service rendered by *Bus Transportation*, the co-worker of *Electric Railway Journal*, in trying to solve the problem of the place of the bus.

"I think the effect of *Bus Transportation* has been good—it has been very helpful to all of us, and street railway men, no matter what they think with reference to the bus, get good from it. I think it will materially assist in developing bus transportation in non-railway territory, as well as in working out the problem of the proper relation between bus and railway in territories where the electric railway is already located and is a necessary part of the transportation system."

"What do you see in the way of economies and improvements of service available for use by electric railways now or in the near future," I asked.

"We must and can speed up our service. We must eliminate downtown congestion, possibly by spreading the distance between stops, although of course, this cannot be carried too far. Many stops slow a car down, but at present in many cities the number of stops per mile or the location of stops close together is a matter of legislative requirement by the city. We are beginning to realize that the street car must be made to approximate as nearly as possible to the individual automobile as to speed, convenience and time of travel from one point to another. Don't misunderstand me here—I do not mean the bus. But every individual has in the back of his brain the idea of liking to ride home in a private automobile with all the comforts that that means. Naturally we cannot do this—there isn't room on the streets for automobile transportation, either in individual cars or in buses in most of our cities. But we can speed up our service and I have already touched upon the place of the light car in this.

"I see no immediate wonderful change. It is a constant plugging away and using the best thing here and the best thing there. Every one is watching the weekly pass as to its effect on stimulating riding. In its application, we must be careful about increasing the number of rides and lowering the gross income. The application of the pass is a proposition which must not be bungled. Fares and passes must be applied correctly.

"The problem of the electric railway is to give service as good as possible and as cheap as possible.

"Safety movements can do a great deal of good toward reducing gross expenditures for accidents both to the public and to employees. In Baltimore, for example, we set aside 4 per cent of our earnings for the claims department and damages, and I think safety movements can materially reduce similar sums on our own property and elsewhere.

"Then there is the one-man car, for which I see a very much greater use than it now has. There are many excellent types of one-man cars to fit various conditions and they are surely economical. There is no doubt but that they have saved some properties from financial ruin, as well as saving them in the public grace of their community. I see no reason why every small city should not be a one-man car proposition. And there are of course a good many places in larger

## Keeping Ahead of the Procession

THERE are lots of fine ideas floating around — managers must see that their properties get the benefit from ideas which have been given to them and to their men.

There is quite a revolution in reducing the weight of cars. . . . This results in lower operating costs and faster, more comfortable service.

We must and can speed up our service.

We must let the employee know that we think something of him as a man. We should do all we can to get high class employees.

Courteous employees and clean cars go a long way in keeping public good will. *Dirt grates on the public.*

cities where one-man car operation is logical. Who knows? What with the advent of turnstile and other devices, we may ultimately reach all one-man operation with even greater transportation speed than we have now."

"What actual gain is going to come from having platform men of larger experience now being employed because of smaller turnover or of higher grade because of more careful means of selection?"

"There is a gain in many ways. There is a gain in having people properly handled by some one who knows his job; there is a real gain in the care of equipment which shows up in reduced maintenance cost per car-mile; there is a real gain in good will to have people who know how to handle the public and there is also a gain in return due to a greater degree of honesty in the handling of fare collected by old and tried employees. There is a gain in the reduced number of accidents, and this is one reason for paying older men more than men new on the property. I think we should do all we can to get high-class employees and to reduce the labor turnover. We must let the employee know that we think something of him as a man. We must realize and let him know that we realize that he has a wife and family who are as dear to him as the manager's family is to him. It is all good common sense—good business, and what ought to be expected in rational human dealing."

"Would you express an opinion on the interurban situation?"

"I have been away from the interurban problems for three years, and of course cannot talk very intimately about them. But I do believe that the interurbans exceeded the city systems in going crazy on car weight. There has been a considerable backing up on this position within the past year or two, and it is going to be a great help to the interurbans to take the position tending toward lighter equipment. There is no doubt a saving in track wear due to the lighter equipment; there is a saving in kilowatt-hour consumption per car-mile, which is not merely theoretical, but which is real and which is more of an item today than it was at former fuel and labor costs; there is a saving on depreciation on the investment (and this is not only per car, but actually per passenger-mile) and then there is a further saving in the one-man interurban car, which I see being used now on some systems."

"How about the zone fare—is it dead as a possibility in this country?"

"You know the English say that the penny is too popular a coin for the railways not to give some sort of a ride for it. But we recognize that the Englishman is a patient person whereas the American public is impatient. The collection of zone fare, according to any scheme so far devised, seems to test the patience of the American public. The zone fare has many advantages in theory but, so far as it has been worked out in this country, it is impractical. It was unfortunate that the Connecticut Company's experiment could not have continued longer, but under the circumstances this apparently was not feasible.* I don't know, maybe some day some one will try it again."

There is one question about which a good deal of discussion has centered in the industry in the past few years and that is the question of valuation and capitalization and rate of return and the relation of these to each other. On this Mr. Emmons pointed out that a good deal of capital was put out a good many years ago at a low rate of interest. In refinancing to make capitalization equal valuation in some cases, a lower capitalization at a higher rate of return could be adjusted to mean the same thing to the investor and perhaps would leave a better taste in the mouth of the public which recognized a fair rate of return for the property as a whole on the valuation allowed. Mr. Emmons said he strongly supported "businesslike valuations, made on the yardstick basis, toward which the valuation committee of the American Electric Railway Association is now working."

"In this subject, as in all other subjects, the railways can impress themselves upon their public by taking the lead in a progressive, substantial and convincing way. There is nothing to be pessimistic about in the railway situation. The transportation requirements of our communities will increase rather than decrease. There are plenty of problems for every electric railway, plenty of opportunities for every electric railway man. My advice in realizing or capitalizing upon these problems is to keep ahead of the procession."

*For a discussion of the reasons leading up to the abandonment of the zone-fare experiment by the Connecticut Company, see *Electric Railway Journal*, Aug. 7, 1920, page 253.

## Training School for Trainmen in St. Louis

THE training school for motormen and conductors on the United Railways of St. Louis embodies a number of novel features. Besides the usual instruction for motormen on the operation of the car control and brake system, which is given on a four-motor passenger car and trailer similar to those used in service, the men receive instruction on the need for avoiding accidents, method of making out accident reports, the importance of courtesy and efficiency and similar public policy matters.

After a period of instruction on the road, they return to the instruction room for a review of the most important features of the first instruction and are examined as to their knowledge of the operation of the various parts of the brake and control equipment, method of making emergency stops, with reverse power, etc. They are also asked to estimate the distance required to stop a car with air brake on level drive rail going at a rate of 10 m.p.h. The purpose of this is to assist them in answering questions in accident blanks and in court that relate to speed and distance.

Applicants for the position of conductor, as part of their school work, are encouraged to take some of their practice trip sheets home for study as well as trip sheets properly made out with the exception of being balanced, so that they may balance them and return them when they report in the morning. Another part of their homework consists of 100 subtractions of register readings, in which the most difficult numbers possible are used.

In their schoolroom practice the applicants are required first to pool their money except bills of large denominations, then take turns acting as conductors and as passengers, the passengers all paying their fares with quarters or halves and requiring the acting conductor to issue a transfer with the payment of each fare. Crews are changed every twenty minutes until each conductor has demonstrated his ability to act efficiently in that capacity. At the conclusion of the trial, the money pooled by each applicant is returned to him by the company.

# Review of Transit Commission Valuation

## Consulting Engineer Finds Many Errors of Omission and Commission in State Commission's Tentative Valuation of Brooklyn Surface Roads and Questions the Methods Followed

THE results of a valuation of the surface railroads of Brooklyn, conducted under his direction, have just been made public by Francis Blossom, member of the firm of Sanderson & Porter, consulting engineers, New York. The valuation was made, so far as practicable, in conformity with the methods and procedure followed by the valuation bureau of the New York Transit Commission, as reported in the *Electric Railway Journal* for Feb. 25, 1922. Mr. Blossom was assisted in the work by a large staff, among whom he mentions particularly R. S. Buck, Thomas F. Mullaney, J. R. C. Armstrong, Charles A. Remelius and Julius A. Hanna, all long engaged in railway work or the manufacture of railway equipment. The valuation covered the properties of the Nassau Electric Railroad, Coney Island & Brooklyn Railroad, Brooklyn, Queens County & Suburban Railroad, South Brooklyn Railway and lessor companies, Brooklyn Heights Railroad, Coney Island & Gravesend Railway, and Brooklyn City Railroad.

### Criticisms of Principles

The report first criticises various general principles or methods of the commission's tentative valuation, as contained in its introductory statement. These criticisms in part follow:

The "original cost" valuation described in the report appears to be a mixture of estimated and of actual costs and of many assumptions, indicating that the valuing engineer has presented figures which show what he thought the properties probably cost or should have cost—under conditions he assumes to have existed when he assumes they were created—rather than what they actually did cost, on a recognized accounting basis. The costs and prices prevailing one or two generations ago are not either normal or applicable to present purchase and sale appraisals, and can have no value therein. They might warrant consideration in a rate case to arrive at an "investor's sacrifice" figure of cost. This would necessarily include accrued deficits in fair return, or going value under the New York law, and other direct and indirect costs.

The 1910-1914 reconstruction cost described in the valuation report uses prices which it designates "pre-war prices." These are supposed to be the prices prevailing during such years, but appear to be the extremely low prices of 1914. These also have passed away. While nearer the prices of today than are the original costs of prior years, there is no justification for calling 1910-1914 prices normal except for their own period. They are super-normal judged by many earlier or lower prices, and sub-normal judged by the higher prices which have since prevailed. Neither does a normal exchange value of commodities exist, although the ratio of the average price of rails and mechanical and electrical equipment, etc., to the average of living costs is much less variable than the ratios of prices of single commodities. The gold dollar shows the most extreme variation in value as measured by everything else.

The 1921 reconstruction cost valuation described in the report is based on an inventory stated therein to have been made as of June 30, 1921, and on prices stated in report to be taken in the "period of the first six months of 1921, which was immediately preceding the completion of the inventory, and intended to reflect the then 'present-day prices and conditions.' "

In each of the three above-described bases of negotiation the report states that deduction should be made either for depreciation or for the cost of putting the properties into first-class operating condition. In this connection, the report states under the caption "depreciation," that "in considering the investor it would become necessary to trace the actual investment of the present holders of the securities, and to ascertain whether such investment when made reflected the depreciated condition of the property before any injustice in deducting depreciation from the full valuation of the property could be seriously maintained. Investors in transit properties have changed many times since operation was first commenced, and the price paid in the transfer undoubtedly considered the condition of the property." This is incorrect, for a stockholder succeeds to all rights of a previous stockholder, and the justice or injustice of any method of treating depreciation cannot be affected by a change in the ownership of securities—whether such change is effected by purchase, gift, bequest, exchange or otherwise. Moreover, prices paid for stock are usually dependent on present or prospective earnings.

The report further states that "the straight line basis has been quite uniformly accepted as the most practical means of determining the amount which should be deducted from the value of the property to which depreciation applies." This statement also is incorrect. Such basis has been quite uniformly rejected. This is admitted in testimony given at the hearings held since the report was presented. The reason it is rejected is that the straight line method is illogical. It takes no cognizance of the wear, tear, use, exposure or condition of the property, nor of the amount of the expenditures made thereon for maintenance, repairs, renewals and replacements. On the straight line depreciation theory of the valuation report two pieces of equipment of the same age are given the same depreciation, and the facts as to their real condition are ignored.

Two methods of computing depreciation are used in the report, viz.: (a) Straight line depreciation, based on the proportion that the estimated expired portion of the estimated life (with allowance for estimated salvage or scrap value) bears to the total estimated life (such life being speculative or unknown in many cases) and (b) depreciation determined by the estimated cost in 1921 of placing the properties in first-class operating condition.

The report advocates taking the so-called "original costs," and subtracting therefrom the cost of placing the properties in first-class operating condition at the higher prices of 1921. It includes in the amounts so deducted both its estimated "deferred maintenance" and its estimated "deferred replacements," i.e., in addition to deferred maintenance the report deducts much accrued straight line depreciation. The report then recommends that the amount of residue, ignoring estimated value of the non-operating property, be offered to the owners, in bonds.

The method used in this connection is stated in the valuation report under the caption "conclusions and recommendations," and reads: "It is our conclusion that a fair valuation for the existing property of companies other than that included under Contracts Nos. 1, 2, 3 and 4 and their related certificates would consist in allowing the original cost less the expenditures necessary to put the property in first-class condition." I do not agree with this conclusion. It is difficult to see how it could be reached by business men. Certainly none of those who wrote the report would consider such a method of valuation fair if applied to their own home or property. If the conclusion or rule expressed in the report were generally applied owners might have to part with property for nothing, or pay a buyer for taking it. It penalizes investors who, instead of waiting until 1921, spent their money twenty, thirty or more years ago to serve the public. A cubic yard of excavation or fill work done in 1890 is now as valuable to the public as if done in 1920. Had the conclusion or rule been originally announced that investors in other kinds of property than railroads would get appreciation in value but that owners of public service property would be denied any appreciation of value if and when they sold their property, Brooklynites would probably now be walking or riding in horse cars or buses. This valuation is for the purpose of purchase. For all work, whenever built, it would seem that the owners are entitled to receive its present value.

Herein I deal with basis number three, mentioned above and given in the report, namely, reconstruction cost at 1921 prices, because I do not consider that a valuation arrived at by any other method will meet the tests of current business practice for the purposes of proposed negotiations.

The report states under caption "expenditures necessary to place property in first-class operating condition" that the present-day condition is not necessarily that of June 30, 1921. This statement is particularly true now, as very liberal expenditures on maintenance have been made since the enaction of the transit act, and the values of the properties are now correspondingly increased. The lesser prices of the present day would, by reducing the costs of the work which the report deducts as necessary to put the properties in good condition—show larger values for each of the properties. The report includes in the amount which it so deducts at 1921 prices: (a) An estimated amount to cover the estimated requirements for overcoming deferred maintenance, and (b) a large additional estimated amount to cover its estimates for "deferred replacements" of equipment, i.e., equipment which it assumes should be retired from service.

Moreover, such deferred replacements have been determined by an erroneous method, i.e., by assuming the expenditure of money to place property in first-class condition and then retiring such property. An indication of the magnitude of the amount that the report claims should be allowed for deferred replacements is given by the statement appearing in report for Public Service Commission, First District, New York, for year ending Dec. 31, 1920, on page 88, which gives the then deferred maintenance of the surface lines as follows: Cars—all companies (based on 3,100 cars) $231,159; track and paving, for the six companies considered, $4,295,159.

The deferred maintenance plus deferred replacements for these same companies is estimated for 1921 in valuation report at $11,368,645.

In this connection the valuation report states "it is believed that due consideration should be given to an estimate of the necessary expenditures of this character as a practical means of determining the actual rather than the theoretical depreciation. Life is necessarily affected by the standard of the repairs. Renovation and rehabilitation from time to time will operate to make over and renew and if successively continued may prolong the line in service to an extent difficult to estimate." This statement cancels the preceding statement in the report which says in effect that it is proper to deduct theoretical depreciation based on age. It substantiates the contention made by the companies that, for proper determination of depreciation, findings must not be theoretical but must be based on inspection and on facts.

The Brooklyn surface road properties are now in seasoned condition and require only that enough money be spent on them to enable them to give a quality of service equal to that which the same properties could give if new. To spend more than this amount would be wasteful and extravagant. In arriving at a purchase and sale figure it may be proper to allow a credit, from the value of the property if new, in amount sufficient to put these properties into condition to give first-class service, but it is not proper to deduct the capital cost of new equipment expected to be purchased with the object of increasing the net earnings receivable by the new owners.

Certain general costs, some of which are mentioned in the report, apply to all the Brooklyn surface roads. Such costs include the construction overhead costs and the company overhead costs, whereas, the direct individual property costs for materials and labor are a function of quantities in each case and of their corresponding unit costs. All such general costs are as inevitable and unavoidable as the costs of steel rails or cars. They may be computed either on the basis of material and labor costs or they may be based on reasonable estimates fixed by experience had in the building of similar properties.

The report underestimates the allowances that must be made for costs of land and right of way. Such costs must, as estimated by Mr. Bennington, be taken on the average at not less than 1.60 times the assessed valuation. In the case of the land owned by the Coney Island & Brooklyn Terminal Company, which is a business corporation and not a railroad company, the land is believed by the company to be salable at more than double the assessed valuation. The report does not even include the necessarily incurred costs incidental to the acquisition of the land and right-of-way, nor the costs such as interest and taxes, of carrying the investment in land and right-of-way during construction. This land must, in most cases, be acquired well in advance of the starting of construction. Interest must be thereafter paid on its cost, and taxes are thereafter payable on such property and must be paid if the tax department does its duty.

The report states that easements, private right-of-way, consents and damages, should be limited in all valuations to the original cost shown on the books, and that they have not enhanced by land value increases or rental value increases. This statement is incorrect as would be soon discovered by any company now attempting to obtain such property and rights or to meet the damage claims that would develop. Even after making this reference to and statement regarding such items the report omits to value any of them except private right-of-way.

As to the methods used in making its valuations, the report has assumed that only a portion of the work would be reconstructed by the contract method. This assumption is contrary to customary practice. If the work were so rebuilt, as contemplated in the report, the company costs, including its administrative and engineering costs, would be greater by enough to offset the saving in job overheads and contractor's services which the report erroneously assumes could so be effected.

## Omissions

The commission valuation report, Mr. Blossom says, also omits many items of value, such as extra cost of piecemeal construction, many miles of irrevocable and perpetual easements, development costs of physical property and business, advantageous advertising and power contracts and franchises, and much property which is useful in the operation of the lines but not now actually in use, such as that purchased to provide reserve capacity.

## Overhead as Determined in the Report

Mr. Blossom also criticises the method of determining "overhead" as well as some of the nomenclature used in the commission valuation report. He explains that in the statistical section, which gives unit cost data, the report adds, but only in the case of some items, the amount of 6 per cent for "job overhead," making what is therein called "construction costs." To this it adds, but only in the case of some items, the amount of 10 per cent for "contractor's services," making what is therein called "contract costs." However, in making up the estimates of "contract costs" for electrical and mechanical equipment and rolling stock, the report adds no overhead but uses the manufacturer's bare selling price to the company, stating that this price corresponds to the above-mentioned "contract costs," which, in the case of track and structures, is the amount paid to the contractor for the finished work, ready to operate. In other words, this means that in the report no allowances for job overhead or contractor's services are included in the electrical and mechanical equipment and rolling stock. The report then adds to "contract costs," as made up from the sum of the foregoing items, certain estimated overhead and other charges to the company. It terms these "company overhead charges" and divides them into "expenses during development" and "expenses during construction."

"Cost to reproduce," according to Mr. Blossom, is made up in the commission report from the total of the estimated costs mentioned above, plus the value placed on land, right-of-way and materials and supplies, though in the last three items, the report includes no overhead or carrying costs. On this method of valuation Mr. Blossom says, in part:

A company or organization reconstructing the Brooklyn surface railroads in 1921 would hove had to pay costs for company overheads in excess of the percentages and amounts allowed in the valuation report of Feb. 15, 1922. A similar statement also applies to the construction overheads. The report depreciates the construction overheads and the company overheads. The company overheads should not be depreciated because the creative engineering, legal and administrative work and the expenses of insurance, taxes, interest and cost of money, once made are permanent and will never be duplicated. Some of the construction overheads will be duplicated when making renewals and

replacements but this statement does not apply to all of the construction overheads or to all of the physical property.

The report appears to allow construction overheads only on track and structures, made up of 6 per cent for "job overhead" and 10 per cent for "contractor's services" (including therein contractor's home office overhead and profit). These, combined, amount to 16.6 per cent, which seems entirely inadequate. My practice in such work is to allow at least 12 per cent for job overhead and to figure it on all (except rolling stock, to which I add 3 per cent) instead of on only a part of the work. The 12 per cent is made up of 4 per cent for contractor's works office costs and 8 per cent for all other items under (a) and (b) of the next following paragraphs. In my opinion this 12 per cent, so figured, should be used in these valuations instead of the 6 per cent as used and figured. The 12 per cent for "job overhead" and the 10 per cent for "contractor's services," combined, amount to 23.2 per cent.

"Contract cost" as defined in report must include the following construction costs: (a) All items listed in report as having been included in "contract cost," (b) express, freight, demurrage, telephone, telegraph, storeroom, storage, yard, automobile hire, cartage, rental, job liability insurance, incidentals, extras, omissions, mistakes, changes, corrections, breakage and waste, rehandling, temporary construction and duplication of work, removal of poor work, removal of obstructions or interferences, excess cost of doing work while maintaining operation, idle or overtime labor, power, heating, lighting for nightwork, failure of sub-contractors and reletting of work, delays, strikes, accidents, weather damage, disasters, miscarriage of shipments, city inspection and permits, bonds, fees, all other uninsurable costs, injuries and damages to persons and property, operation of job shops, construction plant maintenance, trial operation, contractors' works office costs and remuneration for contractors' services, including therein his home office overhead costs.

"Cost to reproduce" as defined in report must include the following company costs: (a) Company overhead costs during construction, such as interest during construction on all expenditures made, taxes during construction, engineering costs, administrative costs, fire insurance; (b) company's costs prior to construction, such as promoter's remuneration for services and expenses, administrative, legal and engineering costs, interest on expenditures made, and taxes on land and right-of-way and on structures; (c) cost of procuring money; and (d) company's costs subsequent to construction, such as working capital, physical property development costs, costs to create the business, and the value of contracts for power, advertising, etc.

Mr. Blossom gives in his report his comments at some length on the various items listed under "cost to reproduce." Speaking first of interest during construction, he points out that this money must often be raised before the work begins and that any organization constructing or reconstructing the Brooklyn surface routes would have had to pay for construction money an annual interest rate of at least 8 per cent, because a lender advancing money for construction would consider the hazards and risks of a loan on an unbuilt project. In 1921 the annual interest rate would have been more than 8 per cent. The interest period must be computed from the time the money is raised until construction is completed and operation begins. The least average interest period would be 2½ years on land, right-of-way and damages, three months on rolling stock, and one year on other property, and it might often be more. Taxes are payable on land and right-of-way after their acquisition, and they are also payable on building structures.

Engineering design and inspection costs would range between 3 per cent and 4 per cent of the full construction costs, including therein the job overhead and the payment for contractor's services. Administrative, legal and office costs during the construction period would range from 2 per cent to 3 per cent of the fair construction costs, including therein the job overhead and the contractor's services. Fire insurance would be not less than 0.4 per cent per year, payable for at least a year on the insurable portions above the foundation of buildings under construction, power plant and substation equipment, and for at least three months on rolling stock. This item would amount to at least 0.05 per cent of the contract costs, exclusive of land and right-of-way.

Discussing the items included under "Company's Costs Prior to Construction," Mr. Blossom declares that the commission report includes nothing for promotion costs, which are always incurred and are unavoidable if creative work of this kind is to be done. Mr. Blossom discusses the other pre-construction costs mentioned in group "b" above and estimates that these 1921 combined pre-construction costs would undoubtedly run from 5 per cent to 10 per cent of the reconstruction costs of the road and that in amount they would total not less than 6 per cent of the contract costs, plus the pre-construction cost of interest on land and right-of-way, consents and damages, and of taxes on land and right-of-way.

On the cost of procuring money, he points out that this cost of financing or of securing construction money is entirely distinct from interest, and that it is underestimated, at least for 1921, in the commission's report. Such allowance must cover all brokerage and underwriting charges, the services and expenses of banking houses and of their security distributing houses, and the expenses of the company, incurred in this connection. Mr. Blossom's experience and that of his firm and of corporations with which he is connected is that the actual cost of public utility money raised by the sale of bonds of profitable going companies would run from 5 per cent to 6 per cent, while the cost of that raised by the sale of junior securities would range from 8 per cent upward. The average cost of so procuring money would certainly exceed 6 per cent and would probably be 7 per cent. These percentages are lower than would be asked for street railway securities, and especially for those of a construction enterprise. Under the conditions in 1921 of the money market, the company credit and the city authorities' attitude, the money might not have been securable even at 10 per cent or 15 per cent. In Mr. Blossom's own Brooklyn valuation figures, he takes 6 per cent as the least percentage that could properly be figured.

COMPARISON OF VALUATIONS

| Company | Commission Valuation Report | Mr. Blossom's Revised Values |
|---|---|---|
| The Nassau Electric Railroad Company | $26,309,070 | $34,335,707 |
| The Coney Island and Brooklyn Railroad Company | 13,296,492 | 16,815,948 |
| Brooklyn, Queens County & Suburban Railroad Company | 10,385,975 | 16,388,409 |
| South Brooklyn Railway Company and Lessor Companies | 8,307,528 | 14,322,522 |
| The Brooklyn Heights Railroad Company | 1,523,521 | 2,188,909 |
| Coney Island & Gravesend Railway Company | 977,318 | 1,231,066 |
| The Brooklyn City Railroad Company | 45,361,243 | 60,914,216 |
| | $106,161,147 | $146,196,777 |

In discussing the next group (d) of reproduction costs, or that of the company's costs subsequent to construction, he says that the commission's report allows for floating capital as determined by the inventory of material and supplies, but includes no allowance for cash working capital, for physical property development costs, cost of experimentation or changes, nothing for expenditures made to create and develop business, and nothing for the value of power or advertising contracts or for franchise value.

The accompanying table shows the valuations made by the Transit Commission and by Mr. Blossom.

# New Light Motor Car for Paris Tramways

**Unified System in French Metropolis Is Trying Out a Novel Form of Car Designed to Secure as Far as Possible the Riding Qualities and Inherent Lightness of the Automobile**

IMPRESSED by the importance of reducing the weight of tramway cars and decreasing the shocks transmitted to the body, the department of studies and of technical control of the Société des Transports en Commun de la Region Parisienne has designed and constructed a sample car seating forty-nine persons and weighing 12.7 net tons. This is 519 lb. per seat, as compared with 633 lb. for the comparable type of car now in operation in Paris. The new one might be called a truckless car, as the two axles are connected through a flexible spring system to the body underframe, which carries the motors rigidly mounted. The wheelbase is 11 ft. 10 in. The car seats forty-nine passengers, and it is driven by two motors of 45-hp. each, rated on a one-hour basis. The details are shown in the accompanying illustration.

Each motor drives, through a longitudinal shaft, a bevel gear carried on the car axle. The gears are of




MOTOR DRIVE AND SPRING SYSTEM OF EXPERIMENTAL CAR NOW BEING TRIED OUT IN PARIS

A—Longitudinal shaft. B—Connecting rods between axles and frame. C—Axle housing. E—Adjusting nut for brake band. F—Brake drum J—Elastic coupling permitting side play. L—Semi-elliptic laminated springs. M—Motor.

heat-treated chrome-nickel steel. The gearing is inclosed in an oil-type casing which provides all bearings for the axle. As the gears run in oil they splash oil into the axle bearings, thus furnishing all necessary lubrication at this point.

An important feature of the design is the flexible spring suspension, combining both semi-elliptic and helical springs. These are so designed that the deflection is slightly over ⅛ in. per ton of load. The suspension provides also for lateral movement in order to prevent the transmission of sidewise shocks to the car body. To this end the connection from the semi-elliptic spring to the car underframe is made through a hanger which is itself essentially a laminated spring. This hanger, which also incloses a helical spring for vertical flexibility, is permitted a lateral movement of about 0.8 in. between stops. The maximum force tending to restore the hanger to its vertical position is about 6,600 lb. However, the body can be easily oscillated by one man pushing and pulling it sidewise.

Braking of the car is done by means of band brakes acting on drums carried on the longitudinal shafts. These can be operated either by hand or by means of small air-brake cylinders mounted on the axle housings. By this arrangement the total weight of braking equipment has been reduced from between 2,500 and 3,300 lb., as on some of the Paris cars, to less than 900 lb. These two methods of braking can be supplemented by the use of the motors, short circuited or reversed.

COMPARATIVE DATA FOR STANDARD AND EXPERIMENTAL TWO-AXLE CARS IN PARIS
Wheelbase 11 Ft. 10 In.

| | Type G Motor Car (Paris System) | New Light Car |
|---|---|---|
| Seating capacity | 49 | 49 |
| Total weight, empty, tons | 15.5 | 12 7 |
| Unsuspended weight, tons | 3.1[1] | 2 1 |
| Weight of truck and equipment, tons | 3.0 | 0 |
| Truck deflection per ton | 0 107 in. | 0 |
| Total deflection per ton | 0 214 in. | 0.357 in. |
| Weight of body, tons | 8.2[2] | 9 6[3] |

[1] Includes that part of the weight of the motor which is supported from the axle.
[2] Complete with underframe and equipment.
[3] Complete with underframe, motors and equipment.

By the use of this new car, G. Vergniole, of the department of studies and technical control of the T.C.R.P. Company, calculates that if all motor cars on this system could be conformed to the new model, an assumption which he says is obviously premature, there would be an annual saving of more than 9,000,000 kw.-hr. The corresponding saving in coal would be 16,500 tons. This indicates the advantage due to a reduction in weight assumed at 2.5 tons, which is much less than would actually be secured.

There is also the advantage of the reduction in unsuspended weight and insufficiently suspended weight, the effect of which is to cause wear and tear on rails, joints, track foundations and rolling stock.

Actual tests of the new car show it to be capable of climbing a grade of 5.3 per cent with a load of more than 13 tons. Starting from rest at the foot of the grade, it reached a speed of 9 m.p.h. on the grade and under the same conditions reached about 5 m.p.h. when drawing an empty train weighing about 25 tons.

Experience with the braking equipment was remarkably satisfactory. The motor car alone was stopped on a downgrade of 2 per cent from a speed of 15 m.p.h. in less than 65 ft. With rheostat braking, arranged to limit the speed to about 6 m.p.h. on a grade of from 3 to 5 per cent, the resistance necessary was shown to be about 6 to 7 ohms.

In concluding his account of the new car, which he covered in an article in *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*, Mr. Vergniole said that tramway construction has followed steam railroad models too far. Automobile construction, involving problems much more complex, has made remarkable progress in the last few years. The tramway conditions are much more nearly analagous to those of the auto-omnibus than they are to those of the railroads. It should be possible through the use of automobile technique, the employment of special steels and light metals, the perfecting of the electrical apparatus and particularly the development of high-speed, light motors, to permit tramway cars to be built with weights comparable with those of the omnibus. In Paris the weight of tramway cars per seat is from 1.7 to 2.6 times that of a gasoline or electric omnibus.

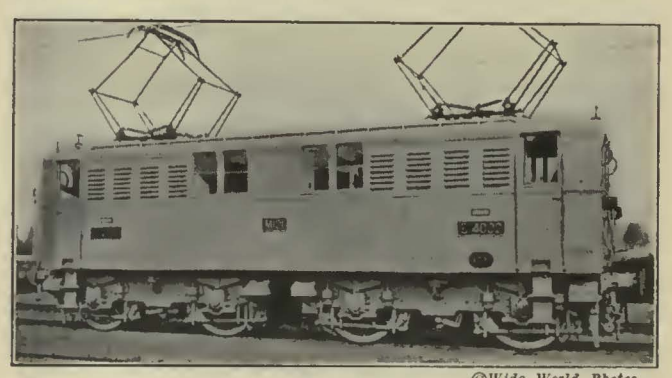
## "Holding a Field by Filling It"

AN ADVERTISEMENT of the Milwaukee Electric Railway & Light Company which recently appeared in a Milwaukee paper is reproduced herewith. In the lines is the essence of volumes on how to finance and simultaneously better public relations. Between the lines is a significant story of one effective way of meeting bus competition.

# Midi Locomotive Tests Successful

**First of Large Order of 1,500-Volt Direct-Current Locomotives Tested Between Pau and Lourdes on Midi System—Maximum Speed Is 60 M.p.h.**

GREAT interest attaches to the recent track test of the first of the direct-current locomotives destined for use on the Midi Railway in France. The test was made between Pau and Lourdes, the locomotive having been built near Tarbes in southwest France by the French Electric Construction Company (Compagnie des Constructions électriques de France). It will be remembered that the Midi, previous to the war, had



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FIRST COMPLETED 1,500-VOLT, 1,000-HP. LOCOMOTIVE FOR MIDI RAILWAY

made investigations of the single-phase system and had under test several different makes of locomotive of this type.

The present locomotive, of which some of the details can be gathered from the accompanying illustration, is for use in freight service, local passenger service and express passenger service on heavy grades. Its weight is about 80 tons, or 20 tons per axle. Each truck carries two motors, capable of developing 250 hp. each continuously, or 350 hp. for one hour. The tractive effort is 16,500 lb. and the maximum speed is 60 m.p.h. The motors drive the axle through double-reduction gears, one set at each end of each motor shaft.

The contactors are operated mechanically through a motor-driven camshaft. The controller and contactor circuits are fed at 120 volts from a motor-generator set supplied from the 1,500-volt line. This set also supplies power for light, heat, compressor motors, etc. The group includes also an exciter generator for use while the locomotive is regenerating.

The main driving motors have forced ventilation, provided by fans, of which there is one for each truck. The fans are driven from the motor-generator set, which is located centrally in the cab on its floor. The motor-compressor groups, of which there are two, are placed at the ends of the cab.

Provision is made so that when several locomotives are used in a train in multiple-unit connection the low-tension circuits of the several groups of motor-gene-

rators can be coupled in parallel by means of special switches. The above details are taken from the issue of *le Génie Civil* for Nov. 11, 1922.

# Letters to the Editors

## *On Statistics*

FORD, BACON & DAVIS, INC.

NEW YORK, Nov. 27, 1922.

*To the Editors:*

The *Journal* never contained a truer or more timely word than its editorial paragraph of last week regarding the use and neglect of statistics. A rather extended opportunity for observation would lead one to believe that there is not a street railway office in the land which is not full of valueless figures, with more coming through the mill every day. The operation of a street railway is a big job and a man generally thinks he does well just to keep it running, and he is right. But he ought to set aside an hour some day to plan out an audit of his statistics. For every report, record or form and for every figure thereon, he should get an answer to these questions:

1. Why is this prepared?
2. What deductions can be drawn from it and what are they worth?
3. Are such deductions systematically drawn?
4. Are the figures right; that is, are they what they purport to be?
5. Can the form be improved so that: (a) It will be more useful? (b) It will be cheaper to prepare?
6. Does it pass under the eye of every one who can make good use of it?
7. Is it consistent with all other figures on the same subject?

It would seem that every one might agree that no figure should be prepared without a real purpose, either as a record, or to indicate efficiency and inefficiency, or to prevent inefficiency. It may be that a figure or form has value in one of these particulars, but does it have enough value to warrant the expense of preparing it and the danger of obscuring figures and deductions of undoubted value. The men who must draw the deductions are busy, so that things should come before them in as simple and vivid form as possible.

Drawing deductions from reports is a fine art. I remember a story in the *Journal* some years ago of a superintendent who came into his general manager's office highly elated because "the Smith Street Line hit 40 cents yesterday." This was in the old 5-cent fare days. The general manager said that any superintendent who let a line earn 40 cents gross revenue per car-mile ought to be fired. In the story, the superintendent had no come-back, but he might have retorted that it would depend upon the average length of haul, size of car, comparative travel in the two directions, per cent of transfers, and a few other things. Figures may not lie, but explanations of them sometimes do.

In the stress of operation, reports are often neglected. No one can get the ultimate essence of a report but the man in authority. However, he could get a lot of help down the line if he would sketch out the things he looks for and the meaning to him of the various figures. This would at least stimulate inquiry.

If figures are not right, it were better that they had never been made. Figures may be all right mathematically, and the books may balance, but if a figure is not exactly what it purports to be, it is wrong. Examination of books and records seldom fails to develop many instances of such errors. This is generally due to lack of consultation and co-operation between departments.

To make forms useful, they should answer specific questions which the man responsible for operation is always asking himself. They should throw light on every vital action or condition. In preparing a form, therefore, the man who is in charge of the work should have a large share. Failure to do this often results in the keeping of more or less private records by members of the organization who cannot get what they want through regular channels, or feel that they cannot rely on what they get.

There is certainly a lot of money wasted in preparing statistics by cumbersome methods, duplications and otherwise. Clerk hire is cheap, but nothing short of 100 per cent efficiency is going to save the electric railway industry.

What is needed pretty generally is a good shaking out of dust, some intelligent analysis of cause and effect, and loyal co-operation between the people who use the figures and the people who make them.

If we should clean house, it may be that some of the commissions would see their way clear to simplifying their requirements in the way of statistics.

J. A. EMERY.

## How the United Railways of St. Louis Keeps Its Public Informed


TRAFFIC-CREATING POSTERS DISPLAYED BY THE UNITED RAILWAYS, ST. LOUIS, MO., AT THE CHICAGO CONVENTION OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION. THESE HAVE BEEN APPEARING FROM TIME TO TIME ON THE COMPANY'S CARS

# Use of One-Man Cars in Europe Spreading*

**Operation with Short Cars Has Been Satisfactory and Some Long Cars Will Be Converted—Due to Customs in Europe Some Loading Difficulties Have Been Encountered, But These Are Gradually Being Overcome**

By P. M. NIEUWENHUIS
Manager of the
Arnhem Municipal Tramways

AFTER an extended study of the operation of safety cars in the United States, the writer recommended their trial to the City Council of Arnhem. The motive for the use of these cars in Arnhem was economic. On account of the increase in cost of labor, reduction in working hours, etc., the cost of operation per car-kilometer had increased from 14½ cents (Holland) in 1914 to 51 cents in 1920, although the fare had increased only from 7½ cents to 10 cents on the city lines and from 15 cents to 20 cents per trip on the suburban lines. It is not thought practicable to increase this fare or to make other economies in operation. The former headway in the city was ten minutes, reduced later to seven and a half minutes, and on the suburban lines was from ten to fifteen minutes. It was estimated that the cost of platform labor per car per year with two men, including wages, pensions, substitutes during the permitted vacation with pay for twelve days of the year, accident insurance, etc., was about 6,000 florins a year. The average number of hours worked by the men per day is seven hours and twenty minutes. The existence of a uniform fare on the suburban lines made the introduction of the American system of one-man car particularly easy, especially as during the rush hours a good many passengers ride on passes or commutation tickets, which it was necessary only to show to the operator.

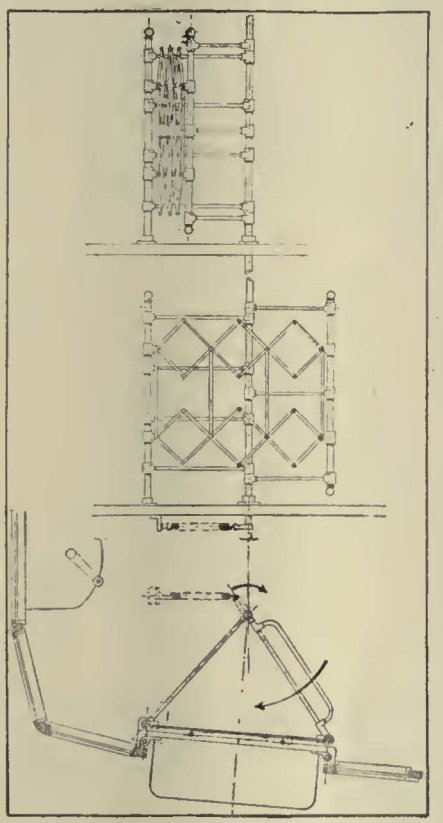
Three one-man safety cars were ordered from a Philadelphia car builder, but the standard design of Birney car had to be somewhat modified because the limit in width was 2.2 meters (7 ft. 2½ in.). These cars had not been received at the time the paper was written. It was also decided to rebuild some existing short cars for one-man operation, though, for reasons of cost, it was considered undesirable to install air brakes and pneumatic equipment for doors and steps, and manual control was used.

The design adopted was based somewhat on that used in Chicago on two-man cars, as observed by the writer.

The car is also supplied with push buttons.

### Collection of Fares

On the one-man cars, of which we now have several, we have only the uniform fare of 10 cents, which entitles a passenger to a transfer. We do not use a fare box, but the operator carries one or two bundles, each consisting of 250 tickets, on which are indicated the date and the hour of issue, and a different color is used for each line. This ticket also serves as a transfer and on the second car is cancelled by having the end torn off. We looked into the subject of fare boxes and transfer issuing machines, but as we needed only a small number of the transfer issuing machines, the builder did not feel that it was worth while to modify his designs to fit the smaller transfer ticket which we wanted to use. As regards the fare box, my own opinion is that the ticket system which we are now using is simpler, but that is a matter of personal opinion only. I realize that fare boxes have been operated for some time with very satisfactory results at Haarlem. Finally we put in a stool for the operator to sit on.



AUTOMATICALLY CLOSING PANTOGRAPH GATE FOR EXIT ON ONE-MAN CARS AT ARNHEM

Having got good results with three rebuilt cars, we decided to change over to one-man operation all of our motor cars of the smaller types, or those with room for eighteen seated passengers and fourteen standing passengers. With these cars we were able to cut down headway in the city from ten minutes to seven and a half minutes, though employing a smaller number of men. In general the service has been entirely satisfactory.

The lines in Arnhem all terminate in a central square (Willemsplein) where the cars stop for a minute or two to permit passengers to change cars, but there has been no appreciable delay at this point, in spite of the large number of people transferring. Operating speeds have not been increased for these cars.

It must be admitted that there has been some delay in loading and some public dissatisfaction therewith. There will be, for instance, a woman returning from the market and carrying as many bundles as a Christmas tree who will mount the platform without the fare in her hand. She will then have to deposit her bundles on the platform, make a search for her pocketbook, which perhaps she can find and perhaps not in the place where she thought it was, then after paying her fare resume possession of her bundles. Then there is the man about town who will jump on the platform and pass quickly to his seat, cigar in mouth (we are in Holland you must remember) and become absorbed in the landscape until the operator touches him on the shoulder and reminds him he has not paid his fare. Then he has to take off his gloves, unbutton his coat, and so on. Fortunately the public is not composed in great part of such individuals.

I arranged with a newspaper man to study the situation, and he reported to me as a result of an inquiry that the public had already become accustomed to the change and he thought that it was a matter of time only that these delays would disappear. Already we are finding that the public is becoming accustomed to having the exact change, and it may be that at least in Holland we can enforce a rule that persons not so supplied will be refused passage.

In the old type two-man cars the public entered by the rear platform and left by the front platform. It is my opinion that only small sized one-man cars, or those capable of carrying from thirty-two to forty passengers, can use the same platform for entering and leaving. As soon as we change our larger cars (which seat twenty-four passengers and have standing room for twenty-five) to one-man operation, the passengers will have to enter by the front platform and leave by the rear.

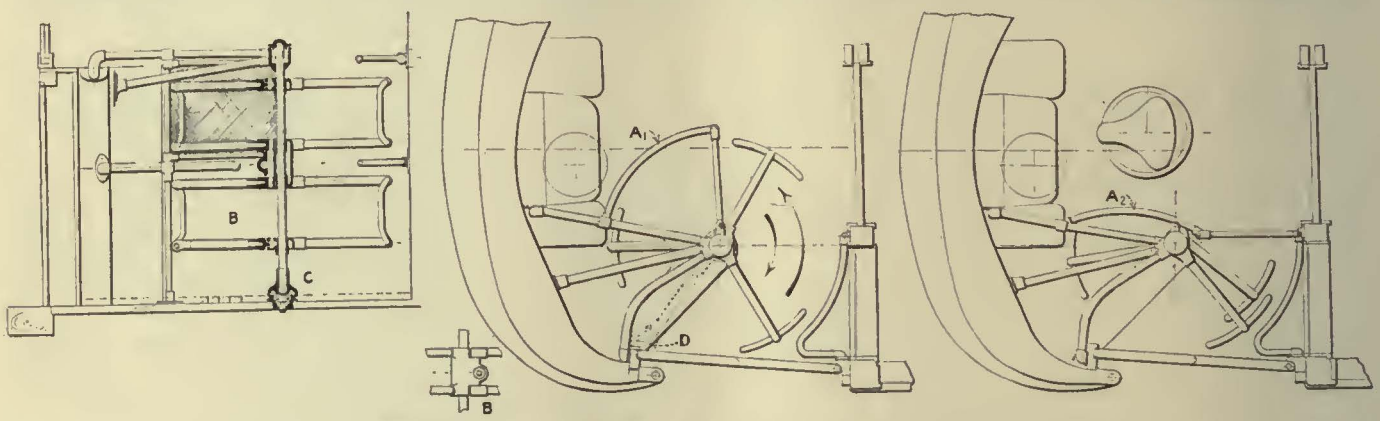
This will make necessary the use of some device which will prevent passengers entering by the rear platform without paying fare. Two types of apparatus have been designed.

The first drawing shows a form of pantograph gate which takes relatively very little room on the platform, although it permits the rapid exit of passengers. At the same time the entrance of passengers is very difficult. The device consists of a V-shaped pipe framework on the platform with a pantograph barrier extending across the exit opening. The pipe barrier consists of two members, one of which is stationary and the other swings so as to provide the opening exit. The latter member is provided with a handle for

*Abstract of paper read at convention of Union International de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Brussels, Oct. 2-6, 1922.

the convenience of the passenger when leaving the car, as shown in the plan view. The swinging member, or gate, is normally held in the closed position, as shown in the plan, by means of a spring which operates on a bell crank lever fastened to the bottom of the rotating member underneath the car platform. To open the gate the passenger takes hold of the handle which is latched and swings the gate forward into the position shown at the top in the engraving. This movement folds the pantograph gate out of the way, leaving a passage wide enough for one passenger only. As soon as the passenger gets off the step the gate automatically closes.

One objection to this gate is that a passenger who is leaving the car by the rear platform may hold the gate open to permit another passenger to get on the car, but this probably would happen very rarely, because by a mirror the motorman can see everything that is going on. However, the company has also designed a different type of barrier in the form of a turnstile for possible use.




FOLDING TURNSTILE FOR EXIT ON ONE-MAN CARS AT ARNHEM

The turnstile used is of a three-arm type and a particular feature lies in the fact that one of the arms can be folded in out of the way. This is of advantage at the operating end of the car, as it provides space for the operator which otherwise would be taken up by the turnstile. Another interesting detail is in connection with the pipe framework barriers. When the turnstile is used for the exit of passengers, a bracket arm shown at $A_1$ in the accompanying drawing projects out and is connected to the center of the turnstile by an arm. At the operating end of the car this arm can be unhooked from the center post and folded into the position shown in A-2. This effectually closes off the opening and at the same time provides additional space for the operator.

### ZONE FARE NOT AN IMPEDIMENT

In introducing his paper Mr. Nieuwenhuis explained that before the adoption of the one-man car in Arnhem, he had made a trip to the United States in February, 1921, where he had made a special study of the one-man safety car. Although a little skeptical as to the conditions which he had read about in the American technical papers, he found on his arrival that he had not been deceived. In this case, Americans, always audacious in their enterprises, had taken the bull by the horns, and by the one-man car had been able practically to reduce the platform costs by half, with the same mileage. To do this in Holland would mean a saving of about 40 francs per motor car day.

Continuing, the speaker said he presumed many railway men would doubt the practicability of introducing the system in their own localities. Public opinion, they would say, would not stand for it, but are the European populations less civilized or less disciplined than those in America? In Arnhem, which has 80,000 inhabitants, and is the center of an agricultural district, the community has accepted the change with good grace. It is possible that in a more industrial locality, more hostility would be shown at first, but in the speaker's opinion everything depends on the way in which the system is introduced to the community and the preliminary educational work done.

Another objection raised to the system is that in most of the European cities the zone system is used; this means the distribution of a large number of fare receipts of different values, and the issuance of these fare receipts takes time and would increase the length of stops. This did not seem an insuperable objection to the speaker, since the fare system if complicated could be simplified. Certainly some effort is worth while to secure such an important saving. Mr. Nieuwenhuis then presented his report, of which an abstract has just been given.

## New International Railway Association Organized

AN INTERNATIONAL railway conference was held recently in Paris, where the permanent headquarters of a new organization, the Union Internationale des Chemins de Fer, will be located. The organization has been formed for the purpose of facilitating international trade and traffic, and it includes Germany, as well as Japan and China. The official language will be French, and it is expected that a general meeting of the association will be held every five years.

## Canadian Association to Meet in Toronto

SECRETARY D. N. GILL of the Canadian Electric Railway Association has sent to the membership a report of the executive and general meetings held in connection with the American Electric Railway Association convention at Chicago. It was decided to hold the 1923 convention at Toronto some time during the summer. It was suggested also that, as many Canadians are members of the American Electric Railway Association, a general meeting of the Canadian Association should be held each year during the convention of the former.

The secretary reported the appointment of the following permanent committees: On public relations—A. W. McLimont, Winnipeg, chairman; Max A. Pooler, St. John; E. W. Oliver, Toronto; George Kidd, Vancouver, and W. J. Lynch, Quebec. On standards—G. Gordon Gale, Hull, chairman; D. E. Blair, Montreal; E. P. Coleman, Hamilton; C. C. Curtis, Sydney; W. G. Murrin, Vancouver; H. T. Gibbs, Toronto; W. G. Gordon, Toronto, and Hugh Millar, Montreal. On safety—J. F. H. Wyse, Toronto, chairman; R. M. Reade, Quebec; C. C. Curtis, Sydney; W. R. McRae, Toronto; W. H. Darracott, Winnipeg, and James Lightbody, Vancouver.

H. E. Weyman, Levis, was appointed chairman of a committee which is to report on the advisability of representing to the dominion government certain changes in the classification of accounts and also on proper accounting for maintenance and depreciation of electric railway properties.

The secretary announced that the interests of the electric railway industry in Canada at the dominion and provincial capitals are being looked after by the following: Dominion—F. G. Burpee, Ottawa; Ontario—C. L. Wilson, Toronto; Quebec—W. J. Lynch; New Brunswick—J. A. Olive, St. John; Nova Scotia—W. L. Weston, Halifax; Manitoba—Edward Anderson, Winnipeg; Saskatchewan—D.. W. Houston, Regina; Alberta—M. Freeman, Lethbridge, and British Columbia—V. Laursen, Vancouver.

## Kentucky Association to Meet at University

THE Kentucky Association of Public Utilities has accepted the invitation of President Frank L. McVey of the University of Kentucky to hold its 1922 annual meeting at the university. The meeting will be held, therefore, at Lexington on Dec. 12. The four utility companies operated in Lexington will tender a dinner on the evening of Dec. 11 to the delegates and guests. On Dec. 12 the meeting will convene at 9 a.m. at the Phoenix Hotel, where there will be preliminary exercises. At 11 a.m. the delegates will board special cars of the Kentucky Traction & Terminal Company for transportation to the university, where at 11:30 the meeting will reconvene in joint session with the student body in the chapel.

At the close of the morning session an inspection of the grounds and buildings of the university will be made, followed by a luncheon and further inspection. At 2:30 p.m. the meeting will be held in Mechanical Hall on the campus.

## New List of International Tramway Association Officers and Directors

THE Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles has announced the complete list of officers and committee members, as follows: Honorary president, Baron Janssen, vice-governor of the Société Générale de Belgique, Brussels; president, C. de Burlet, Brussels; vice-presidents, H. Géron, Brussels, and G. Pavie, Paris; directors J. F. S. Barth, Christiania; L. Boulle, Paris; H. Caufriez, Brussels; Marquis de Foronda, Barcelona; F. de Lancker, Brussels; W. Gerlicz, Lodz; J. Kessels, Brussels; F. Level, Paris; A. Mariage, Paris; Commander A. Natoli la Mantéa, Palermo; Kai Norregaard, Copenhagen; Ch. Rochat, Geneva; G. Salvadori, Turin; Ch. Thonet, Liége, and J. W. van der Vegt, Rotterdam.

## Safety Code Revision Under Way

ON NOV. 2 there was held in New York City a meeting of the sectional committee of the American Engineering Standards Committee to consider possible revision of Section 2 of the National Electrical Safety Code. The proceedings were largely in the nature of organization. Dr. M. G. Lloyd, United States Bureau of Standards, was elected chairman; C. B. Hayden, of the Wisconsin Railroad Commission, vice-chairman, and Roy C. Dwyer, of the Bureau of Standards, secretary. It was decided that an executive committee consisting of these three officers and one representative each of the several interests represented should constitute the working body.

The executive committee will be made up as follows: Officers mentioned, and Thomas Sproule, Newark, N. J., representing National Electric Light Association; K. L. Wilkinson, New York City, American Telephone & Telegraph Company; Charles Rufus Harte, New Haven, Conn., American Electric Railway Association; George Gibbs, New York City, American Railway Association; A. E. Knowlton, Yale University, New Haven, Conn., Public Utilities Commission of Connecticut; R. A. Bloomsburg, New York City, National Association of Mutual Casualty Companies; R. A. Smith, Norfolk, Va., International Association of Municipal Electricians; R. W. E. Moore, East Pittsburgh, Pa., National Safety Council; Charles H. Gantz, Hamilton, Md., United States Department of Labor.

After consideration of a number of suggestions made by the main committee, the sub-committee adjourned to meet in Washington on Nov. 27.

# Transit Expert Reviews Situation Abroad

**D. L. Turner, of New York Transit Commission on Recent Trip Abroad Was Impressed by the Relation Between Size of Buildings and City Transportation Problems**

AT A MEETING of the New York Chapter of the American Association of Engineers, held at the Hotel McAlpin, New York City, on Nov. 14, the speaker was Daniel L. Turner, consulting engineer of the New York Transit Commission. Mr. Turner had recently visited Glasgow, Liverpool, Edinburgh, London, Berlin, Paris, and other cities in Great Britain and on the Continent. He gave statistics of track mileage and the riding habits in a number of cities, together with running comments on his observations of electric railway construction and operating methods, including the allied subject of buses.

Contrasting conditions in New York City with those abroad, he said that the terrific congestion due to the construction of very high buildings, which threatened to make transportation an impossible problem in New York in a few years, is absent in the foreign cities. In the latter, five-story buildings are considered plenty high enough in the business districts, with the result that the traffic offered by the occupants of these buildings is fairly well distributed.

In Liverpool, said Mr. Turner, there is subway and surface transportation, with a few buses, with little belief in the usefulness of the last named. The great development there is in the direction of "arterial ways," which are wide highways with provision for tramways in the center. On these highways the cars can make such good speed as to bring them into the class of rapid transit.

Glasgow, wth 500 miles of single track, is much overbuilt from the tramway standpoint. Frequent service is given, with the result that the traffic at one time exceeded 500 rides per capita per annum. Fares are collected on the zone system, nearly 60 per cent of the passengers paying the minimum fare of 1½ cents. The municipality manufactures its own cars, under individual contracts with the workmen, and paints them different colors for the several routes. The property is in excellent condition and has reduced its indebtedness to $1,500,000, after paying which the city will own the property free of encumbrance. The manager, James Dalrymple, is buying in small lines for the city, and expects to electrify a seven-mile subway which is now operated by cable.

Edinburgh presented little of interest from the transit standpoint, as it is now being changed over from cable operation to the overhead trolley. There was great difficulty in bringing the citizens around to approve this change, but the changeover will soon be complete.

In London Mr. Turner was impressed by the fact that there is no competition between the buses and the rapid-transit lines, which serve different districts. The London County Council operates surface cars but is not permitted in the center of the city, where buses handle all surface traffic. A dozen or more different companies operate the rapid-transit lines. The buses work in well with the general transportation system of the city.

The London buses seem to be almost innumerable, and they follow many routes. It is, however, very easy to get around with their aid, as the routes are convenient and the buses are plainly marked with route signs.

One thing about London transportation is the alacrity with which passengers board and alight from the cars. They are expected to be prompt and not get hurt. Crowds of people desiring transportation are much more amenable to reason and control than in this country. Their reasonableness is shown further in the fact that they do not demand all-night transportation.

On the Continent Mr. Turner found conditions interesting, but with few features of great novelty. In Greater Berlin, which was formed in 1920, there are few rapid-transit facilities in the new sections. Much traffic is handled by the Stadtbahn, which is steam operated. The Ringbahn, a suburban system, carried considerable traffic, but rapid transit is not considered important and involves but 12 per cent of the total traffic. Six-car trains are the maximum. Eighty-five per cent of all traffic in the city is carried on the tramways, buses being very little used. Train operation is common, this plan being preferred to that of providing a large number of places per operating unit by the use of the double-deck plan which is common in England. The zone fare seems to be operating satisfactorily.

# American Association News

## Committee Appointments for 1922-1923

PRESIDENT C. D. EMMONS of the American Association and the presidents of the affiliated associations have completed their committee appointments for the current association year. These are listed below. These committees have already begun to function, the first meetings having been held in New York City last week.

### American Association

#### Finance

J. H. PARDEE, president J. G. White Management Corporation, New York, N. Y., chairman.
R. P. STEVENS, New York, N. Y.
J. G. BARRY, Schenectady, N. Y.

#### Policy

BRITTON I. BUDD, president Metropolitan West Side Elevated Railway, Chicago, Ill., chairman.
J. P. BARNES, Louisville, Ky.
H. G. BRADLEE, Boston, Mass.
H. E. CHUBBUCK, Peoria, Ill.
W. H. SAWYER, East St. Louis, Ill.
PAUL SHOUP, San Francisco, Calif.
H. D. SHUTE, East Pittsburgh, Pa.
J. J. STANLEY, Cleveland, Ohio.
L. S. STORRS, New Haven, Conn.
ROBERT I. TODD, Indianapolis, Ind.

#### National Relations

CHARLES L. HENRY, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.
W. R. ALBERGER, Oakland, Calif.
P. S. ARKWRIGHT, Atlanta, Ga.
H. G. BRADLEE, Boston, Mass.
ARTHUR W. BRADY, Anderson, Ind.
C. D. CASS, Waterloo, Iowa.
F. C. CHAMBERS, Des Moines, Iowa.
B. C. COBB, New York, N. Y.
S. M. CURWEN, Philadelphia, Pa.
J. H. HANNA, Washington, D. C.
T. N. MCCARTER, Newark, N. J.
JOHN W. SHARTEL, Oklahoma City, Okla.
H. B. WEATHERWAX, Albany, N. Y.

#### Subjects and Meetings

J. N. SHANNAHAN, president Newport News & Hampton Railway, Gas and Electric Company, Hampton, Va., chairman.
W. R. ALBERGER, Oakland, Calif.
H. V. BOZELL, New York, N. Y.
HARLOW C. CLARK, Newark, N. J.
L. C. DATZ, Memphis, Tenn.
C. R. ELLICOTT, New York, N. Y.
EDWIN GRUHL, New York, N. Y.
W. F. HAM, Washington, D. C.
G. H. HARRIES, Chicago, Ill.
HENRY R. HAYES, New York, N. Y.
W. V. HILL, San Francisco, Calif.
J. E. HUTCHESON, Montreal, Can.
WALLACE MUIR, Lexington, Ky.
W. G. NICHOLSON, Omaha, Neb.
L. H. PALMER, Baltimore, Md.
C. C. PEIRCE, Boston, Mass.
G. T. SEELY, Youngstown, Ohio.

#### Publicity

FRANK R. COATES, president Community Traction Company, Toledo, Ohio, chairman.
BARRON COLLIER, New York, N. Y., vice-chairman.
P. S. ARKWRIGHT, Atlanta, Ga.
J. F. COLLINS, Jackson, Mich.
P. H. GADSDEN, Philadelphia, Pa.
L. E. GOULD, Chicago, Ill.
F. T. GRIFFITH, Portland, Ore.
A. A. HALE, Boston, Mass.
G. A. RICHARDSON, Philadelphia, Pa.
L. S. STORRS, New Haven, Conn.
ELTON S. WILDE, New Bedford, Mass.

#### Publications

L. S. STORRS, president The Connecticut Company, New Haven, Conn, chairman.
F. G. BUFFE, Kansas City, Mo.
HARLOW C. CLARK, Newark, N. J.
EDWIN C. FABER, Aurora, Ill.
P. N. JONES, Pittsburgh, Pa.
M. B. LAMBERT, East Pittsburgh, Pa.
C. C. PEIRCE, Boston, Mass.
A. M. ROBINSON, Philadelphia, Pa.
MARTIN SCHREIBER, Camden, N. J.
J. E. WILKIE, Chicago, Ill.

#### Company and Associate Membership

W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
H. H. ADAMS, Chicago, Ill.
W. R. ALBERGER, Oakland, Calif.
A. C. BLINN, Akron, Ohio.
LUKE C. BRADLEY, Houston, Tex.
F. D. BURPEE, Ottawa, Ont.
T. C. CHERRY, Syracuse, N. Y.
JILSON J. COLEMAN, Scranton, Pa.
L. E. GOULD, Chicago, Ill.
EDWARD M. GRAHAM, Bangor, Me.
A. L. KEMPSTER, New Orleans, La.
GEORGE R. LYMAN, New York, N. Y.
W. J. LYNCH, Quebec, Que.
WILLIAM H. MCGRATH, Seattle, Wash.
J. C. MCQUISTON, East Pittsburgh, Pa.
H. H. NORRIS, New York, N. Y.
E. M. WALKER, Terre Haute, Ind.
E. P. WALLER, Schenectady, N. Y.
E. A. WEST, Denver, Colo.
E. F. WICKWIRE, Mansfield, Ohio.
J. H. WILSON, Mobile, Ala.

#### Special Sub-Committee on Canadian Membership

W. J. LYNCH, general manager Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., chairman.
F. D. BURPEE, Ottawa, Ont.

#### Company Section and Individual Membership

MARTIN SCHREIBER, manager southern division Public Service Railway, Camden, N. J., chairman.
C. P. BILLINGS, Pittsburgh, Pa.
F. G. BUFFE, Kansas City, Mo.
F. R. COATES (executive committee member), Toledo, Ohio.
W. J. FLICKINGER, New Haven, Conn.
J. H. MALLON, Chicago, Ill.
W. G. MURRIN, Vancouver, B. C.
A. T. PERKINS, St. Louis, Mo.
HARRY REID, Indianapolis, Ind.

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

W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
MINNIE B. W. BAKER, Denver, Colo.
F. D. BEARDSLEE, St. Louis, Mo.
JOHN W. BELLING, Boston, Mass.
R. M. BOOKER, Hampton, Va.
R. I. BROWN, Little Rock, Ark.
JOHN N. CADBY, Madison, Wis.
L. E. EARLYWINE, Indianapolis, Ind.
REX FOWLER, Des Moines, Iowa.
D. N. GILL, Hull, Que.
O. D HALL, Oklahoma City, Okla.
W. V. HILL, San Francisco, Calif.
E. F. KELLEY, Louisville, Ky.
F. C. LEWIS, Framingham, Mass.
A. BLISS MCCRUM, Charleston, W. Va.
T. T. PARKER, Cottonwood Falls, Kan.
R. V. PRATHER, Springfield, Ill.
J. P. ROSS, Birmingham, Ala.
W. F. STANTON, Rochester, N. Y.
HENRY M. STINE, Harrisburg, Pa.
E. N. WILLIS, Dallas, Tex.

#### Construction and Maintenance of Highways for Motor Vehicles

W. J. HARVIE, vice-president Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.
C. M. CHENEY, Des Moines, Iowa.
W. F. GRAVES, Montreal, Canada.
SAMUEL W. GREENLAND, Fort Wayne, Ind.
E. C. JOHNSON, Los Angeles, Calif.
E. P. ROUNDEY, Utica, N. Y.
J. N. SHANNAHAN (executive committee member), Hampton, Va.
H. M. STEWARD, Boston, Mass.

#### Co-operation of Manufacturers

E. F. WICKWIRE, secretary the Ohio Brass Company, Mansfield, Ohio, chairman.
R. E. ADREON, St. Louis, Mo.
GEORGE A. BARNES, New York, N. Y.
W. D. BLATZ, Bridgeport, Conn.
C. R. ELLICOTT (executive committee member), New York, N. Y.
E. C. FABER, Aurora, Ill.
P. N. JONES, Pittsburgh, Pa.
J. C. MCQUISTON, East Pittsburgh, Pa.
E. B. MEISSNER, St. Louis, Mo.
GEORGE R. ROWLAND, New York, N. Y.
P. L. THOMPSON, New York, N. Y.
E. P. WALLER, Schenectady, N. Y.

### Education

EDWARD DANA, general manager Boston Elevated Railway, Boston, Mass., chairman.
EDWARD J. BLAIR, Chicago, Ill.
THOMAS CONWAY, JR., Aurora, Ill.
C. B. FAIRCHILD, Philadelphia, Pa.
M. B. LAMBERT, East Pittsburgh, Pa.
M. MCCANTS, San Francisco, Calif.
C. E. MORGAN, Brooklyn, N. Y.
HENRY H. NORRIS, New York, N. Y.
A. T. PERKINS, St. Louis, Mo.
F. R. PHILLIPS, Pittsburgh, Pa.
J. P. PULLIAM, Milwaukee, Wis.
J. V. SULLIVAN, Chicago, Ill.
WILLIAM VON PHUL, New York, N. Y.
H. E. WEEKS, Davenport, Iowa.
THOMAS S. WHEELWRIGHT, Richmond, Va.

### Electrolysis

W. J. HARVIE, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.
JAMES P. BARNES (executive committee member), Louisville, Ky.
L. P. CRECELIUS, Cleveland, Ohio.
ADRIAN HUGHES, JR., Baltimore, Md.
M. B. ROSEVEAR, Newark, N. J.
G. W. VAN DERZEE, Milwaukee, Wis.

### National Utility Associations

RANDAL MORGAN, vice-president United Gas Improvement Company, Philadelphia, Pa., chairman.
BRITTON I. BUDD, Chicago, Ill.
JOSEPH K. CHOATE, New York, N. Y.
F. R. COATES, Toledo, Ohio.
E. C. FABER, Aurora, Ill.
P. H. GADSDEN, Philadelphia, Pa.
L. S. STORRS, New Haven, Conn.
R. I. TODD, Indianapolis, Ind.
J. W. WELSH, New York, N. Y.

### Mail Pay

L. H. PALMER, assistant to president United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
GORDON CAMPBELL, York, Pa.
G. K. JEFFRIES, Indianapolis, Ind.
R. A. LEUSSLER, Omaha, Neb.
SAMUEL RIDDLE, Louisville, Ky.
W. S. RODGER, Highland Park, Mich.
R. P. STEVENS (executive committee member), New York, N. Y.
C. L. S. TINGLEY, Philadelphia, Pa.
H. B. WEATHERWAX, Albany, N. Y.

### Co-operation with the National Safety Council

L. H. PALMER, assistant to president United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
W. H. BOYCE, New Brighton, Pa.
WALLACE MUIR, Lexington, Ky.

### Trackless Transportation

H. B. FLOWERS, vice-president and general manager United Railways & Electric Company, Baltimore, Md., chairman.
J. H. ALEXANDER, Cleveland, Ohio.
R. E. DANFORTH, Newark, N. J.
B. J. FALLON, Chicago, Ill.
GEORGE KEEGAN, New York, N. Y.
C. W. KELLOGG, Boston, Mass.
T. J. MCGILL, Minneapolis, Minn.
H. A. MULLETT, Milwaukee, Wis.
D. W. PONTIUS, Los Angeles, Calif.
H. B. POTTER, Boston, Mass.
G. T. SEELY, Youngstown, Ohio.
CLAUS SPRECKELS, San Diego, Calif.
E. A. WEST, Denver, Colo.

### Uniform Motor Vehicle Regulatory Laws

C. D. CASS, general manager Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, chairman.
R. R. BRADLEY, Chicago, Ill.
A. W. BRADY, Anderson, Ind.
H. E. CHUBBUCK (executive committee member), Peoria, Ill.
DAVID DALY, Keokuk, Iowa.
D. W. PONTIUS, Los Angeles, Calif.
B. E. TILTON, Syracuse, N. Y.

### Mid-Year Dinner

J. H. HANNA, vice-president Capital Traction Company, Washington, D. C., chairman.
H. L. BROWN, New York, N. Y.
C. R. ELLICOTT, New York, N. Y.
H. B. FLOWERS, Baltimore, Md.
W. F. HAM, Washington, D. C.
W. H. HEULINGS, JR., Philadelphia, Pa.
C. E. MORGAN, Brooklyn, N. Y.
C. C. PEIRCE, Boston, Mass.
E. F. WICKWIRE, Mansfield, Ohio.

## Accountants' Association

### Engineering-Accounting (joint committee)

H. C. KIMBALL, auditing department Washington Railway & Electric Company, Washington, D. C., chairman.
J. C. COLLINS, Rochester, N. Y.
G. F. DINNEEN, Holyoke, Mass.
A. W. GRADY, Durham, N. C.
CHARLES H. LAHR, Akron, Ohio.

### Relations with Other Associations

M. W. GLOVER, auditor West Penn Railways, Pittsburgh, Pa., chairman.
L. T. HIXSON, Indianapolis, Ind.
I. A. MAY, New Haven, Conn.
F. H. SILLICK, New York, N. Y.
F. E. WEBSTER, Haverhill, Mass.

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G. C. ESTILL, New Orleans, La.
R. B. FISHER, Harvey, Ill.
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### Automatic Substations

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### Engineering Manual

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H. C. DECAMP, Dayton, Ohio.
J. E. DUFFY, Syracuse, N. Y.
A. L. REYNOLDS, Youngstown, Ohio.
KARL A. SIMMON, East Pittsburgh, Pa.
A. SWARTZ, Toledo, Ohio.
L. G. VAN NESS, Cincinnati, Ohio.
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**Traffic Regulations**

H. B. FLOWERS, second vice-president and general manager the United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
HENRY O. BUTLER, St. Louis, Mo.
F. R. COGSWELL, Pittsburgh, Pa.
FRANK P. EDINGER, Chicago, Ill.
W. H. MALTBIE, Baltimore, Md.
PAUL E. WILSON, Cleveland, Ohio.

## Camden Section Elects Officers

AT THE OCTOBER meeting of the Public Service Railway, Southern Division, company section, the following were elected to serve for the coming year: President, C. V. Wallace; vice-president, W. H. Wright; secretary, George C. Stoll; treasurer, P. O'Connor; directors, Hamilton C. Wonderly and Robert A. McArthur. Martin Schreiber, manager of the division, related some Chicago convention experiences, stating that he noted a spirit of optimism that has been missing at recent conventions.

In the general discussion one speaker referred to the possibility of using water on slippery rails instead of sand. He stated that this is being done in Liverpool, England. The discussion covered a number of practical points in connection with the daily operation of the system.

## "Aera" Subscription Price

MENTION was made in the report of the executive committee meeting in last week's issue of this paper that an increase in the subscription rate to *Aera* was planned. Secretary Welsh has called attention to the fact that this is in error, and that no increase in the subscription rate to individuals is now contemplated.

## Committee on National Relations Organizes

ANOTHER of the committees to meet early in the association year was that on national relations, of which Charles L. Henry, Indianapolis, Ind., is chairman. This committee met in New York City on Nov. 24 and discussed its work in a general way. No definite program was outlined, but a review of the situation of the electric railways in so far as they are affected by national legislation was taken. Besides the chairman there were present F. C. Chambers, Des Moines, Iowa; B. C. Cobb, New York City; S. M. Curwen, Philadelphia, Pa.; J. H. Hanna, Washington, D. C., and H. B. Weatherwax, Albany, N. Y.

## Association Information and Service

THE American Association office announces the following additions to and revision of its service bulletins. These are available to all members of the association in good standing.

*Public utility laws*—A summary of the laws creating state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and laws of the transportation companies. This is the seventh installment of the compilation which was begun in June.

*Interurban wage agreements*—An analysis of the agreements now in effect on the lines of twelve large interurban companies, showing in comparative form the provisions of each agreement.

*Relief from paving burdens*—A review of recent developments in the movement to obtain relief from municipal requirements to repave and maintain the pavement along electric railway tracks, with accounts of the leading cases which have recently been decided.

*Automobile transportation costs*—Some figures on costs of automobile operation in both passenger and freight services. Contains report of the Fifth Avenue Coach Company for the year ended June 30, 1922.

*Trend of materials prices*—A new edition of the association's compilation bringing down to date the trend of prices of materials used by the electric railways, as furnished by the manufacturers.

In addition to the above, supplements to the association's fare bulletin, wage bulletin and cost of living studies have been prepared, bringing them down to date.

## Safety Experts to Study Automobile Accidents

ONE of the first, if not the first, of the newly appointed committees to organize and meet was the committee on accident prevention of the Transportation & Traffic Association. This met in New York City on Nov. 24 with Chairman H. B. Potter, Boston, Mass., in the chair. Other members present were H. O. Allison, New Brighton, Pa.; M. W. Bridges, Chicago, Ill.; C. W. Chase, Gary, Ind.; A. W. Koehler, Rochester, N. Y.; C. E. Morgan, Brooklyn, N. Y.; C. E. Mulford, Richmond, Va.; J. V. Sullivan, Chicago, Ill.; and E. M. Walker, Terre Haute, Ind. President G. T. Seely, of the T. & T. Association, also attended for part of the meeting.

After general discussion a sub-committee was appointed to draft a questionnaire asking for reports on different classes of accidents, particularly collisions with vehicles, derailments, car collisions, boarding and alighting accidents (for open and closed cars separately) and personal collisions. This committee will consist of Messrs. Bridges, Chase, Koehler, Boyce, Sullivan and Potter. It was also decided to have this committee co-operate with the corresponding committee of the Claims Association.

A second sub-committee was next appointed to prepare a compilation of methods of handling accident-prevention problems. The investigation will include plans for co-operating with civic and other bodies. The committee will comprise Messrs. Walker, Morgan, Reade, Warren and Harmon.

The following were appointed as a committee to co-operate with the American Association Committee of One Hundred (through Labert St. Clair), in regard to the preparation of safety posters which are to be distributed free to all electric railways in the United States. The appointees were: Messrs. Potter, Allison, Morgan, Sullivan and Walker.

Mr. Potter urged strongly the giving up of such outworn slogans as "Safety First," "Watch Your Step," etc., and recommended that new ones be formulated. One of the recent epigrams which had struck his fancy was: "Any accident may be fatal."

Mr. Seely addressed the committee, stating that it has a free hand to develop its subject, which is one of the most important ones at present in connection with the welfare of the industry. The situation is so alarming that anything that can be done to assist electric railways in reducing accident costs will be greatly appreciated.

# Recent Happenings in Great Britain

## London Underground Railways' New Capital, Extensions and Fare Reductions—Electrification of Southern Railways—More Time Saving

*(From Our British News Representative)*

ON OCT. 18 a prospectus was issued inviting subscriptions for additional capital to the amount of £3,958,000 for three of the London underground electric railway companies. Three days later it was announced that the issue was oversubscribed and that lists were closed. The rapidity of subscription was no doubt due to the fact that the new capital is guaranteed by the state both as to principal and interest under the trade facilities act of 1921. The issue was the second and final portion of the total guaranteed by the government.

In June last redeemable second debenture stock was put on the market at the price of 94 per cent by the London Electric Railway to the extent of £1,000,000 and by the City and South London Railway to the extent of £1,500,000. The present issue is of £2,250,000 of 4½ per cent redeemable second debenture stock in the case of the London Electric, £1,250,000 of the same denomination of stock for the City and South London, and £458,000 of 4½ per cent redeemable debenture stock of the Central London Railway, all dated 1942-72, and all at the issue price of 93 per cent. The stocks are of course trustee securities.

The new works to be carried out, some of which have already been begun, include the widening of the tunnels of the City and South London Railway, the construction of a connecting "tube" line between the railway at Euston and the Charing Cross and Hampstead Railway at Camdentown, the building of a surface continuation on the latter railway from Golder's Green to Edgware, the construction of an extension of the Great Northern & Piccadilly railway from Hammersmith to a junction with a branch of the London & South Western Railway, the provision of additional rolling stock, the improvement of stations and the substitution of escalators for lifts at a number of stations. These works will, among other things, enable through trains to be run from Edgmore in the north to Clapham in the south, and from Finsbury Park in the north to Richmond in the southwest, thus greatly adding to public facilities. Meantime work will be afforded to thousands of men, and it may be recalled that the object of passing the grade facilities act was to promote employment for the workless on undertakings of permanent public utility.

### London Fares Reductions

The London underground railway companies have announced that a scheme of reductions in force will be put into operation on Jan. 1, 1923. The minimum 1½d. fare will be retained, but fares above that amount will be reduced to an approximate rate of 1d. per mile up to 4d., and thereafter the distances given for all fares above 4d. will be increased. This, it is hoped, will encourage the longer-distance traffic and help to build up the outer suburbs.

As under the London electric railways fares act, 1920, workmen's return fares are the single ordinary fares for the double journey, workmen will benefit correspondingly with the reduction in ordinary fares. The minimum return workman's fare, however, remains at 3d. Season ticket rates will be lowered in proportion to ordinary fares. Over all, the reductions affect one-third of the railway fares. The companies have in the past not charged up to their full statutory powers on the average, and when the reductions are carried out they will be charging less on the average than 1d. per mile.

Of course the companies hope that increased traffic will be a result of the reductions. Expenses have not yet fallen sufficiently to warrant wholly the present concessions. The cost of carrying a passenger for the first nine months of 1922 compared with the first nine months of 1921 shows a reduction of only three-tenths.

### The Southern Railway Amalgamation

By the railways act of 1921 it was provided, inter alia, that all the steam railway companies of Great Britain should be combined into four great companies, and that work of amalgamation is now in progress. In regard to what is called the southern group, there is an interest for readers of this journal, because two out of the three railways to form the group, the London & South Western and the London, Brighton & South Coast Railways, already use electric traction on their London suburban lines, and the third, the South Eastern & Chatham Railway, proposes to adopt the same method on its suburban routes. Toward the end of October it was announced that these companies had at last agreed on the terms on which they will form the southern group.

The new amalgamated company will issue its stocks in exchange for those of the existing companies, and its capital will be £144,846,000. It does not seem to be anticipated that there will be much trouble in arranging for the running of through electric trains between the three hitherto existing undertakings should it be found desirable. At the same time it may be noted that the London & South Western uses direct current at 600 volts on a third-rail conductor, that the London & Brighton works on the single-phase high-tension system with overhead wires, and that the South Eastern & Chatham contemplates the use of high-tension direct current.

### Speed in "Booking"

On the New York underground railways, where I believe a uniform fare for any distance prevails, the question of speed in issuing tickets (here called "booking") to passengers cannot present the same difficulty as it does on the London underground railways, where the fares are in proportion to distance to be traveled. As local city railways are extended, however, the necessity for graduated fares, even in America, becomes more acute, so that the following details supplied officially to me by the London underground railway companies may be of interest. It may be remarked that the comparison between the issuing of tickets by hand and by booking machine shows such an extraordinary efficiency and smartness on the part of the booking clerk that he ought to have substantial promotion.

The figures also indicate that if there are many booking clerks like him there is no material advantage in using a booking machine.

The test was taken during the heavy rush hour of 5:30 to 6:30 p.m. At Piccadilly Circus Station of the "Underground" during the hour a booking clerk issued by hand 809 tickets. Out of the number of passengers, 441 required change, the details being: Nine required ½d. change; three required change for 3d.; 157 needed change for 6d.; 130, change for 1s.; 85, change for 2s.; 51, change for 2s. 6d., and six, change for 10s. At Oxford Circus Station, by means of an electrically operated booking machine, between 5:30 and 6:30 p.m. a booking clerk issued 872 tickets.

During that time he was delayed in answering four inquiries for season tickets and in supplying from the emergency ticket rack six ordinary tickets which the machine was unable to meet. The machine delivers the change as well as the tickets.

### Edinburgh Conversion

A remarkably smart bit of work was carried out by the Edinburgh tramway department in the early morning hours of Sunday, Oct. 22, in connection with the conversion of the lines from cable to electric traction. Up to midnight on Saturday, Oct. 21, cable cars were running in Princes Street, the great central thoroughfare of the city. At half-past nine o'clock on Sunday morning the first electric car ran over the route, which is about a mile long. All the work which could be done beforehand had of course been carried out. Squads of men, numbering in all about 300, were put on at several points about midnight to adjust the tracks and to erect the center poles and trolley wires. By Sunday evening a complete Princes Street service of cars was in operation by electric traction.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Service Complaint Filed

**International Blames Inability of New Men—Local Service Restored in Lockport, "Owl" in Buffalo**

Traffic experts of the Public Service Commission are making a survey of service on the local lines of the International Railway, Buffalo, N. Y., as a result of an appeal to the municipal authorities for improved service. City authorities have served notice on the company that cars must be operated with more regularity.

Herbert G. Tulley, president of the International, says the company has more than sufficient men to operate its local and interurban cars, but since the so-called Philadelphia vacationists have returned home, the new men being employed by the company have given considerable trouble. The claims department of the railway company has many accident and claims investigations under way.

The City Council unanimously adopted a resolution demanding that all the cars operated on the local lines of the International be equipped with life guards, emergency brakes and rear exits and crews must report all accidents to the police. This resolution was made necessary because of the increasing number of traffic accidents. The International did not appear in opposition to the proposed resolution. It is the company's contention that the city is without such authority as the Public Service Commission only has jurisdiction.

The activities of the claims department of the International and the Philadelphia Rapid Transit Company officers who have been detailed to strike duty in Buffalo are confined almost exclusively to getting evidence against jitney owners and drivers and arresting them. Several arrests are made daily and fines of $25 to $50 are imposed by the City Court Judges. The City Court calendar is now so congested with jitney cases demanding jury trials that it will keep many of the judges busy until next April hearing the evidence.

The International Railway has taken an appeal from the decision of the Appellate Division of the Supreme Court which upset the writ of mandamus obtained by the railway to compel Mayor Schwab to enforce the anti-jitney laws. The case now has been carried to the New York State Court of Appeals.

Local service on the Lockport lines of the International was restored Nov. 25. The city had been without local service since the start of the strike, July 1. Three days after service was restored Edgar J. Dickson, vice-president of the International, stated that riding was 50 per cent of normal, with little or no disorder by the strikers.

Half-hour "owl" service has been restored by the company on many of the local lines of the International in Buffalo. Other lines with no "owl" service since the strike are now operating on an hourly basis.

Police Chief Elliott of the city of Tonawanda has served notice on the International that cars run on lines within the city limits must not operate at a greater speed than 8 miles an hour. The action follows a vote by the Board of Aldermen, which is the result of the increasing number of accidents. The order affects the old Buffalo-Niagara Falls interurban line and the Buffalo-Kenmore-Gratwick line.

## Will Spend $550,000 in 1923

The Virginia Railway & Power Company and the City of Petersburg, Va., will spend approximately $550,000 in 1923 in improvements and betterments. The improvement work includes new paving work, new tracks, a trackless trolley for Walnut Hill and the extension and enlargement of Petersburg hydro-electric development. The paving will cost about $150,000 and the new tracks and power plant will cost the company approximately $400,000.

The railway service will continue in the city as the Council rejected the trollibus proposal but the system will be operated in Walnut Hill. Two of the trackless trolley cars have already been ordered and probably will be in Petersburg by Jan. 1, 1923.

## Bill Provides for Electrification

William J. MacDonald, a Boston real estate operator, recently filed with clerk of the House a bill authorizing the incorporation of the Boston Rapid Transit Company, for the purpose of financing the electrification of the railroads entering the north and south stations, for the construction of a union station in the Back Bay district and for authority to construct tunnels to connect the two leading stations with the Boston, Revere Beach & Lynn Railroad.

Under the terms of the bill the company is authorized to issue stock to an amount of not more than $100,000,000, with the right to increase its capital stock. The new company offers to electrify the Boston & Maine, Boston & Albany and the New Haven for a distance of 15 miles from the State House, operating for the benefit of the traveling public. The bill provides that the corporation shall file with the legislature, on or before Feb. 1, 1925, a report of the results of its negotiations accompanied by plans, terms, surveys, estimates and other data incidental to a comprehensive plan for consolidation of proposed lines.

## Votes Down One-Man Car

**City Council of Toledo Disapproves of Commissioner Cann's Plan for Changing Deficits Into Balances**

One-man cars left the streets of Toledo, Ohio, at midnight on Thursday, Nov. 23, by vote of the City Council, which finally stood 16 to 3 against the new type of equipment.

Commissioner Wilfred E. Cann, who has made many changes in local operations to effect an operating deficit into balances each month for the stabilizing fund, in an effort to secure lower fares, recommended the one-man cars as one of the only remaining avenues to save money. The cars were placed in operation on the Bancroft line on July 1.

With these results Mr. Cann recommended to the Council committee the adoption of a weekly pass at $1 each as a trial with the idea of making the savings immediately available to the regular patrons in decreased fares. But the Council turned down the whole proposition largely on the recommendations of street car men and organized labor in general.

The ten one-man cars on the Bancroft line and twenty placed in operation a few weeks ago on the Cherry line were saving $3,750 a month, Mr. Cann told the Council. Approximately 50 per cent of the saving had been put back into increased service.

"By going back to the old type cars we lose the net savings and the public loses the net increase in service," declared the commissioner to the Council. "The surplus earnings for October which were credited to the stabilizing fund amounted to slightly less than $7,000. With the extremely high costs incident to operation of street railways today this surplus was effected by economies of such strict character that they cannot be continued."

Mr. Cann said that the total amount of money spent for maintenance of tracks, equipment and overhead per car-mile in Toledo was less now than the amount spent for maintenance of tracks alone in Detroit. An increase of 1 cent a car-mile for maintenance in October would have wiped out the entire surplus.

The commissioner argued that changes in equipment would do away with 75 per cent of the objections to the one-man car as it was placed in operation on the Cherry line—Peter Witt type with entrance and exit at front door—and that the weekly pass would eliminate the other 25 per cent of objections.

Savings effected by the one-man cars amounted to 22 per cent decrease in the labor costs of operation and at the same time a 6 per cent increase in service.

## Readjustment Plan Operative

### Final Steps Being Taken Under Which the Status of Affairs of New York Companies Will Be Changed

The so-called Interborough-Manhattan plan of readjustment, under which the intercorporate relations of the Interborough Rapid Transit Company and the Manhattan Railway, New York, will be placed on a new basis, has been declared operative by concurrent action of the three committees representing the security holders principally affected. The committee for Interborough-Metropolitan 4½ per cent bonds has accordingly called for payment on Dec. 27, the purchase price of the new ten-year 6 per cent Interborough notes, amounting to $160 on each $1,000 bond, or $32 a share of Interborough Rapid Transit Company stock.

Bondholders who exercise the option to take the notes will receive $160 in notes, 5.25 shares of Interborough Rapid Transit voting trust certificates, and five shares of Fifth Avenue Bus Corporation voting trust certificates. Bondholders who exercise the second option under the plan, that of not subscribing to the new notes, will receive 2.10 shares of Interborough Rapid Transit voting trust certificates and two shares of Fifth Avenue Bus stock certificates. Depositors of Interborough stock who elect to take the notes will get $32 a share in notes and one share of Interborough stock trust certificates.

Depositors of bonds with the committee who have not heretofore elected to subscribe to the notes may do so up to Dec. 27.

Execution of the readjustment plan, by relieving the Interborough Rapid Transit Company of a portion of the rental for the Manhattan Elevated lines and providing it with additional cash, is expected to work a practical reorganization of the company, putting it on its financial feet and ending threats of receivership. The holding company, Interborough-Consolidated Corporation, and all its stocks and bonds will cease to exist.

The capitalization of the combined Interborough Rapid Transit Company and Manhattan Railway will be as follows:

| | | |
|---|---|---|
| (1) | Interborough Rapid Transit Company 1st and refunding mortgage 5 per cent bonds | $154,446,000 |
| (2) | Interborough Rapid Transit Company 10 year 7 per cent notes secured by Interborough Rapid Transit Company bonds | 34,330,000 |
| (3) | Manhattan Railway bonds | 45,206,000 |
| (4) | Manhattan Railway stock | 60,000,000 |
| (5) | Interborough Rapid Transit Company unsecured 6 per cent notes | 10,500,000 |
| (6) | Interborough Rapid Transit Company stock | 35,000,000 |

All the other securities, including $45,700,000 principal amount of Interborough Consolidated Corporation preferred stock and 932,600 shares of no par value common stock of the same corporation, are wiped out. The $64,000,000 of 4½ per cent bonds of the Interborough Consolidated Company disappear and those who were formerly bondholders of that company now become stockholders of the Interborough Rapid Transit Company. The stock of the Interborough Rapid Transit Company was formerly pledged back of the Interborough-Consolidated bonds. The details of this plan were published in the *Electric Railway Journal* for Oct. 14, page 648.

As a step in the plan of readjustment the Fifth Avenue Bus Corporation was chartered in Delaware on Nov. 14 with a capital stock of $40,000,000. The details of this move were contained in a letter sent on Nov. 27 by the protective committee of the Interborough-Metropolitan 4½ per cent bonds to all bondholders.

The plan calls for a readjustment of the stock of the New York Transportation Company—a holding company owning the entire capital stock of the Fifth Avenue Coach Company, operating Fifth Avenue-Riverside Drive bus lines. The stock of the New York Transportation Company is now held by trustee in bankruptcy of the Interborough-Consolidated Corporation, which, under the Interborough-Metropolitan readjustment plan, will be liquidated.

According to the announcement the Interborough-Metropolitan Committee, Grayson M-P. Murphy, chairman, will acquire 103,574 shares of the New York Transportation stock now held by the bankrupt Interborough - Consolidated Corporation estate. This stock will be vested in the new bus company, which will issue enough no par value stock to provide five shares for each $1,000 of Interborough-Metropolitan 4½ per cent bonds, the stock so issued to be vested in voting trustees.

From time to time, it was stated, the new corporation probably will acquire additional stock of the New York Transportation Company, of which the general public now holds 131,476 shares, and that shares of the new concern shall be issued therefor. The Fifth Avenue Bus Corporation, it was explained, has offered to purchase the 103,574 shares of New York Transportation Company stock held by the Interborough-Consolidated Corporation at $3,262,581, or $31.50 a share, the market price as of Nov. 15.

The officers of the Fifth Avenue Bus Corporation are Grayson M-P. Murphy, president; Frederick Strauss, vice-president, and D. R. Noyes, treasurer. The directorate includes Charles H. Sabin, Charles S. Sargent Jr., Frederick T. Wood and Stephen Van Ness.

The Interborough Rapid Transit Company in September operated at a deficit of $464,759 after charges, compared with a deficit of $398,204 in September, 1921. Operating revenue increased $66,437 over revenue for September last year, while operating expenses and taxes increased $164,577, amounting to $2,977,649. A comparative statement of earnings for September, 1922 and 1921, follows:

| | 1922 | 1921 |
|---|---|---|
| Gross | $4,258,082 | $4,191,645 |
| Net after taxes | 1,280,434 | 1,378,573 |
| Total income | 1,331,008 | 1,425,409 |
| *Deficit after charges | 466,759 | 398,204 |

* Exclusive of deficit accruals under the provisions of Contract No. 3 and related elevated certificates, which under these agreements with the city are payable from future earnings.

It is explained that the statement for September, 1922, is provisional pending final adoption of the Interborough-Manhattan plan, which provides for readjustment of fixed charges reducing Manhattan dividend rental, omitting temporarily sinking fund payment on Interborough first and refunding 5 per cent bonds and refunding existing 8 per cent obligations by issue of $34,330,000 of new 7 per cent ten-year notes. The deficit after charges for the three months ended Sept. 30, 1922, based on existing fixed charges, amounted $1,775,418.

In September both subway and elevated divisions of the Interborough system reported deficits after charges; the former shows a deficit of $46,962, compared with a surplus in September, 1921, of $10,195, the latter a deficit of $419,797, against a deficit last year of $408,398.

## Holds One-Man Car Has Place

A systematic effort has been made by the Boston (Mass.) Elevated Railway to determine the precise place of the one-man car in the transportation system of Boston. It has held hearings in various sections to sound public opinion on the subject, trying to learn first hand what the patrons of the road think of the car. In conformity with the conclusions reached the company will recast its service and withdraw the one-man car from certain sections, and perhaps extend it to others.

The public trustees of the road held a meeting on Nov. 28 and passed the following vote on the subject:

Voted: That the trustees of the Boston Elevated believe that the one-man car has a proper place upon the railway system which is under their management as the elevated, subway or tunnel train, the two-man car and the electric or motor omnibus each has its proper place, for the reason that rightly used the one-man car is a factor that makes possible more frequent service and extension of the 5-cent fare as well as economy in operation.

Further voted, That the one-man car is not suited for operation under conditions of heavy traffic for the reason that under such conditions its use provokes and often seriously annoys passengers in boarding the car, and occasions delays which result in interruptions of schedule that interfere with efficient service; that therefore all changes necessary to bring the use of one-man cars under the rules above stated be promptly made.

## No Prospects for Ending Strike

Efforts to end the strike of linemen and substation operators of the Cincinnati (Ohio) Traction Company have proved futile. H. H. Broach, International vice-president of the Brotherhood of Electrical Workers, who has been negotiating for the men, has left Cincinnati, apparently abandoning his efforts. The traction company has enough men at work to keep the lines in repair, according to Walter Draper, vice-president of the company. He said that the company was stringing no new lines at the present time, but that this work would be renewed Dec. 1 by men from another city.

The men went on a strike two weeks ago, when the traction company refused their request for a 25 per cent increase in salary.

## Fifteen Injured in Interurban Accident

A Flint limited interurban car of the Detroit (Mich.) United Railway was hurled from its tracks when it hit an open switch at the Fair Grounds loop on Woodward Avenue, Detroit, on Friday evening, Nov. 17, and turned over, injuring fifteen of the seventy-five passengers aboard. The car covered a distance of about fifty feet after leaving the track, crossing the sidewalk and breaking a heavy pole supporting overhead telephone wiring before coming to a stop in the soft dirt in a vacant space beside the fair grounds.

Neither the motorman nor the conductor of the car was injured.

According to statements made shortly after the accident occurred, a city car using the same track had taken the electrically operated switch and entered the Fair Grounds loop shortly before the approach of the interurban. The switch remained open. It was reported that the switch would not close upon the approach of a car traveling faster than about twelve miles an hour. While the motorman stated that his car was going at the rate of about twenty or twenty-five miles an hour, some of the passengers were of the opinion that the speed was much greater.

When the trucks of the heavy car hit the loop the body of the car was hurled clear of the trucks. The fact that the accident did not prove more serious is attributed to the heavy construction of the car, which saved it from being smashed by the force with which it hit after leaving the open switch.

Patrolmen from a nearby booth notified the nearest station and fifteen patrolmen in the police flier arrived to take charge of the rescue work. A number of motorists also aided. The prompt work averted a panic.

After making their statements both members of the car crew were released.

## Replies to One-Man Car Complaint

In reply to a letter by Paul A. Franke, secretary of the Twenty-Eighth Taxpayers' Protective Association, Brooklyn, N. Y., Lincoln C. Andrews, chief executive officer of the New York Transit Commission, upholds the uses of the one-man car. Mr. Franke calls the one-man cars "murder cars" and refers to an accident on Oct. 28 where a pedestrian was run over by one of these cars. In Mr. Andrews' reply it was made plain that the accident in question could not be attributed to carelessness on the part of the driver and that the records of the various companies throughout the country show that there are less street accidents from the use of one-man cars than there were when the same lines were operated by two-men cars. Further, that "the use of one-man car operation is being accepted and more and more broadly used throughout the country where traffic conditions and car equipment justify it."

In conclusion Mr. Andrews requests Mr. Franke to inspect the operation of a new type of one-man car equipment which has just been put into service on the Park Avenue line in Brooklyn.

## Conferences on Wage Agreement

Officials of the Worcester Consolidated and the Springfield Street Railway Company are in conference with the officials of the Carmen's Union over the establishment of a wage agreement for 1923. They have held several conferences and have failed to reach an agreement.

Consequently the case will be submitted to a special board of arbitration. Bentley W. Warren will act for the companies and James H. Vahey for the unions, and if these men can come to an early agreement on a third arbitrator the case will come to a hearing within a week or two.

The men have asked for an increase in the maximum wages from 58 to 68 cents an hour, and the company has asked them to accept a reduction to 50 cents as the maximum. A reduction of 14 per cent is proposed for the trackmen and shop men.

# News Notes

**An Example of Spirit.**—The Dallas (Tex.) Railway and its employees have contributed more than $2,000 for the support of Dallas charities during 1923.

**Employees Perform.**—The Colonial Minstrels, the members of which are Public Service Railway employees, recently conducted a successful two-night performance at Camden, N. J. William G. Scheina, assistant superintendent of the southern division of the railway, was the interlocutor.

**Wage Agreement Continued.** — The employees of the United Railways & Electric Company, Baltimore, Md., have accepted the offer of President C. D. Emmons to continue the present wage agreement. The contract which would have expired on Jan. 1, 1923, provides a scale of from 45 to 50 cents an hour for motormen and conductors.

**Wages to Remain the Same.**—Samuel W. McCall, neutral arbitrator in the Berkshire (Mass.) Street Railway's wage dispute, on Nov. 27, returned a report to the effect that wages shall remain the same for the year beginning June 1, 1922, as for the year preceding. Blue uniform men receive a maximum of 53 cents an hour. The 400 employees sought increases averaging about 25 per cent, while the company desired to reduce the pay by about 10 per cent.

**Welfare Work Continues.**—The director of the welfare department of the Interborough Rapid Transit Company, New York, N. Y., has submitted the annual report to the president and general manager for the year ended June 30, 1922. According to figures shown sixty-five men were listed on the pension payroll as of July 1, 1922. For the fiscal year ended June 30, 1922, the voluntary relief department paid out a total of $108,391, including sickness and accident benefits. The total amount of loans outstanding on June 30, 1922, amounted to $8,226.

**Power Development Article Reprinted.**—H. M. Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, Atlanta, Ga., wrote an article in the Nov. 2 issue of the *Manufacturers' Record* entitled "Power Development of Georgia Railway & Power Company on Tallulah and Chattooga Rivers." The article has been reprinted in pamphlet form, with illustrations showing a remarkable series of aeroplane views of the properties and power development of the company in the counties of Habersham and Rabun, Georgia.

**Protests Street Widening Plan.**—An argument is on in Louisville, Ky., between merchants and the city administration over a proposed plan to widen two or three blocks of Fourth Avenue, the busiest street in the city, by cutting 15 ft. from the east side, with owners on the west side paying for the necessary changes. The change would result in resetting all car tracks, and perhaps result in less congestion in the widened area, but greater congestion where the street again narrowed. It would also cost the Louisville Railway a good deal of money in rebuilding its tracks.

**Hydro Commission Favored.**—By a vote of seven to five the City Council of Windsor, Ont., expressed its approval of the operation of the Windsor Municipal Railway by Ontario Hydro-Electric Commission. In other words the move of the transportation committee to call into conference delegates from other municipalities interested in the lines met with defeat. Alderman A. W. Jackson, who supported the recommendation of the committee, asserted that municipalities by their delegates should decide whether it was advisable to take advantage of the new municipal street act, and appoint a local commission to operate the railway system.

**Seeks Twenty-five-Year Franchise.**—The management of the Waterloo-Wellington Railway, an electric line operating between Kitchener and Bridgeport, has applied to the city for a twenty-five-year franchise. The present franchise ran out a year ago, and a year's extension was granted. This will be up in February. If the city will not grant the franchise the railway company was asked that the city of Kitchener purchase the line. The railway was offered to the city some years ago, and the City Council turned it down. The question has been turned over to the railway committee of the City Council, which will have a conference with the Light Commission.

# Financial and Corporate

## Valuation at $70,000,000

### Brief Filed Fixes United Railways Valuation $20,000,000 Higher than Commission's Figure

Attorneys for the receiver of the United Railways of St. Louis have filed with the Missouri Public Service Commission at Jefferson City a brief declaring that the valuation of the company's property for rate-making purposes should be fixed at $70,000,000. This is $20,000,000 higher than the tentative valuation put on the property by the Public Service Commission in September, 1919.

The brief was filed by Charles W. Bates and T. E. Francis, attorneys for Rolla Wells, receiver of the United Railways, and for F. W. Doolittle and William H. Bennett, consulting engineers for the receiver.

It is stated by the brief:

> While under some theories of valuation announced by the courts and adopted by evaluating bodies as the yardstick by which to measure the present fair value of the property of a public utility for a rate base we should be justified in asking for a higher figure, we have concluded, after studying the evidence, that the above amount ($70,000,000) constituted the fair value of the property devoted to public use on Jan. 1, 1919.

After stating that additions to the property since Jan. 1, 1919, are matters for consideration by the technical staff of the commission, the brief says that the property involved included the United Railways and its subsidiaries, the Missouri Electric Railroad and the Florissant Construction, Real Estate and Investment Company, all referred to as "the company."

The brief outlined some statistical facts with respect to the United Railways. The company serves a population of about 1,000,000 and an area of approximately 240 square miles. It employs in the furnishing of transit service a total of 460 miles of track and overhead distribution system. It operates 1,449 passenger cars, 225 work service cars and three electric locomotives.

| | |
|---|---|
| Purchase price paid to syndicates for shares of capital stock of underlying companies, measured by the market value of the securities of the United Railways given in payment | $32,811,105 |
| Purchase of scattered stock of underlying companies | 1,316,031 |
| Bonds of underlying companies | 13,980,100 |
| New current assets of underlying companies assumed (a credit) | 708,498 |
| Purchase of suburban stock 1906 | 3,200,000 |
| Suburban bonds assumed | 7,500,000 |
| Suburban current liabilities assumed | 447,932 |
| Construction 1890-1919 | 16,895,274 |
| Working capital | 2,253,876 |
| Total | $76,895,820 |
| To this is added $736,608 as the value of the Missouri Electric Company, making a grand total "historical cash investment" of | $77,632,428 |

During the last calendar year for which complete figures are available (1921) the company, according to the brief, carried 282,447,190 revenue and 150,562,354 transfer passengers, a total of 433,009,544. In performing this service the receiver operated 44,301,764 car-miles and 4,789,450 car-hours, employing 3,508 trainmen and 2,118 other employees, including officers.

The brief includes a table to show what is termed "the historical cash investment" of the United Railways and the Missouri Electric Company as of Jan. 1, 1919. The table for the United Railways is given herewith.

By "historical cash investment" is meant the aggregate purchase price paid by the United Railways for the property, together with the amount of working capital employed in operating the properties and the cost of constructing all extensions, additions and permanent improvements.

## Recently Sold Property to Be Improved

The property of the Maumee Valley Railways & Light Company, sold at sheriff's sale to Marion Miller, president of the Home Savings Bank, Toledo, and chairman of the bondholders' protective committee, on Nov. 15, will be turned over to the Maumee Valley Railway. A reorganization and extensive improvements will be made with $100,000 of new capital.

The property sold for $50,000. It has been operating at a loss for the last three years.

Following recommendations of engineers who made a recent survey of the property one-man safety cars of the light interurban type will be put into service rather than gasoline-driven cars. Both had been under consideration. Seven of the new cars will be purchased. Heretofore the company has rented most of its equipment from the Community Traction Company.

The new company will seek twenty-year franchises in Maumee and Perrysburg, the twin villages up the river from Toledo. In return the railroad will promise twelve-minute headway service, the new equipment, and possibly reduction in fares. The general plan is more or less contingent upon the granting of the franchises.

The Maumee Valley Railway will have an authorized bond issue of $500,000, of which only $350,000 will be outstanding. There are $300,000 of 5 per cent underlying bonds of the old company represented by the bondholders' protective committee.

In addition the new company will issue $100,000 of preferred stock and $400,000 worth of common stock.

LeRoy Eastman, of the law firm of Smith, Baker, Effler, Allen & Eastman, is attorney for the bondholders' committee.

## Electric Line Sold—Improvements and Extensions Contemplated

John B. Weekley of Birmingham has purchased the electric railway system of the Alabama Traction Company, which operates electric cars in Decatur and Albany, Ala. The consideration was not made public.

The Alabama Traction Company has been in the hands of a receiver for some time, hence the purchase of the electric property by Mr. Weekley depends upon the confirmation of the sale by the United States Court. A representative of Mr. Weekley said that the matter of confirmation of sale would come before the United States Court on Dec. 15, and that he was confident the sale would be confirmed at that time.

Mr. Weekley's representative stated that it was the intention of Mr. Weekley to organize a stock company, which would take over eventually the electric lines of Decatur and Albany. It is stated from Decatur that Mr. Weekley is contemplating improving and extending the lines, just as soon as the confirmation of the sale by the United States Court is completed and all necessary details are arranged.

Mr. Weekley was before the Decatur City Council recently and asked for a thirty-year franchise over the streets of that city for the operation of the electric lines. This franchise has been granted. A similar franchise was asked for at the hands of the Albany City Council. The Albany franchise is now in the hands of a committee, and reports from Albany say the franchise will be granted. The present franchise of the Alabama Traction Company has but a short time to run, it is stated.

The stock of the Alabama Traction Company is owned largely by Eastern interests, which have controlled the company for a number of years. The Alabama Traction Company is the oldest street car company in North Alabama. The company had its beginning in 1887 when Sam Wharton built about 2 miles of track and operated mule cars over these tracks. About the year 1906 Mr. Wharton sold out to a stock company, which converted the proposition into an electric street car system, connecting the cities of Decatur and Albany. The company went into bankruptcy about five years ago and since that time has been operated by a receiver.

Today the Alabama Traction Company's trackage is about 10 miles, the lines reaching the principal sections of Decatur and Albany. They have a number of modern street cars and a large brick carhouse and offices.

It is understood from Decatur that people in several of the outlying suburban sections of Decatur and Albany are asking for street car lines to be built to those sections. It is believed that Mr. Weekley and his company, when fully organized and ready for business, will extend the lines for several miles, reaching out to the principal suburbs of Decatur and Albany.

## Improvement Seen in Brooklyn Report

An improved condition is noted in the four months' operation of the Brooklyn (N. Y.) Rapid Transit Company ended Oct. 31, 1922. Compared with a net income of $724,097 for the four months ended Oct. 31, 1921, the net for the same period this year stood at $1,032,-114. Total operating revenues were $12,140,178 against $11,501,296 a year ago. Expenses this year were $7,982,-153 against $7,618,286 for the same four months in 1921. The improvement was credited to strict economy.

## Reorganization Plan Up for Approval

Approval of the reorganization of the Syracuse & Suburban Railroad, Syracuse, N. Y., as the Syracuse & Eastern Railroad has been asked of the Public Service Commission. Edward Powell, representing the bondholders who bought the road under foreclosure sale, made the application. The new concern asks authorization to issue $300,000 in common stock and $512,000 in bonds, which are to be delivered to the reorganization committee for payment of the railroad property.

The new company will not take over a spur line tapping Montclair and did not include it in its petition to the commission. The abandonment of the spur line has brought a wide protest.

## October Operations in Toledo Show Surplus

October operations of the Community Traction Company, Toledo, Ohio, show that a surplus of $6,991 was added to the stabilizing fund, which now shows a balance of $174,313, according to the report made by Commissioner W. E. Cann to the Board of Control at its mid-month meeting.

The city ownership or sinking fund now amounts to $362,316, of which $255,000 is represented by 6 per cent bonds of the company which have been purchased.

During October the gross earnings amounted to $311,117, representing an increase of $6,746 over the same month last year.

Operating expenses also showed an increase of $10,620, due in large part to credit for overpayment on power returned last year. Increased maintenance and higher taxes produced a net income of $49,925, being approximately $10,000 less than for the month of October last year.

During the month there were operated 651,096 car-miles, as compared with 625,758 for October, 1921. Revenue passengers totaled 5,032,026, an increase of 285,326 over the same month last year. The increase in riding is due principally to elimination of direct bus competition and the improvement in industry.

Commissioner Cann gave the Board of Control a complete history of his dealings with the Council on the one-man car subject and outlined his belief that changes in equipment and trial of the weekly pass at $1 would show remarkable results in favor of the new one-man cars.

He said increased charges for maintenance would be necessary soon.

## 1921 Income Amounts to $230,531

The board of directors of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., recently submitted to the shareholders a report on the operations for the year ended Dec. 31, 1921. Railway operating revenues for 1921 were $2,512,540, against $2,092,334 for 1920. Operating expenses advanced from $1,534,206 in 1920 to $1,810,455 for the year ended Dec. 31, 1921. The net income in 1921 was $230,531.

This figure is considered low when compared with former years. In 1917 the net income was $462,651; 1918, $494,536; 1919, $319,400; 1920, $287,-006. The 1921 figures include operation of the Annapolis Short Line.

## Surplus of More Than $1,010,347 for Nine Months

For the first nine months of 1922 the Virginia Railway & Power Company, Richmond, Va., realized a surplus of $1,010,347 after deducting all items except depreciation and reserve. The gross earnings for the nine months' period in 1922 were $6,830,822, which represented a decrease of $778,233 over the same period in 1921. However, there was a decrease in expenses in 1922 amounting to $1,099,705. This decrease helped materially the net earnings of $2,583,487, an increase of $321,-473 over the first nine months' net earnings of 1921. The company's statement shows a much improved financial condition.

## Sioux City Railway and Light Properties Merge

The Sioux City Service Company and the Sioux City Gas & Electric Company recently came under the same control when a merger was completed on Nov. 2. This settlement places both companies under the control of the United Gas & Improvement Company, which has had an interest in the gas and light company at Sioux City for some time. The merger was in accordance with an ordinance passed by the City Council and approved by the people of Sioux City on Aug. 28. The property of the Service Company, which operates the railways in Sioux City and furnishes part of the power and lighting service, is valued at approximately $4,000,000.

H. L. Kirk, formerly general manager of the Service Company, has been elected president to replace R. J. Dunham, who has resigned. W. J. Bertke, formerly general superintendent of the Gas & Electric Company, has been elected vice-president and general manager of the Service Company. Mr. Bertke will hereafter be in charge of the operation of the street railway system in addition to the gas and electric properties.

The merger will mean little or no change in the railway service; however, ambitious plans have been laid for enlarging the gas and electric service through the installation of additional mains and transmission lines. The merger has also made possible the consolidation of the two power and lighting services so that they can now be operated as a unit.

## Improvement in 1922 Operation Noted

The annual report of the United Light & Railways Company, Grand Rapids, Mich., for the calendar year 1921 contains a comparative statement of operation for the twelve months ended Sept. 30, 1922, compared with the twelve months ended Dec. 31, 1921. This statement shows the progress the company made during the first nine months of 1922. The gross earnings for the year ended Sept. 30, 1922, were $11,467,995, an increase of $93,179 over the calendar year ended Dec. 31, 1921. The operating expenses decreased from $8,002,742 to $7,886,079 for the twelve months ended Sept. 30, 1922. The balance after all dividend charges for the 1922 period was $982,899 against $833,201 for the year ended Dec. 31, 1921.

# Financial News Notes

**Authorizes Purchase.**—The City Council of Toronto, Ont., has passed a by-law authorizing the purchase of the Toronto Suburban Railway, including the line to Guelph.

**Authorizes Bond Issue.**—The Missouri Public Service Commission has given authority to the Hannibal Railway & Electric Company, Hannibal, Mo., to issue $150,000 first mortgage 7 per cent bonds, due Nov. 1, 1932.

**Bonds Offered.**—Halsey, Stuart & Company, Philadelphia, Pa., are offering $3,500,000 of the Sioux City Gas & Electric Company's first mortgage 6 per cent gold bonds, series "A." The bonds, in denominations of $1,000, $500 and $100, are offered at 99½ and interest yielding about 6.05 per cent. The due date is Sept. 1, 1947.

**Balance Shows Increase.**—For the twelve months ended Oct. 31, 1922, the Republic Railway & Light Company, Youngstown, Ohio, reports gross earnings of $7,793,409, against $7,568,619 for the twelve months ended Oct. 31, 1921. Operating expenses and taxes in the 1922 period decreased $110,639. The balance for depreciation, dividends and surplus was $551,843 in 1922, an increase of $269,079 over the twelve-month period ended Oct. 31, 1921.

# Traffic and Transportation

## Council Rejects Proposal

### Seattle Body Tables Mayor's Request for Lower Fare—Other Developments in Discussion

After extended discussion and debate by Mayor E. J. Brown and members of the City Council of Seattle on the advisability of bringing up for decision at this time the matter of a 5-cent fare on the lines of the Seattle (Wash.) Municipal Railway, the City Council, as a whole, voted to table the Mayor's most recent proposal submitted to the Council in letter form. The Mayor's letter recommended the adoption of a 5-cent carfare, effective Feb. 1, with the issuance of transfers only for tokens to be sold at the rate of four for 25 cents or 6¼ cents each. Mayor Brown had first intended that the matter as to whether the deficit caused by a 5-cent fare should be made up by taxation be submitted to the voters at the spring election, but decided later that this move would be inadvisable.

The City Council, after discussion of the Mayor's recommendation, tabled the letter, on the ground that it would be most impolitic to talk about reductions in carfare before the United States Circuit Court of Appeals renders a decision in the street car litigation now before it. Decision in the so-called "specific performance suit" brought by the Stone & Webster interests against the city in the street car litigation is expected daily. The case was heard two months ago by three judges of the Circuit Court of Appeals, sitting in Seattle, arguments being presented by the legal representatives of the Puget Sound Power & Light Company and the city of Seattle on Sept. 19.

In this case the power company asked for a decree directing that in event the revenues of the street railway are sufficient to pay the interest and principal on the $15,000,000 bonds given for the railway system, but not sufficient to pay all cost of maintenance and operation, the city should make up the deficit in cost of operation and maintenance out of the general tax fund or any other available fund.

Judge E. E. Cushman last spring before the State Supreme Court, in the "fourteen taxpayers" suit, made a decision that under no circumstances could the city's general fund be invaded for the support of the Municipal Railway. Following the State Supreme Court's decision, the city appealed the decision of Federal Judge Cushman in the specific performance suit to the United States Circuit Court of Appeals, asking that the decree entered by Judge Cushman be annulled and set aside. The Circuit Court of Appeals decision is the one expected daily.

There were other developments in the carfare discussion. Superintendent D. W. Henderson said that the railway could return to a 6¼-cent fare, that is, four tokens for 25 cents, by March 1, probably without any deficit. The Mayor rejected, on advice of Councilman Erickson and Superintendent Henderson, the idea of the weekly pass system. A discussion was held on the plan of adopting the pay-as-you-leave system of fare collection for outbound cars and pay-as-you-enter system for inbound cars.

#### MAYOR'S LETTER QUOTED

In his letter to the City Council, Mayor Brown said:

> The obligations of our transportation system were made under the present carfare charge, and all obligations due and payable will be met Feb. 1, 1923, and I see no reason why a reduction in carfare cannot be made to take effect on that date. Many plans have been suggested and I have given careful consideration to each and every one of them, carefully considering at all times that our transportation system should be popularized and brought into public favor by lowering the rate of charges on carriding to the public and increasing the gross revenue.
>
> The pass system has been investigated. But the pass system would not give relief in lower carfare to the citizens of Seattle who are compelled to use the street cars, but would only afford cheaper transportation to those who are constantly moving about the city. It would give that class transportation far below cost.
>
> The people of our city are accustomed to using a transfer. If we were to abandon the transfer and sell car ride tokens at 4 cents, no one would pay 5 cents for a ride, when they could buy tokens for 4 cents. This would endanger the revenue and would compel transfer users to pay two fares, and would not be equitable.
>
> I believe that a 5-cent carfare for all straight rides will secure for our transportation system all the short rides that 4-cent tokens would do. I believe that our citizens are willing to pay 6¼ cents, or 25 cents for four tokens, in all cases where transfers are to be used.
>
> I do not believe that our homeowners should at any time be asked to make up any deficit that may arise from the operation of our transportation system.

## Permits Elimination of Low Ticket Rate

The City Council of Meridian, Miss., recently granted the privilege to the Meridian Light & Railway Company of eliminating the present rate of 5 and 6¼ cents for tickets. This ticket rate will be replaced by a 7-cent ticket charge, to be sold in strips of five for 35 cents, and will have a universal transfer privilege. The present 10-cent cash fare and school ticket rate of 3⅛ cents will remain in force.

H. G. Bonner, general manager of the Meridian Light & Railway Company, sent a letter to the City Council requesting such changes because of the company's insufficient income. He said that the experiment with the 5-cent fare had proved a failure after a trial period of nine months. He claimed further that the results showed that the 5-cent ticket fare had increased riding to a very limited extent, so that the net result had been to decrease railway income about $113 a day as compared with the income for the same nine months of last year. In spite of materially reduced expenses the railway was now failing to make its operating and maintenance expenses by over $100 a day.

## Fight on Jitneys Renewed

### Company at Albany, N. Y., Determined Unfair Competition Growing Out of Strike Shall Stop

An aftermath of the United Traction Company's trolley strike in Albany and Troy a year ago is the continued operation of jitneys between Albany and Troy and Troy and Averill Park. Recently Justice Ellis J. Staley in the Supreme Court imposed a fine of $250 or thirty days in the Albany county jail on six operators of jitneys who have been operating in the face of an injunction granted during the strike by Justice Harold J. Hinman. Only two of the six adjudged guilty were present in the court at the time they were declared in contempt.

J. Stanley Carter, representing the United Traction Company, made proof of the service of charges of violations on sixteen men. Those not adjudged guilty were represented by attorneys, who asked for adjournments to make a defense. They were given until Nov. 29 to present affidavits disproving the charges, and at this time if Justice Staley is in doubt as to their guilt on the affidavits he will require the production of the witnesses on both sides at a hearing on Dec. 2 in special term.

#### OPPOSED TO ADJOURNMENT

Mr. Carter opposed any adjournment of the proceedings and said the injunction order was well known to the defendants operating jitneys illegally and that all the judges of the district have imposed fines on those who have been adjudged guilty for more than a year. He said they have been making a joke of the order of the court and persist in violating the law and the injunction.

The United Traction Company included many other alleged jitney operators in the show cause order, but they have not been served. Efforts will be made, Mr. Carter said, to bring these additional defendants into court to put an end to jitneying.

Warrants for the arrest and commitment of the six men adjudged guilty of contempt of court were placed in the hands of Sheriff John J. Allen, of Albany County, who will either collect the fines or take them to jail to serve their sentences.

The operation of jitneys between Albany and Troy, due to the fact that the boat line did not run ferries during the past summer on account of the coal situation, has been a particularly lucrative venture and the jitney operators have been willing to take the chance. While the fare on the jitneys is higher than that of the traction company many persons have preferred that means of transportation because of its celerity. The traction company is now determined to stamp out the last remaining signs of competition in this line.

## Law Does Not Require Cut in Capital Traction Fare

In reply to an application of the Federation of Citizens' Associations seeking a reduction in fare on the lines of the Capital Traction Company, Washington, D. C., Corporation Counsel Stephens recently advised the Public Utilities Commission that the law did not require a cut in the fare on the Capital Traction cars on the ground that that company was earning more money than the Washington Railway & Electric Company. It was the position of the federation that the commission was acting without authority in maintaining the same fare for both companies when the rate gave the Capital Traction a larger return. It is believed that the commission will reject the application.

Arguing that the commission had no power under the law to fix a rate of return upon valuation which is greater for one company than for another, Mr. Stephens went on to say that the decisions of public utility commissions and courts throughout the country had established the principle that a public utility corporation had the right to earn a fair return upon the investment, which would have to be decided by the Public Utilities Commission having supervision of the subject. "Certainly," he said, "it cannot be conclusively said, as argued on behalf of the citizens' associations, that it is discrimination, within the meaning of the law, to allow one rate of return for one company and a larger rate for another, because the law is entirely silent upon this subject.

Concluding Mr. Stephens said in part:

> I do not think the argument could be maintained before any judicial tribunal that the commission is guilty of a discrimination, in the legal sense, in fixing the same rate of fare for both street railroad systems of the District of Columbia, especially so in view of the fact that it is generally recognized by those cognizant with the subject that to do so would seriously cripple, if not permanently wreck, one of the great transportation systems in the city.

## Pass Plan Extended—Mayor Prefers Five-Cent Fare

The Tacoma Railway & Power Company has received notice of an extension of the pass system for ninety days, the initial trial period of the system expiring Nov. 26. During the trial period the company has built up its pass patronage from 7,000 to 11,000 a week, and company officials, including Manager Richard T. Sullivan, consider the system a success. The renewal of the trial period will run to Feb. 25, 1923, at which time the company hopes the system will have proved itself a success to the point of warranting its permanent adoption. Figures given out by the company show that the system has increased traffic during the non-peak hours to an average of 4½ cents per ride.

Mayor A. V. Fawcett, who has made a vigorous fight for a 5-cent fare for Tacoma residents and who started a bus system on routes where travel was heaviest in an effort to compel the traction company to grant a 5-cent fare, states that he would like to see the pass system made permanent, but that he also wanted a straight 5-cent fare for the workingman. Discussing the question, Mayor Fawcett said that the present system economically was beneficial to about half the residents of Tacoma as compared with previous cost conditions. He believed that the pass encouraged people to go down town more often and afforded more opportunity for spending money. He said he did not object to the pass plan, but believed the solution of the fare problem lay in the 5-cent rate.

## Refuses Ordinance for Bus Operation

The City Council of Richmond, Ind., at a recent meeting, refused to consider an ordinance on third reading which would have granted a franchise to a company to operate passenger buses in the streets of that city. The ordinance was postponed indefinitely. The proposed bus line was to operate in competition with the car lines of the Terre Haute, Indianapolis & Eastern Traction Company. The Council was disposed to favor the bus lines when the ordinance was first introduced some weeks ago, but since that time there has been some criticism of the ordinance. The traction company has indicated its intention of improving city service where a survey indicates improvement is needed. New cars are to be put on some lines.

## Pasadena Has "Weekly Pass"

Effective Nov. 27, the Pacific Electric Railway will establish a "weekly pass" plan on its local lines in Pasadena, Calif. This will provide passengers with a pass good for an unlimited number of local trips at a cost of $1 weekly. The pass is transferable; the only limitation is that the pass is honored for only one person on any one trip of a car.

The passes will be sold at local ticket offices of the company and on local cars beginning on Monday of each week and will be good for passage until midnight the following Sunday. They will be accepted on interurban trains for transportation within local zone fare limits. The company introduced the weekly pass plan for the first time on its local lines in September, 1922, in Riverside and Pomona, and Pasadena, the third point, is decided upon in a continuation of the plan to test the acceptability of the weekly pass to the patrons.

**Another City Will Try "Pass"**—It was recently announced by an official of the Interstate Public Service Company that the weekly pass plan would be adopted on the lines in New Albany, Ind. It will be the regular $1 transferable pass good for one week, although only one person may ride on it at a time. The date for starting the new plan has not been announced, but it is probable that it will be Dec. 3.

## Rejects Application

### Commission Disapproves Extension of Washington Bus Company's Lines—Railway Service Adequate

The Public Utilities Commission of the District of Columbia has declined to approve the application of the Washington Rapid Transit Company for an extension of its service. In refusing the petition the commission stated that earlier approval for the establishment of bus lines on a number of routes now being served had been given because at that time the street car lines were seemingly unable during the rush hours to provide adequate and convenient carrying capacity for the public. The number of car riders were then greater than at present, however, and the conditions that warranted the comparatively large invasions of the regions already served by the railway no longer present themselves.

If the Public Utilities Commission were now to grant further bus extensions of like character, while promoting the convenience of relatively few, they would tend to damage the interests of greater numbers of the people. The commission spoke further of the high investment required by the railway company in installing the underground type of construction and the fact that they are required to pay a tax of 4 per cent on their gross receipts, pave a large portion of the streets and pay the salaries of the street crossing policemen, all of which must be earned over and above the so-called fair return out of the receipts of the car riders.

The Public Utilities Commission said that certain diagonal streets not occupied by car lines lend themselves to a more direct and more rapid transportation than can be had on the railway lines and that bus lines had been permitted for that reason. Such bus lines, however, have invariably taken from the car companies the cream of their traffic—the short-haul rider—and this notwithstanding the fact that bus lines pay into the public treasury no portion of their gross receipts, no paving tax and nothing for street crossing policemen.

In opinion of the commission there is a legitimate field for bus service, but this does not lie in the multiplication of lines or vehicles reaching the heart of the city. It lies rather in providing service in extension of the street car lines into territory so thinly settled as not to justify the large investment necessary for street railway service.

The bus lines should be feeders. They should create business and not rob the street railways of the just reward due to their heavy investment for the public benefit. The commission also stated that such public service as was justified in a city should be owned and operated by the street railway companies and co-ordinated so that transfer privileges and other desirable joint relations would result.

# Personal Mention

## J. R. Ong Consultant

**Mr. Ong Has Resigned from Atlanta Company to Take Up Independent Work**

Another proof of scientific specialization in the field of mass transport is the creation of the job of transportation engineer, the man who co-ordinates the efforts of the mechanical department in providing the transportation equipment and of the operating department in handling that equipment to best advantage. It involves the analysis of operating methods to the end that good service may be rendered economically. One of the earliest workers in this field has been J. R. Ong, who after varied experience on both large and small properties and in both the operating and regulating fields has just hung out his shingle as consulting transportation engineer. He will make his headquarters at Piqua, Ohio, because of its central location.

J. R. ONG

Mr. Ong in taking up independent work resigns as transportation engineer of the Georgia Railway & Power Company, Atlanta, Ga. While connected with the Atlanta property he has done much to co-ordinate schedules with traffic and has been instrumental in planning methods to improve "on-time" operation; but even more to study the general trend of the city's growth so that proper provision would be made in the future for maintaining and bettering the company's standards of service. In this he has had the encouragement of F. L. Butler, general operating manager, who induced Mr. Ong to come to Atlanta after previous association with him in his work with the Winnipeg (Canada) Electric Railway.

A review of the positions which Mr. Ong has held indicates that he is well equipped for his new work. In 1909 he was graduated from Purdue University in electrical engineering, having previously been with the Indianapolis & Cincinnati Traction Company and the Chicago, Lake Shore & South Bend Railway in the car shops during the stressful period of construction and inaugural operation. From Purdue Mr. Ong became an apprentice with the Westinghouse Electric & Manufacturing Company at its main plant in East Pittsburgh and was later transferred to the company's Philadelphia sales office. In 1911 he became superintendent of substations on the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.

With the experience obtained in the manufacturing, commercial, construction and operating side of electric transportation, Mr. Ong has completed the circle by work with the regulating bodies. From 1912 to 1918 he was a member of the joint engineering staff serving the Railroad Commission of Wisconsin and the Wisconsin Tax Commission. In this position he not only made investigations of street and interurban railway service matters but was also engaged in the valuation of these properties. Later he resigned to become traffic engineer for the board of control of the Kansas City Railways, following which he went to Winnipeg, where he made a fine record for economical operation, at the same time maintaining a high standard of service.

## Municipal Railway Advocate Will Go to Washington

James Couzens, Mayor of Detroit, has been appointed by Gov. Alexander J. Groesbeck as United States Senator from Michigan. He will fill the unexpired term of former Senator T. H. Newberry, resigned. The appointment has been accepted.

Mayor Couzens has long been a prominent figure in Detroit. In 1919 his proposition to purchase the Detroit United Railway lines was defeated. Undaunted, he obtained permission from the voters to build a municipal system. Later, he arranged for the purchase of the privately-owned system and, after the voters had approved, consolidated it with the new municipal lines. This undertaking by the city of Detroit became effective last May. Complete details of the taking over of the lines were given in the *Electric Railway Journal*, issue of May 20, 1922.

## New Director in Electrical Engineering School

Paul M. Lincoln has recently been appointed director of the school of electrical engineering in the College of Engineering, Cornell University. He succeeds in this position the late Alexander Gray. Mr. Lincoln brings to his new position a practical engineering experience of nearly thirty years with wide connections in the engineering world. He has been connected with the Short Electric Company, Cleveland; the Westinghouse Electric & Manufacturing Company, Niagara Falls Power Company and the Lincoln Electric Company, which had been organized by his older brother in 1894. For many years he has taken an active interest in the affairs of the American Institute of Electrical Engineers. In 1902 he invented the synchroscope, a device which has come into universal use where alternating-current machines are paralleled. For this invention he was awarded the John Scott Medal by the city of Philadelphia on recommendation of the Franklin Institute of that city.

## Edited from the Cars

**"Boise Valley Stotts" Has Traveled 121,680 Miles by Interurban Railroad in Quest of News**

Editing a department of a well-established daily newspaper literally from an electric railroad is unique even in these modern days, but it has been done for almost seven years by James R. Stotts, editor of the Loop Department of the Boise *Evening Capital News*, better known throughout Idaho, Oregon and Washington as "Boise Valley Stotts" because of the big part he has played the past thirteen years in the development of the Boise Valley and its agricultural, horticultural, dairying and livestock raising industries.

J. R. STOTTS

His faith in the Boise Valley since he came to it in the early part of 1910 has been of an optimistic nature and his vision of the greatness of its future has been clear, for before the Gem Irrigation district tributary to the Boise Valley was reclaimed he traveled over the great desert then comprising it and predicted its ultimate reclamation. It was on April 1, 1916, that Mr. Stotts initiated the "Interurban Department" of the evening paper of Boise, using the interurban electric railroad of the Boise Valley Traction Company in making his daily 60-mile trip around the valley, and from the date of the initiation of his department up to the present he has never had a vacation and has missed only one day from his work, that day's absence hav-

ing been due to sickness. Up to Oct. 1 of the present year Mr. Stotts had worked 2,027 days, used 121,680 miles of interurban railroad mileage and written for his department approximately 10,000 columns of news matter.

The psychology and value of "Touching Elbows with Folks" and especially those engaged in agriculture is thoroughly understood by him and it is probable that he knows and can call by name not less than 20,000 people of the different communities of the valley. He knows their environments, has studied their industries and is constantly active in every movement for the progress of those industries. One of his penchants is getting the view of the other fellow and understanding his problems. If Bill Smith and his neighbors import a pure-bred bull into the community they tell "Boise Valley Stotts" and he writes of it. If one of them has raised the standard of his hogs "Boise Valley Stotts" is advised and the incident is given publicity, or if a bumper crop has been produced he is told of it. He has a mania for statistics and he can tell you the exact annual revenue of any of the valley's industries or the exact annual shipment of any commodity and its total value.

Both of the local newspapers of Boise carry an "Interurban Loop Department" and this results in considerable free and valuable advertising for the traction company.

## Guy A. Richardson Resigns

Guy A. Richardson, vice-president in charge of operation of the Philadelphia (Pa.) Rapid Transit Company, has announced his resignation. The reason for his leaving the Mitten forces was not disclosed. It was said that Mr. Richardson had originally intended to resign on Oct. 13, but had remained to assist in the scheduling of the Frankford Elevated Market Street subway routes.

In April, 1919, Mr. Richardson came to Philadelphia as superintendent of transportation, leaving the position of general superintendent of the Puget Sound Traction, Light & Power Company. Within a year he was elected vice-president of the company, becoming one of the youngest electric railway executives in the country. On one occasion Mr. Mitten pronounced Mr. Richardson "the best transportation operating engineer in America."

R. F. Tyson, assistant to Mr. Richardson, will temporarily assume the duties of vice-president.

## A. E. Duty Dead

A. E. Duty, assistant general manager of the Cleveland (Ohio) Railway, died on Nov. 29. Mr. Duty had been with the electric transportation system in Cleveland for more than fifty years. He served from 1912 until eight months ago as general superintendent of transportation, at which time he was promoted, on the death of George L. Radcliffe, to the position of assistant general manager.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Commercial Community Co-operates

An extract from the forthcoming annual report of the Secretary of Commerce for the fiscal year 1921-1922 refers to the administrative work of the department in the matter of revising commercial statistics. It said that through the manufacturers' associations, committees were created in the principal industries, and upon their advice the work of the Bureau of the Census in this important direction had been reorganized and simplified. Further, that co-operation had also been established with various trade associations for the proper publication of current statistics bearing on production and distribution, and the monthly publication entitled "Survey of Current Business" had been started by the department and had been greatly welcomed by the business community.

## Co-operation on Specifications for Federal Purchases

The American Engineering Standards Committee has appointed a standing committee on co-operation with the Federal Specifications Board with the object in view of eliminating the differences between specifications for government purchases and the usual practice of commercial supplies. Many manufacturers of electric railway supplies furnish the government with materials, so that this co-operation promoted through this committee "will give the industry a better opportunity to participate in the development of specifications for government purchases and it will at the same time bring to the government, to a greater degree than has heretofore been possible, the talent of the 200 industrial organizations co-operating in the work of the American Engineering Standards Committee." It is expected that the net result will be national specifications recognized by the industry and government alike.

## Advice Offered on Export Problems

The National Foreign Trade Council New York, N. Y., has announced the organization of a Trade Adviser Service "to act throughout the year as a medium for the interchange of experience on foreign trade problems." According to the anouncement more than 100 leading foreign trade executives from all parts of the United States have agreed to co-operate in this work.

This service will be given without obligation to the inquirer and without remuneration to the adviser "solely with the bigger and broader point in view of assisting in the development of American foreign trade."

The general chairman of the Trade

## ELECTRIC RAILWAY MATERIAL PRICES—NOV. 28, 1922

### Metals—New York

| | |
|---|---|
| Copper, electrolytic, cents per lb | 13.625 |
| Lead, cents per lb | 7.10 |
| Nickel, cents per lb | 39.00 |
| Zinc, cents per lb | 6.975 |
| Tin, Straits, cents per lb | 36.50 |
| Aluminum, 98 to 99 per cent, cents per lb | 22.50 |
| Babbitt metal, warehouse, cents per lb.: | |
| Fair grade | 35.00 |
| Commercial | 25.00 |

### Bituminous Coal

| | |
|---|---|
| Smokeless mine run, f.o.b. vessel, Hampton Roads | $8.00 |
| Somerset mine run, Boston | 4.00 |
| Pittsburgh mine run, Pittsburgh | 2.625 |
| Franklin, Ill., screenings, Chicago | 2.50 |
| Central, Ill., screenings, Chicago | 1.675 |
| Kansas Screenings, Kansas City | 2.50 |

### Track Materials—Pittsburgh

| | |
|---|---|
| Standard Bessemer steel rails, gross ton | $40.00 |
| Standard open hearth rails, gross ton | 40.00 |
| Railroad spikes, drive, Pittsburgh base, cents per lb | 2.75 |
| Tie plates (flat type), cents per lb | 2.35 |
| Angle bars, cents per lb | 2.75 |
| Rail bolts and nuts, Pittsburgh base, cents, lb. | 4.17 |
| Steel bars, cents per lb | 2.00 |
| Ties, white oak, Chicago, 6 i n. x 8 in. x 8½ ft. | 1.40 |

### Hardware—Pittsburgh

| | |
|---|---|
| Wire nails, base per keg | 2.75 |
| Sheet iron, (28 gage), cents per lb | 3.00 |
| Sheet iron, galvanized, (28 gage), cents per lb | 4.00 |
| Galvanized barbed wire, cents per lb | 3.40 |
| Galvanized wire, ordinary, cents per lb | 2.50 |

### Waste—New York

| | |
|---|---|
| Waste, wool, cents per lb | 15.00 |
| Waste, cotton, (100 lb. bale), cents per lb.: | |
| White | 14.00 |
| Colored | 12.00 |

### Paints, Putty and Glass—New York

| | |
|---|---|
| Linseed oil, (5 bbl. lots), cents per gal | 90.00 |
| White lead, (100 lb. keg), cents per lb | 12.125 |
| Turpentine, (bbl. lots), per gal | $1.55 |
| Car window glass, (single strength), first three brackets, A quality, discount* | 84.0% |
| Car window glass, (single strength), first three brackets, B quality, discount* | 86.0% |
| Car window glass, (double strength, all sizes, A quality), discount* | 85.0% |
| Putty, 5 lb. tins, cents per lb | 5.50 |

*These prices are f.o.b. works, boxing charges extra.

### Wire—New York

| | |
|---|---|
| Copper wire base, cents per lb | 15.75 |
| Rubber-covered wire, No. 14, per 1,000 ft | 6.70 |
| Weatherproof wire base, cents per lb | 16.00 |

### Paving Materials

| | |
|---|---|
| Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd | $3.35 |
| Common, per sq.yd | 3.10 |
| Wood block paving 3½, 16 treatment, N. Y., per sq.yd | 2.39 |
| Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots | 50.00 |
| Crushed stone, ¾-in., carload lots, N. Y., per cu.yd | 1.75 |
| Cement, Chicago consumers net prices, without bags | 2.60 |
| Gravel, ¾-in., cu.yd., N. Y | 2.00 |
| Sand, cu.yd., N. Y | 1.00 |

### Old Metals—New York

| | |
|---|---|
| Heavy copper, cents per lb | 12.00 |
| Light copper, cents per lb | 9.50 |
| Heavy brass, cents per lb | 6.50 |
| Zinc, old scrap, cents per lb | 4.50 |
| Yellow brass, cents per lb (heavy) | 7.00 |
| Lead, heavy, cents per lb | 5.75 |
| Steel car axles, Chicago, net ton | $18.00 |
| Old car wheels, Chicago, gross ton | 16.50 |
| Rails (short), Chicago, gross ton | 18 75 |
| Rails (relaying), Chicago, gross ton | 33.50 |
| Machine turnings, Chicago, net ton | 9.75 |

Adviser Service is E. P. Thomas, president United States Steel Products Company; A. E. Ashburner, American Multigraph Sales Company is vice-chairman, and C. J. Warren, Remington Typewriter Company, is executive chairman.

## Automatic Substations for Baltimore

The United Railways & Electric Company is contemplating the installation of automatic substation equipment in its substations during 1923. A study of the advantages of such installation is now being made under the direction of Vice-President H. B. Flowers.

## Rolling Stock

**Maumee Valley Railway, Toledo, Ohio,** the new company formed by the acquisition of the Maumee Valley Railways & Light Company, will make extensive improvements to the system. Seven new cars will be purchased.

**United Railways, St. Louis, Mo.,** has been authorized, through Rolla Wells, receiver, by Judge Faris in the United States Court to expend $1,227,902 for fifty new cars and to meet interest on bonds and current expenses.

**New York State Railways, Syracuse, N. Y.,** suffered the loss of the Oneida carhouse by fire. The loss is in excess of $100,000. Four trolleys, two of the third-rail type, in use between Syracuse and Utica, were destroyed. These cars were each valued at $30,000. The building was totally destroyed.

## Track and Roadway

**Southern Pacific Company, San Francisco, Calif.,** has received permission from the Railroad Commission to relocate a spur track at grade across a county highway in the vicinity of Visalia, Tulare County.

**Columbus, Delaware & Marion Electric Company, Columbus, Ohio,** is making rapid progress on the new lines it is building between Worthington and North Columbus. All-steel ties are being laid in concrete and new and very heavy rail is being used. Officials say that the track will be smooth and free from defects that cause cars to sway. It is expected that the new line will be completed and ready for use before February. All of it is to be double-tracked.

## Power Houses, Shops and Buildings

**Pacific Electric Railway, Los Angeles, Calif.,** proposes to replace a manually operated motor-generator set at its substation at Strawberry Park on its Watts-Redondo line with a synchronous converter automatic 1,000-kw. set. The present 1,000-kw. motor-generator set at Strawberry Park substation is to be transferred to the Watts substation to increase the present capacity of this unit.

**Puget Sound Electric Railway, Tacoma, Wash.,** has completed plans and will start work immediately on a new interurban station to be erected at South Eighth and A Streets, to replace the present station, which will be dismantled. Building will be of mission type, with brick and stucco exterior. It will have an arcade for the entrance to cars, and a covered parking space for motor buses. Complete, it will cost approximately $20,000.

**Birmingham Railway, Light & Power Company, Birmingham, Ala.,** suffered an explosion of a gas pipe at its carhouse recently which did a considerable amount of damage to the offices on the second floor. The office furniture was badly scorched and burned, while all of the window glass was demolished. Officials of the company say there was a leak in one of the gas pipes and a number of men were looking for it when one of them struck a match and the explosion followed. No one was injured.

## Trade Notes

**Peter D. Thropp,** vice-president of the John E. Thropp's Sons Company, Trenton, N. J., died on Nov. 23. Mr. Thropp was an official of the De Laski & Thropp Circular Woven Fire Company and the Eureka Flint & Spar Company. The Thropp company specializes in the making of rubber machinery.

**Wilson Welder & Metals Company, New York, N. Y.,** is now represented exclusively in Maryland, Virginia and the District of Columbia by the Alexander Milburn Company of Baltimore. A large stock of color-tipt welding metals and plastic-arc welding machines is available at this point for distribution throughout the territory and a complete demonstration plant is in operation.

**Refractories Manufacturers' Association, Pittsburgh, Pa.,** is sending out a printed questionnaire to be used in connection with a survey which it is organizing to obtain complete information regarding the furnaces in which refractory materials are used. All consumers of refractory brick, it is stated, will derive a certain benefit from the successful prosecution of the work and co-operation with the undertaking.

**Power Specialty Company, New York, N. Y.,** builders of Foster superheaters, economizers and oil heating and cooling equipment, announces the opening of new branch offices in Detroit, Mich., in the Dime Savings Bank Building, in charge of L. Lanyi, and in Boulder, Colo., at 2324 Fourteenth Street, in charge of R. B. Nutting, who was formerly Chicago district manager.

**Roller-Smith Company, New York, N. Y.,** announces the appointment of the Electric Material Company as its agent in the state of Washington and parts of Oregon and Idaho. The Electric Material Company has recently opened an office in the Hinckley Building, Seattle, and will handle the Roller-Smith Company's lines of electrical instruments, circuit breakers and radio apparatus in that territory. The Seattle office is in charge of R. F. Robinson, who has been engaged in the electrical industry since 1905, when he was graduated from the University of Wisconsin with the degree of electrical engineer. The Electrical Material Company's main office is at 589 Howard Street, San Francisco, and it also has a branch office in the Title Insurance Building, in Los Angeles. Roller-Smith apparatus is handled by both of these offices as well as the Seattle office, which means that the Electric Material Company represents the Roller-Smith Company along the entire Pacific Coast.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.,** received during the month of October contracts for power apparatus aggregating more than $3,500,000. This shows a marked increase in the total sales of previous months and, according to the company, indicates a definite trend toward a revival of business in the electrical industry. Among the concerns from which the contracts were received are the Georgia Railway & Power Company, Union Traction Company of Indiana and the Ohio Public Service Company.

## New Advertising Literature

**Heine Boiler Company, St. Louis, Mo.,** has issued an attractive folding pamphlet called "Talk, Talk, Talk versus Coal Production." The pamphlet tells what the Heine boilers are doing all over the country in helping the industry "to carry on" during the coal strike.

**General Electric Company, Schenectady, N. Y.,** has issued Bulletin 44,018, called Metropolitan and Elevated Systems, which presents from an engineering viewpoint the principal characteristics of several great rapid transit systems. The facilities for power production, transformation, transmission and utilization are outlined briefly for each of the systems in the cities of Boston, Chicago, New York and Philadelphia.

**Combustion Engineering Corporation, New York, N. Y.,** has issued two pamphlets entitled "The Coxe Stoker" and "Service." The larger bulletin on the Coxe stoker covers particularly the performance of this stoker on Western and Mid-Western bituminous coals. A number of test reports, each accompanied by corresponding curves, are included. These tests show very remarkable results and because they are complete in every respect they will be of considerable interest to the engineering world. The "Service Bulletin" will be of value to all stoker companies. This booklet presents the stoker manufacturers' side of the question and shows why a proper charge for real stoker service would not only be fair to the recipient but would be to his advantage. It is illustrated with an interesting cartoon story.

## The little brake with the big reputation

From the very beginning—the Peacock Staffless Brake has made good on the safety car. Why? Because it was especially designed with a knowledge of the conditions which would occur.

The ordinary arbitrary formulas for braking power did not apply properly in this case. The light weight construction of the car itself, together with its large passenger carrying capacity, creates an abnormal live load ratio when the car is filled.

Peacock Staffless Brakes provide ample braking power to stop the safety car on any grade, with the heaviest passenger load it can carry. They are at least twice as powerful as the ordinary hand-brake.

Peacock Staffless Brakes are light in weight and occupy minimum platform space.

*Write for full details*

# PEACOCK STAFFLESS BRAKES

## NATIONAL BRAKE COMPANY

**890 Ellicott Square**
**Buffalo, N. Y.**

Canadian Representative: Lyman Tube & Supply Co., Ltd., Montreal, Canada

# Bankers and Engineers


# McGraw-Hill Publications
## Every one the leader in its field

**American Machinist**

Serves the men responsible for results wherever any kind of machinery is made or used. The recognized clearing house of the better ways of doing things in the machine shop, of the new ideas in machinery and of the most approved methods in shop management. $5.00 per year.

**American Machinist—European Edition**

Published in London (for 23 years) by a special staff who thoroughly understand the needs and wishes of the machinery manufacturing executives of Great Britain and the European Continent. 35 shillings per year.

**Bus Transportation**

A transportation engineering and business paper of the passenger bus industry—including automobile buses, trackless trolleys and any other self-propelled buses. It covers managerial, organization, operating and maintenance problems, complete news of the industry and details of equipment. $2.00 per year.

**Chemical and Metallurgical Engineering**

Exponent of the fundamental engineering principles on which the chemical, metallurgical and allied industries are based. The scope of its editorials and articles may be summarized as the engineering, technology and economics of those industries. $4.00 per year.

**Coal Age**

Devoted to the mining and marketing of coal. Presents new methods, new equipment, new construction, current news production statistics and market data. $3.00 per year.

**Electrical Merchandising**

The monthly magazine of the electrical trade. It gathers from the field new selling ideas and effective commercial and financial methods and disseminates these facts among those who sell, manage and finance electrical appliances, equipment, supplies or service. $2.00 per year.

**Electric Railway Journal**

The engineering and business newspaper of the electric railway industry. It thoroughly covers corporate policies, construction, managerial, operating and maintenance methods, legal and financial news, equipment and supplies and all phases of public relations. $4.00 per year.

**Electrical World**

The executives' and engineers' paper, including in its scope public policy matters and the outstanding commercial situations. It presents the latest authoritative information on the activities of the central station, the industrial electrical engineer and on the scientific, manufacturing and commercial fields of electricity. $5.00 per year.

**Electrical Review and Industrial Engineer**

Devoted to the problems of electric operation and maintenance in mills and factories, particularly from the standpoint of the man responsible for the proper inspection, operation and maintenance of electrical equipment. $2.00 per year. (*Published in Chicago.*)

**Engineering and Mining Journal-Press**

Recognized as the standard authority on metal mining, milling, refining and on the mineral industries. Reports on methods, processes and improved equipment used in the leading mines, mills and smelters. Gives authoritative summaries of market conditions and prices. $4.00 per year.

**Engineering News-Record**

Records the intimate technical details concerning notable operations, keeps its readers abreast of current engineering and construction practice, and reports promptly and accurately the civil engineering and construction news of the day. $5.00 per year.

**Ingenieria Internacional**

Presents the latest information on the current achievements, practices, equipment and apparatus of the five major branches of engineering in all parts of the world, with special reference to their application and use in the Spanish-reading countries. $5.00 per year. (*Printed in Spanish.*)

**Journal of Electricity and Western Industry**

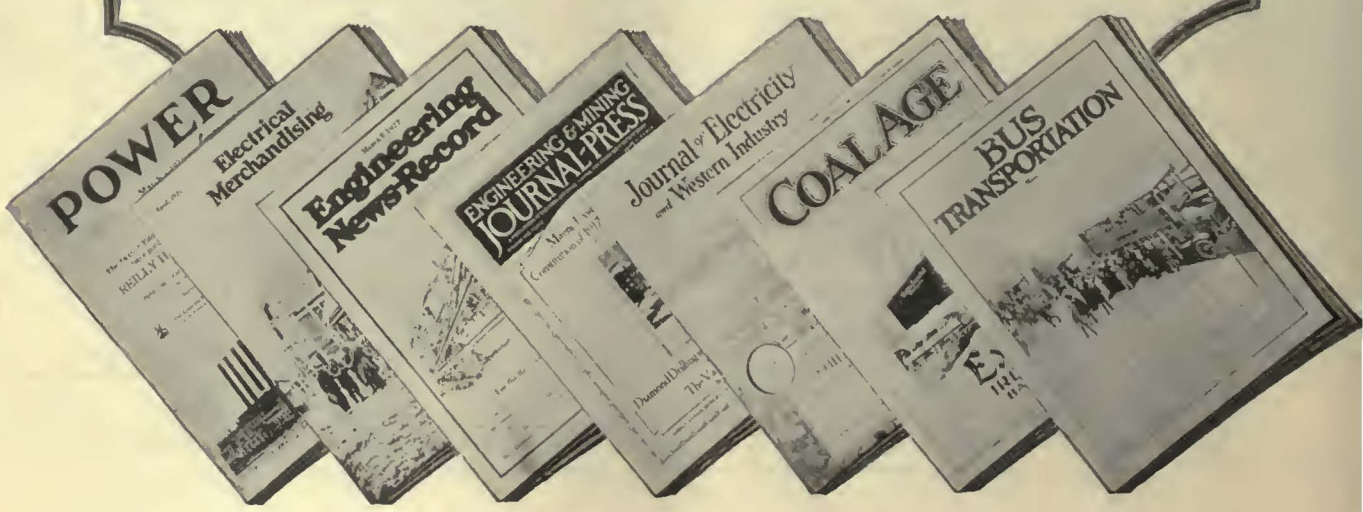
Reports Western events, advocating economy, efficiency and convenience of electric power for all industries of the West, manufacturing, agricultural, mining, merchandising and home-building. $2.50 per year. (*Published in San Francisco.*)

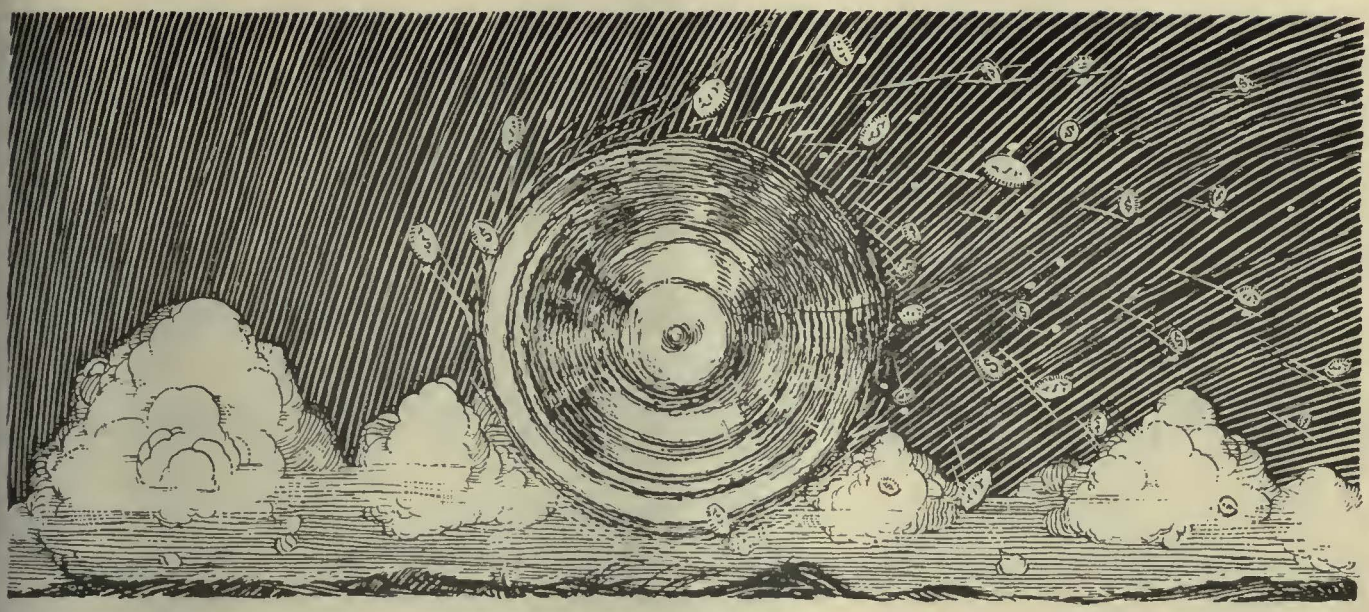
**Power**

It reports every phase of the progress in the generation and transmission within the power plant—including steam, oil, gas and water-power prime movers, and electrical refrigerating, ventilating, pump and elevator auxiliary equipment. $3.00 per year.

We will be pleased to send a sample copy of the publication which serves *your* industry. Please address Promotion Department.

## McGraw-Hill Company, Inc.
**Tenth Avenue at 36th Street, New York City**





# The High Cost of "Spinning Wheels"

If your bus is equipped with *ordinary springs* you will lose 1,000 miles of travel in one year.

It seems incredible and yet, figure it out for yourself.

If your bus operates over a road that has but 1 inch depression every 10 feet and the springs rebound throwing the bus 1 inch off the ground, your *wheels spinning* in the air burning gas and getting nowhere, will have left the ground in one year a distance of 1,000 miles—*miles of lost motion.*

Think how far the money *you* pay for "*spinning wheels*" would go toward paying for a new bus in only one year.

MITTEN-TRAYLOR MOTOR BUSES, equipped with HIFLEX SPRING SUSPENSION will cut your lost miles more than half.

HIFLEX, by actual test, keeps the wheels of a bus on the road *six times longer* than ordinary spring suspension.

## Hiflex does more—

| | |
|---|---|
| It eliminates side sway | Increases number of riders |
| Reduces fuel consumption | Reduces cost for repairs |
| Insures safe operation | Increases life of the bus |
| Reduces driver fatigue | Permits use of solid tires |

INCREASES YOUR BUS REVENUE

## MITTEN-TRAYLOR MOTOR BUSES are HIFLEX equipped

*If you want to know more about what HIFLEX does and how it does it write for our special booklet*

# MITTEN-TRAYLOR

INCORPORATED

*Philadelphia*

MITTEN

TRAYLOR

AIR BRAKE HANDLES: Bronze
AIR BRAKE HANDLES: Malleable Iron
CAR TRIMMINGS:
- Conductor Signal Bells
- Door Sheaves and Track
- Motorman's Seats
- Patent Door Locks
- Platform Foot Gongs
- Register Rod Fittings
- Stationary Register Pulleys, Single
- Stationary Register Pulleys, Double
- Swinging Register Pulleys

CASTINGS: Special Attention Given to All Classes
- Aluminum
- Brass
- Bronze
- Cast Steel
- Grey Iron
- Malleable Iron
- White Metal
- Zinc

CONNECTORS: Two-Way, Three-Way, Four-Way
CONTROLLER HANDLES:
- Bronze, operating
- Bronze, reversing
- Malleable Iron, operating
- Malleable Iron, operating, adj. type
- Malleable Iron, operating, with bronze or steel bushings
- Malleable Iron, reversing
- Malleable Iron, reversing, adj. type
- Malleable Iron, reversing, with bronze or steel bushings

CONTROLLER PARTS:
- Contact Fingers, operating
- Contact Fingers, reversing
- Contact Segment Tips
- Contact Segments
- Contact Washers
- Controller Finger Tips
- Controller Cylinder Shafts
- W. H. type HL Controller Parts
- G. E. type M, M K and PC Controller Parts

DESTINATION SIGNS, STEEL.
DROP FORGINGS: Light, Medium, Heavy
DUST-PROOF AND OIL LUBRICATED CENTER PLATES.
GRID RESISTANCE: Complete for two or four motor equipment
- Grid Resistance Repair Parts for All Types

LINE MATERIAL:
- Feeder Ears
- Splicing Ears
- Trolley Ears

MACHINERY:
- Armature Bearing, Babbitting and Broaching
- Armature Machine, Columbia Pat'd
- Armature Buggies
- Armature Lead Flattening Rolls
- Armature Shaft Straightener
- Armature Winding Stands
- Axle Straightener
- Babbitting Moulds
- Banding and Heading Machines
- Bearing Boring Machines
- Car Hoists
- Car Replacers
- Coil Taping Machines
- Coil Winding Machines
- Pinion Pullers, any type
- Pinion Pullers: Repair Parts
- Pit Jack, Pneumatic
- Signal or Target Switches
- Tension Stands

MOTOR SUSPENSION BARS.
MOTOR AND TRUCK SPRING CAP CASTINGS.
PLOW TERMINALS.
POWER STATION: Special attention given to the Manufacture of Standard Boiler and Stoker Grate Bars also Ash and Coal Down-take Pipes; or other types of Castings used in Power Stations.
RAILWAY MOTOR PARTS:
- Armature Bearing Shells: Malleable Iron
- Armature Bearing Shells: Semi-Steel
- Armature Bearings: Bronze
- Axle Bearing Shells: Malleable Iron
- Axle Bearing Shells: Semi-Steel
- Axle Bearings: Bronze
- Axle and Armature Bearings: With or Without Babbitt Lining: Base, Lead or Tin
- Armature Coils
- Armature Shafts
- Bolts, Special for Motors and Trucks
- Brushholder Parts
- Brushholders, Complete
- Commutators, All Types
- Dowel Pins for Armature and Axle Bearings
- Field Coil Terminals
- Field Coils
- Gear Cases: Malleable Iron
- Gear Cases: Sheet Steel, Welded or Riveted
- Motor Covers
- Pinion Nuts
- Thrust Collars

RATCHET BRAKE HANDLES: Bronze
- Ratchet Brake Handles: Malleable Iron

THIRD RAIL SHOE BEAM: Repair Parts
THIRD RAIL SHOE BEAMS.
TROLLEY CONTACT WASHERS.
TROLLEY HARPS.
TROLLEY POLES.
TROLLEY WHEELS, COLUMBIA.
- Trolley Wheels to Specifications

TRUCK PARTS:
- Brake Pins
- Brake Rigging for All Types of Brakes
- Brakes, for Maximum Traction Trucks, Columbia Patented
- Coupling Pins
- Equalizers
- Gusset Plates
- Journal Box Covers
- Journal Box Shims
- Journal Boxes
- Journal Brass Wedges
- Journal Brasses
- Journal Check Plates
- Turnbuckles

A one-man car equipped with an Ohmer Fare Register with a capacity of twelve different fare classifications.

# When You Sell Anything Make a Record of It

In selling any commodity, it is good business practice to put down in black and white just what each sale amounts to and what it consists of. This is just as necessary in selling electric railway transportation as it is in selling groceries or dry goods.

## OHMER Fare Registers

which are made in a sufficient number of types and sizes to meet all electric railway requirements, record in permanent form all the details in connection with transportation sales.

## OHMER
## Fare Register Company

**Dayton, Ohio**

Ohmer Equipment in a Side Entrance Car

On the Speedy Interurban Fliers

On Electric Locomotives

On Powerful Snowplows

# MILLER
# TROLLEY SHOES
## *on the Portland-Lewiston Interurban*

Installed nearly five years ago, Miller Trolley Shoes have been used continuously ever since on *all* the equipment of the Portland-Lewiston Interurban. Why? Ask that company's officials and you will learn that Miller Trolley Shoes stay on the wire at high speeds, give steady contact, are quiet where trolley wheels were noisy, and last much longer.

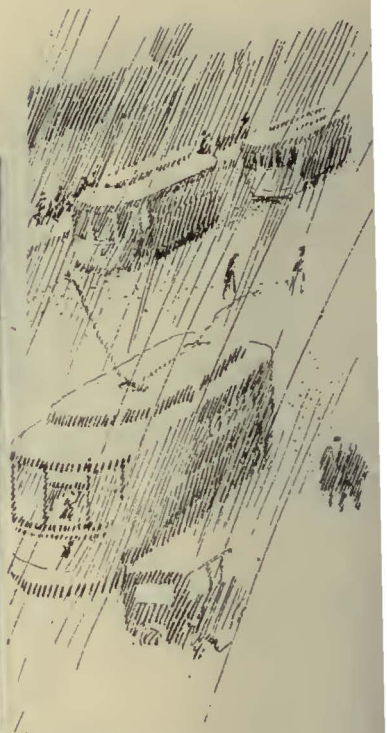
On the passenger express cars they have four 90-hp. motors and speed up to practically a mile-a-minute. They enter cities and run under city traffic conditions. The electric locomotive has four 125-hp. motors and will draw ten loaded flat cars. Yet under all these diverse conditions, Miller Trolley Shoes give most satisfactory service.

### Tests of trolley wire wear show Miller Trolley Shoes do not wear the wire

A while ago they checked up on trolley wire wear at 12 points and found, after four months, three spots where the micrometers showed a bare .001 inch wear. At the rest no wear could be observed.

**MILLER TROLLEY SHOE CO., Boston-21, Mass.**

*Western Representative:* Economy Electric Devices Co., 1590 Old Colony Bldg., Chicago, Ill.



# Winter Traffic Troubles Minimized

When you install *Stafford Roller Bearings* on your trucks you have eliminated one of the most common and most frequent sources of winter trouble.

These bearings normally decrease journal friction 90%. *The Stafford Roller Bearing* shows up to even greater advantage in cold weather when the lubricating oil and packing of the antiquated friction bearing congeal into a solid mass.

Watch your bearings in cold weather—when they are most severely tested, and you'll see why *Stafford Roller Bearings* for car trucks have been so enthusiastically received and endorsed by practical railway men.

*Guaranteed for three years*

**STAFFORD ROLLER BEARING CAR TRUCK CORPORATION**

LAWTON MICHIGAN

"IT ROLLS THE FRICTION AWAY"

# Another Lifer in the Boyerized Family

Here's a turnbuckle that is as much better than the ordinary turnbuckle as Boyerized pins and bushings are in comparison with the untreated sort.

Instead of a big, coarse-threaded jam nut that needs a two-fisted wrench for application and yet won't stay put, you require only a pocket-size wrench that is applied at a convenient angle.

What's the secret?

The jam-nut idea is replaced by a split clamp with a spring power that just won't be loosened once the little nut you see at one side has been tightened.

The split of this clamp is lined with felt, serving a double purpose: First, to act as an oil feed; second, to keep the oil from working out of the oil pocket which keeps the threads lubricated *always*.

That isn't all, either. The end of the McArthur turnbuckle is so arranged that each half is cut at a different angle, exposing a cross-section of one full tooth. This tooth acts like a cutting tool in shearing off any ice or snow from the threads, as the latter feed into the turnbuckle for adjustment.

## For Trucks with Inside-hung Brakes and Motors

The McArthur Turnbuckle is exceptionally valuable. Here with the turnbuckle rods coming directly over the rails there is not enough clearance for a pitman to make a handy turn with the large wrenches needed on jam nuts. With the McArthur, a little wrench calls the turn and calls it right.

Keep a McArthur well brushed and it will

**LAST AS LONG AS THE TRUCK**

## The McArthur Turnbuckle

**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, Oregon.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

### Other Members of the Boyerized Family

| | |
|---|---|
| Brake Hangers | Center Bearings |
| Brake Levers | Side Bearings |
| Pedestal Gibs | Spring Post Bushings |
| Brake Fulcrums | Spring Posts |

Bolster and Transom Chafing Plates

# SEARCHLIGHT SECTION

## EMPLOYMENT-BUSINESS OPPORTUNITIES-EQUIPMENT

**UNDISPLAYED—RATE PER WORD:**

*Positions Wanted*, 4 cents a word, minimum 75 cents an insertion, payable in advance.

*Positions Vacant* and all other classifications, 8 cents a word, minimum charge $2.00.

*Proposals*, 40 cents a line an insertion.

**INFORMATION:**

*Box Numbers* in care of any of our offices count 10 words additional in undisplayed ads.

*Discount* of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

**DISPLAYED—RATE PER INCH:**

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

*An advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

### POSITIONS VACANT

MAN, experienced in both line work and track work on fifteen mile interurban railroad in New Jersey; salary $150.00 per month. State your experience. P-479, Elec. Railway Journal, 10th Ave. at 36th St., New York City.

### POSITIONS WANTED

DIVISION road master, general foreman; practical experience, for twenty-two years maintenance, construction, special work, steam or electric; three years division road master on New England city and interurban line; prefers Middle West or Coast. PW-484, Elec. Ry. Journal, 10th Ave. at 36th St., New York City.

GENERAL foreman of shops and car houses, with a proven record of eighteen years on large city and interurban properties, desires to make a change; can furnish A-1 references as to character and ability; understand all details of mechanical department thoroughly; willing to go anywhere. PW-478, Elec. Railway Journal, 10th Ave. at 36th St., New York City.

MANAGER or superintendent railway, light and power properties; successful organizer and tactful in public relations; very resourceful in rehabilitating properties; excellent references. PW-481, Elec. Railway Journal, 10th Ave. at 36th St., New York City.

MR. MANAGER, are you in need of a capable, practical superintendent of transportation who is fully competent to take over all details and handle same in a manner that would be a credit to your property? Successful in public relations, safety campaigns and capable of getting results from employes; recognized as an economical operator. At present with large property; present relations are pleasant; personal reasons for desiring a change to another property. A proven record of eighteen years with large city, suburban and interurban properties with high grade references is back of this ad. PW-485, Elec. Railway Journal, Leader-News Bldg., Cleveland, Ohio.

### POSITIONS WANTED

SUPERINTENDENT, with successful record as statistician and operating head; experienced in interurban, safety car and bus operation; can get desired results; satisfactory relations with prsent employer: personal reasons for desiring change. Address PW-477, Elec. Railway Journal, Leader-News, Bldg., Cleveland, Ohio.

**Are You The Man**

we need, not merely to sell our products to the electric traction industry, but what is more important to render a real engineering service that is associated with that product? The man we want may be associated with the electric traction industry at this time or with a sales organization covering that industry. He has probably realized that his opportunity lies in the direction of the sales engineer who sells his product because of the engineering service he can render. To such a man we can offer a real position. He will be located in the East. State your qualifications fully and address

P-483, Electric Railway Journal
Leader-News Bldg., Cleveland, Ohio.

FOR SALE

**20—Peter Witt Cars**

**Weight Complete, 33,000 lbs.**

Seat 53, 4—G. E. No. 258-C Motors, K-12-H Control, West. Air Taylor Trucks, R.H. Type. Complete.

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

**"Opportunity" Advertising:**

Think
*"SEARCHLIGHT"*
First!

0099

**New Motor Repair Parts**

**IMMEDIATE SHIPMENT**

We have in stock virtually every part necessary to complete all of the types of non-interpole motors. They are new and were manufactured by either the Westinghouse Company or the General Electric Company. They may be purchased at 25 per cent less than the manufacturers present pricca.

Send your ordera to us and deduct 25 per cent from the current quotationa.

*What have you for sale?*

**TRANSIT EQUIPMENT CO.**
*Cars—Motors*
501 Fifth Avenue, New York.

**3000 TONS**
**60 lb. Relaying Rail**
**A.S.C.E. Section and Angles**
**At Girard, Pa.**

**Buffalo Housewrecking and Salvage Co.**
Buffalo, N. Y.

FOR SALE

2—*Brand New* G. E. Reversible motor equipments, 550 volt, D.C., each consisting of:
1—50 Hp., 250/1000 r.p.m., and one 6 hp., 1100 r.p.m., intermittant rating motors, complete with control panels, controllers, rheostats, etc. Price each equipment, $1000, f.o.b., New York, boxed.

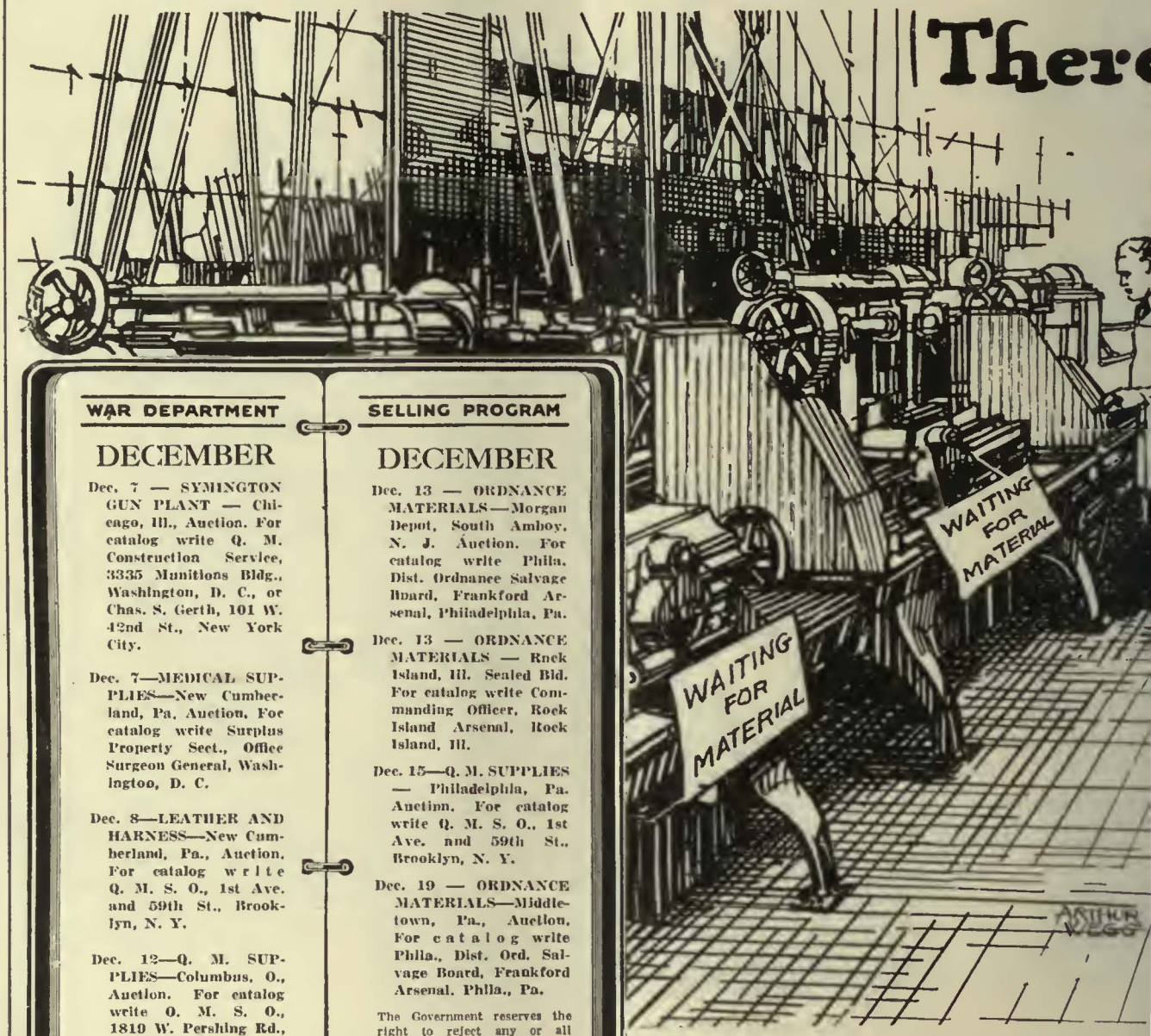
**GR. WEINBERG & AL. POSNER ENGINEERING COMPANY, Inc.**
120 Broadway, New York, N. Y.

# SOME ONE WANTS TO BUY

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards

***Sell It Before Depreciation Scraps It***

**THE SEARCHLIGHT SECTION IS HELPING OTHERS—LET IT HELP YOU ALSO!**


**WAR DEPARTMENT**

## DECEMBER

Dec. 7 — SYMINGTON GUN PLANT — Chicago, Ill., Auction. For catalog write Q. M. Construction Service, 3335 Munitions Bldg., Washington, D. C., or Chas. S. Gerth, 101 W. 42nd St., New York City.

Dec. 7—MEDICAL SUPPLIES—New Cumberland, Pa. Auction. For catalog write Surplus Property Sect., Office Surgeon General, Washington, D. C.

Dec. 8—LEATHER AND HARNESS—New Cumberland, Pa., Auction. For catalog write Q. M. S. O., 1st Ave. and 59th St., Brooklyn, N. Y.

Dec. 12—Q. M. SUPPLIES—Columbus, O., Auction. For catalog write O. M. S. O., 1819 W. Pershing Rd., Chicago, Ill.

**SELLING PROGRAM**

## DECEMBER

Dec. 13 — ORDNANCE MATERIALS—Morgan Depot, South Amboy, N. J. Auction. For catalog write Phila. Dist. Ordnance Salvage Board, Frankford Arsenal, Philadelphia, Pa.

Dec. 13 — ORDNANCE MATERIALS — Rock Island, Ill. Sealed Bid. For catalog write Commanding Officer, Rock Island Arsenal, Rock Island, Ill.

Dec. 15—Q. M. SUPPLIES — Philadelphia, Pa. Auction. For catalog write Q. M. S. O., 1st Ave. and 59th St., Brooklyn, N. Y.

Dec. 19 — ORDNANCE MATERIALS—Middletown, Pa., Auction. For catalog write Phila., Dist. Ord. Salvage Board, Frankford Arsenal, Phila., Pa.

The Government reserves the right to reject any or all bids.

**SEND FOR CATALOG** **SEND FOR CATALOG**

NOTE—Sale of Sodium Nitrate, approximately 25,000 short tons, located at Jacksonville, Tenn., will be held by Sealed Bids, closing 12 o'clock noon, December 15, 1922. For information and proposal form, address District Ordnance Salvage Board, Room 808, Army Bldg., 39 White-10-G.A.

# WAR DE

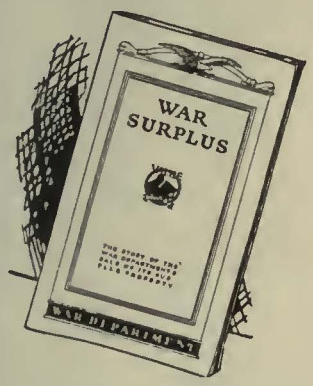
# No Profit in Marking Time

IDLE machines do more than gather dust. They pile up a costly overhead—while you're waiting for the material that wasn't delivered on schedule.

Many a plant has been saved this embarrassment and expense by discovering a War Department Sale on just the materials they needed. For every War Department Sale means *immediate delivery!*

And a big saving, as well.

Look in your business paper or the daily press for the sales announcements. When you find one that fits your needs, send for the catalog. Then seize your opportunity, for such a one will never come again. Address inquiries to Major J. L. Frink, Chief, Sales Promotion Section, Office, Director of Sales, Room 2515 Munitions Building, Washington, D. C.




*Send for this booklet, The Story of War Department Sales.*

ARTMENT

# 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 Receivers, Aftercoolers**
Ingersoll-Rand Co.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
**Armature Shop Tools**
Elec. Service Supplies Co.
**Automatic Return Switch Stand**
Ramapo Ajax Corp.
**Automatic Safety Switch Stands**
Ramapo Ajax Corp.

**Axle Straighteners**
Columbia M. W. & M. I. Co.
**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Babbitt Metal**
More-Jones B. & M. Co.
**Babbitting Devices**
Columbia M. W. & M. I. Co.
**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Bankers and Brokers**
Coal & Iron National Bank
**Batteries, Dry**
National Carbon Co.
Nichols-Lintern Co.
**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
A. Gilbert & Sons B. F. Co.
Le Grand, Inc., Nic.
More-Jones Br. & Metal Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Roller**
Stafford Roller Bearing Car Truck Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co.
Elec. Service Supplies Co.

**Benders, Rail**
Ry. Track-work Co.
Watson-Stillman Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Rail Welding & Bonding Co.

**Bonding Apparatus**
Amer. Steel & Wire Co.
Elec. Ry. Imp. Co.
Elec. Service Supplies Co.
Indianapolis Switch & Frog Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.

**Bonds, Rail**
Amer. Steel & Wire Co.
Elec. Railway Imp. Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)**
American Bridge Co.
Bates Exp. Steel Truss Co.
Creaghead Eng. Co.
Elec. Ry. Equip. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

**Brakes, Brake Systems and Brake Parts**
Ackley Brake & Sup. Corp.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.

**Bridges & Buildings**
American Bridge Co.

**Brooms, Track, Steel and Rattan**
Amer. Rattan & Reed Mfg. Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
National Carbon Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite**
Morganite Brush Co.
National Carbon Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Brushes, Wire Pneumatic**
Ingersoll-Rand Co.

**Buckers, Coal**
American Bridge Co.

**Buses, Motor**
Brill Co., The J. G.
Mitten Traylor, Inc.
St. Louis Car Co.

**Bushings**
Nat'l Fibre & Insulation Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Cables**
(See Wires and Cables)

**Cambric Tapes, Yellow & Black Varnish**
Irvington Varnish & Ins. Co.
Mica Insulator Co.

**Carbon Brushes**
(See Brushes, Carbon)

**Car Lighting Apparatus**
Elec. Service Supplies

**Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse Elec. & M. Co.

**Cars, Dump**
Differential Steel Car Co., Inc.

**Cars, Gas Rail**
St. Louis Car Co

**Cars, Passenger Freight Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire Cummings Mfg. Co.
National Ry Appliance Co.
St. Louis Car Co
Thomas Car Works, Perley A.
Wason Mfg. Co.
Witt, Peter

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A & J. M.
Columbia M. W. & M. I. Co.
More-Jones Br. & Metal Co.

**Castings, Funnel**
Wharton, Jr., & Co., Inc. Wm.

**Castings, Gray Iron and Steel**
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Wharton Jr., & Co., Inc., Wm.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Le Grand, Inc, Nic

**Catchers and Retrievers Trolley**
Earll, C. I.
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Catenary Construction**
Archbold-Brady Co.

**Ceiling, Car**
Pantasote Co., The

**Circuit Breakers**
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equip. Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.
**Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.
**Clusters and Sockets**
General Electric Co.
**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
**Coils, Armature and Field**
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Coin-Counting Machines**
International Register Co. The
Johnson Fare Box Co.
**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Commutator Truing Devices**
General Electric Co.
**Commutators or Parts**
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.
**Compressors, Air Portable**
Ingersoll-Rand Co.
**Compressors, Gas**
Ingersoll-Rand Co.
**Condensers**
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.
**Condensor Papers**
Irvington Varnish & Ins. Co.
**Conduits, Underground**
Std. Underground Cable Co.
**Connectors, Solderless**
Westinghouse Elec. & M. Co.
**Connectors, Trailer Car**
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
**Controllers or Parts**
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Controller Regulators**
Electric Service Supplies Co.
**Controlling Systems**
General Electric Co.
Westinghouse Elec. & M. Co.
**Converters, Rotary**
General Electric Co.
Westinghouse Elec. & M. Co.
**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.
**Copper Wire**
Anaconda Copper Mining Co.
**Cord Adjusters**
Nat'l Fibre & Insulation Co.
**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works
Silver Lake Co.
**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
**Couplers, Car**
Brill Co., The, J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
**Cross Arms, (See Brackets)**
**Crossings**
Ramapo Ajax Corp.
**Crossing Foundations**
International Steel Tie Co.
**Crossing Frogs and Switches**
Ramapo Ajax Corp.
Wharton, Jr., & Co., Inc., Wm.
**Crossings, Manganese**
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.
**Crossing Signals. (See Signals, Crossing)**
**Crossings, Track. (See Track, Special Work)**
**Crossings, Trolley**
Ohio Brass Co.
**Curtains and Curtain Fixtures**
Brill Co., The, J. G.
Electric Service Supplies Co.
Morton Mfg. Co.
Pantasote Co., The
**Dealers' Machinery**
Electric Equipment Co.
Transit Equipment Co.
**Derailing Switches, Tee Rail**
Ramapo Ajax Corp.
**Destination Signs**
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Electric Service Supplies Co.
**Detective Service**
Wish Service, P. Edward
**Dogs, Lathe**
Williams & Co., J. H.
**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
**Doors and Door Fixtures**
Brill Co., The, J. G.
General Electric Co.
Safety Car Devices Co.
**Doors, Folding Vestibule**
National Pneumatic Co., Inc.
**Draft Rigging. (See Couplers)**
**Drills, Rock**
Ingersoll-Rand Co.
**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.
**Dryers, Sand**
Electric Service Supplies Co.
**Ears**
Ohio Brass Co.
**Electric Grinders**
Railway Track Work Co.
**Electrodes, Carbon**
Indianapolis Switch & Frog Co.
Railway Track Work Co.
**Electrodes, Steel**
Indianapolis Switch & Frog Co.
Railway Track Work Co.
**Electrical Wires and Cables**
American Elec. Works
Roeblings Sons Co., J. A.
**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler John A.
Byllesby & Co., Inc., H. M.
Day & Zimmerman, Inc.
Dodd, J. N.
Drum & Co., A. L
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly, Cook & Co., Inc.
Ong, Joe R
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Sangster & Mathews
Smith & Co., C. E.
Stone & Webster
Witt, Peter
**Engines, Gas, Oil and Steam**
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.
**Expansion Joints, Track**
Wharton Jr., & Co., Inc., Wm.
**Fare Boxes**
Cleveland Fare Box Co.
Economy Elec. Devices Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
**Fences, Woven Wire and Fence Posts**
Amer. Steel & Wire Co.
**Fenders and Wheel Guards**
Brill Co., The, J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Sup. Co.
Le Grand, Inc, Nic
Star Brass Works
**Fibre and Fibre Tubing**
Nat'l Fibre & Insulation Co.
Westinghouse E. & M. Co.
**Field Coils. (See Coils)**
**Flexlinum Insulation**
Nat'y Ry. Appliance Co.
**Floodlights**
Electric Service Sup. Co.
**Flooring, Composition**
American Mason Safety Tread Co.
**Forgings**
Columbia M. W. & M. I. Co.
Williams & Co., J. H.
**Frogs & Crossings, Tee Rail**
Ramapo Ajax Corp.
**Frogs, Track. (See Track Work)**
**Frogs, Trolley**
Ohio Brass Co.
**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse Elec. & M. Co
Williams & Co., J. H.
**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.
**Gaskets**
Westinghouse Tr. Br. Co.
**Gas-Electric Cars**
General Electric Co.
**Gas Producers**
Westinghouse Elec. & M. Co.
**Gasolene Torches**
Economy Elec. Devices Co.
**Gates, Car**
Brill Co., The, J. G.
**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & M. Co.
**Gears and Pinions**
Ackley Brake & Sup. Corp.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.
**Generating Sets, Gas-Electric**
General Electric Co.
**Generators**
English Electric Co.
General Electric Co.
Westinghouse Elec. & M. Co.
**Goggles, Safety**
Indianapolis Switch & Frog Co.
**Gongs (See Bells and Gongs)**
**Graphite**
Morganite Brush Co.
**Greases. (See Lubricants)**
**Grinders and Grinding Supplies**
Indianapolis Switch & Frog Co.
Railway Track-work Co.
**Grinders, Portable**
Railway Track Work Co.
**Grinders, Portable Electric**
Railway Track Work Co.
**Grinding Blocks and Wheels**
Railway Track-work Co.
**Guards, Cattle**
American Bridge Co.
**Guard Rail Clamps**
Ramapo Ajax Corp.
**Guard Rails, Tee Rail & Manganese**
Ramapo Ajax Corp.
**Guards, Trolley**
Electric Service Sup. Co.
Ohio Brass Co.
**Hammers, Pneumatic**
Ingersoll-Rand Co.
**Harps, Trolley**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Sup. Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Star Brass Works
**Helmets, Welding**
Indianapolis Switch & Frog Co.
**Headlights**
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
**Headlining**
Pantasote Co., The
**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.

Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Electric Service Sup. Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain-Block Co.

**Hoists, Portable**
Ingersoll-Rand Co.

**Hose, Bridge**
Ohio Brass Co.

**Hydraulic Machinery**
Watson-Stillman Co.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Insulating Cloth, Paper and Tape**
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
National Fibre & Insulation Co.
Westinghouse Tr. Br. Co.

**Insulating Comnounds & Varnishes**
Sterling Varnish Co.

**Insulating Machinery**
Amer. Ins. Machinery Co.

**Insulating Silk**
Irvington Varnish & Ins. Co.

**Insulation. (See also Paints)**
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Creaghead Engineering Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Insulator Pins**
Electric Service Sup. Co.
Hubbard & Co.

**Insulation Slot**
Irvington Varnish & Ins. Co.

**Insulating Varnishes**
Irvington Varnish & Ins. Co.

**Insurance, Fire**
Marsh & McLennan

**Inventions Developed and Perfected**
Peters & Co., G. D.

**Jacks. (See also Hoists and Lifts)**
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
National Ry Appliance Co.
Watson-Stillman Co.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., The, J. G.

**Labor Adjusters**
Corporation Service Bureau, The

**Lamp Guards and Fixtures**
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent (See also Headlights)**
Anderson M. Co., A. & J. M.
General Electric Co.
Nat'l Elec. Specialty Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker**
Nichols-Lintern Co.

**Lanterns, Classification**
Nichols-Lintern Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lightning Protection**
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
English Electric Co.
General Electric Co.
Hubbard & Co.
More-Jones Br. & Metal Co.
Westinghouse Elec. & M. Co.

**Locking Spring Boxes**
Wharton, Jr. & Co., Inc. Wm.

**Locomotives, Electric**
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.
Vacuum Oil Co.

**Lubricants, Oil and Grease**
Borne, Scrymser Co.
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.
Vacuum Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**
Columbia M. W. & M. I. Co.
Watson-Stillman Co.

**Manganese Steel Guard Rails**
Ramapo Ajax Corp.

**Manganese Steel, Special Track Work**
Indianapolis Switch & Frog Co.
Wharton, Jr. & Co., Inc., Wm.

**Manganese Steel Switches, Frogs and Crossings**
Ramapo Ajax Corp.

**Meters, Car Watt-Hour**
Economy Elec. Devices Co.

**Mica**
Mica Insulator Co.

**Motor Buses (See Buses, Motor)**

**Motormen's Seats**
Brill Co., The, J. G.
Electric Service Sup. Co.
Wood Co., Chas. N.

**Motors, Electric**
General Electric Co.
Westinghouse Elec. & M. Co.

**Motor and Generator Sets**
General Electric Co.

**Nuts and Bolts**
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

**Oils (See Lubricants**

**Packing**
Electric Service Sup. Co.
Westinghouse Tr. Br. Co.

**Paints and Varnishes for Woodwork**
Ackley Brake & Sup. Co.
National Ry. Appliance Co.
Sterling Varnish Co.

**Pavement Breakers**
Ingersoll-Rand Co.

**Paving Material**
Amer. Br. Shoe & Fdry Co.

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Watson-Stillman Co.
Westinghouse Tr. Br. Co.

**Planers. (See Machine Tools)**

**Plates for Tee Rail Switches**
Ramapo Ajax Corp.

**Pliers, Rubber Insulated**
Electric Service Sup. Co.

**Pneumatic Tools & Accessories**
Ingersoll-Rand Co.

**Pole Line Hardware**
Ohio Brass Co.

**Pole Reinforcing**
Drew Elec. & Mfg. Co.
Hubbard & Co.

**Poles, Metal Street**
Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.

**Poles and Ties, Treated**
International Creosoting & Construction Co.

**Poles, Ties, Posts, Piling and Lumber**
International Creosoting & Construction Co.
Le Grand, Inc., Nic
Nashville Tie Co.

**Poles, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
National Tube Co.
Nuttall Co., R. D.

**Poles, Tubular Steel**
Elec. Ry. Equip. Co.
Electric Service Sup. Co.
National Tube Co.

**Power Saving Devices**
Economy Electric Devices Co.
Nat'l Ry. Appliance Co.

**Pressure Regulators**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Pumps**
Ingersoll-Rand Co.
Watson-Stillman Co.

**Pumps, Vacuum**
Ingersoll-Rand Co.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

**Punching Machinery**
Watson-Stillman Co.

**Rail Braces & Fastenings**
Ramapo Ajax Corp.

**Rail Joints**
Rail Joint Co., The

**Rail Joints, Welded**
Indianapolis Switch & Frog Co.

**Rail Grinders. (See Grinders)**

**Railway Safety Switches**
Consolidated Car Heating Co.
Westinghouse Elec. & M. Co.

**Rail Welding. (See Welding Processes)**
Ry. Track-work Co.
Rail Welding & Bonding Co.

**Rattan**
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Electric Service Sup. Co.
McGuire Cummings Mfg. Co.
St. Louis Car Co.

**Registers and Fittings**
Brill Co., The, J. G.
Electric Service Sup. Co.
International Reg. Co., The
Ohmer Fare Register Co.
Rooke Automatic Reg. Co.
St. Louis Car Co.

**Reinforcement, Concrete**
Amer. Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils)**
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Westinghouse Elec. & M. Co.

**Resistances**
Consolidated Car Heating Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Rheostats**
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing, Car**
Pantasote Co., The

**Roller Bearings**
Stafford Roller Bearing Car Truck Co.

**Sanders, Track**
Brill Co., The, J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

**Sash Fixtures, Car**
Brill Co., The, J. G.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Screw Drivers, Rubber Insulated**
Electric Service Supplies Co.

**Seating Materials**
Brill Co., J. G.
Pantasote Co., The

**Seats, Bus**
St. Louis Car Co.

**Seats, Car. (See also Rattan)**
Amer. Rattan & Reed Mfg. Co.
Brill Co., The, J. G.
Heywood-Wakefield Corp.
Peters & Co., G. D.
St. Louis Car Co.

**Second-Hand Equipment**
Electric Equipment Co.

**Secret Service**
Corporation Service Bureau, The

**Securities Electric Railway**
Bonbright & Co.

**Shades, Vestibule**
Brill Co., The, J. G.

**Shovels**
Hubbard & Co.

**Shovels, Power**
Brill Co., The, J. G.

**Signals, Car Starting**
Consolidated Car Heating Co. Co.
Electric Service Supplies Co.
Nat'l Pneumatic Co., Inc.

**Signals, Indicating**
Nichols-Lintern Co.

**Signal Systems, Block**
Electric Service Supplies Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters. (See Brake Adjusters)**

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Ry. Equip. Co.
Electric Service Supplies Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.

**Smokestacks, Car**
Nichols-Lintern Co.

**Snow-Plows, Sweepers and Brooms**
Amer. Rattan & Reed Mfg. Co.
Brill Co., The, J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire Cummings Mfg. Co.

**Soldering and Brazing. (See Welding Processes and Apparatus)**

**Spikes**
Amer. Steel & Wire Co.

**Special Adhesive Papers**
Irvington Varnish & Ins. Co.

**Splicing Compounds**
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Springs, Car and Truck**
Bemis Car Truck Co.
Brill Co., The, J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

**Sprinklers, Track and Road**
Brill Co., The, J. G.
McGuire Cummings Mfg. Co.

**Steel and Steel Products**
Morton Mfg. Co.

**Steps, Car**
American Mason Safety Tread Co.
Morton Mfg. Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strain Insulators**
Ohio Brass Co.

**Strand**
Roeblings' Sons Co., J. A.

**Superheaters**
Babcock & Wilcox Co.

**Sweepers, Snow. (See Snow Plows, Sweepers and Brooms.)**

**Switch Stands**
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

**Switches, Selector**
Nichols-Lintern Co.

**Switches, Tee Rail**
Ramapo Ajax Corp.

**Switches, Track. (See Track, Special Work)**

**Switches and Switchboards**
Anderson Mfg. Co., A. & J. M.
Electric Servivce Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie**
Ingersoll-Rand Co.

**Tapes and Cloths. (See Insulating Cloth, Paper and Tape)**

**Tee Rail, Special Track Work**
Ramapo Ajax Corp.

**Telephones and Parts**
Electric Service Sup. Co.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
Consolidated Car Heating Co. Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

**Thread-Cutting Tools**
Williams & Co., J. H.

**Ticket Choppers and Destroyers**
Electric Service Supplies Co.

**Ties, Mechanical**
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
American Bridge Co.
Barbour-Stockwell Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tongue Switches**
Wharton, Jr., & Co., Inc., Wm.

**Tool Holders**
Williams & Co., J. H.

**Tools, Track and Misc.**
Amer. Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

**Tools, Thread Cutting**
Williams & Co., J. H.

**Towers and Transmission Structures**
American Bridge Co.
Archbold--Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

**Track Grinders**
Railway Track Work Co.

**Trackless Trolleys**
St. Louis Car Co.

**Track, Special Work**
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New York Switch & Crossing Co.
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Wharton, Jr., & Co., Inc., Wm.

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Ohmer Fare Register Co.

**Transfer Tables**
American Bridge Co.

**Transformers**
General Electric Co.
Westinghouse Elec. & M. Co.

**Treads, Safety, Stair, Car Step**
Amer. Mason Safety Tread Co.
Morton Mfg. Co.

**Trolley Bases**
Ackley Brake & Sup. Corp.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nat'y Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Bases, Retrieving**
Ackley Brake & Sup. Corp.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
More-Jones Br. & Met. Co.
Nat'y Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Buses**
Brill Co., The, J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Trolley Materials**
Electric Service Supplies Co.
Ohio Brass Co.

**Trolley Materials, Overhead**
More-Jones Brass & Metal Co.

**Trolley Shoes**
Miller Trolley Shoe Co.

**Trolleys and Trolley Systems**
Ford Chain-Block Co.

**Trolley Wheels. (See Wheels, Trolley)**

**Trolley Wheel & Harps**
More-Jones Brass & Metal Co.

**Trolley Wheel Bushings**
More-Jones Brass & Metal Co.

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American Elec'l Works
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.
Roeblings Sons Co., J. A.

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Brill Co., The, J. G.
Bemis Car Truck Co.
McGuire Cummings Mfg. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

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National Tube Co.

**Tubing, Yellow & Black Flexible Varnishes**
Irvington Varnish & Ins. Co.

**Turbines, Steam**
General Electric Co.

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Perey Mfg. Co., Inc.

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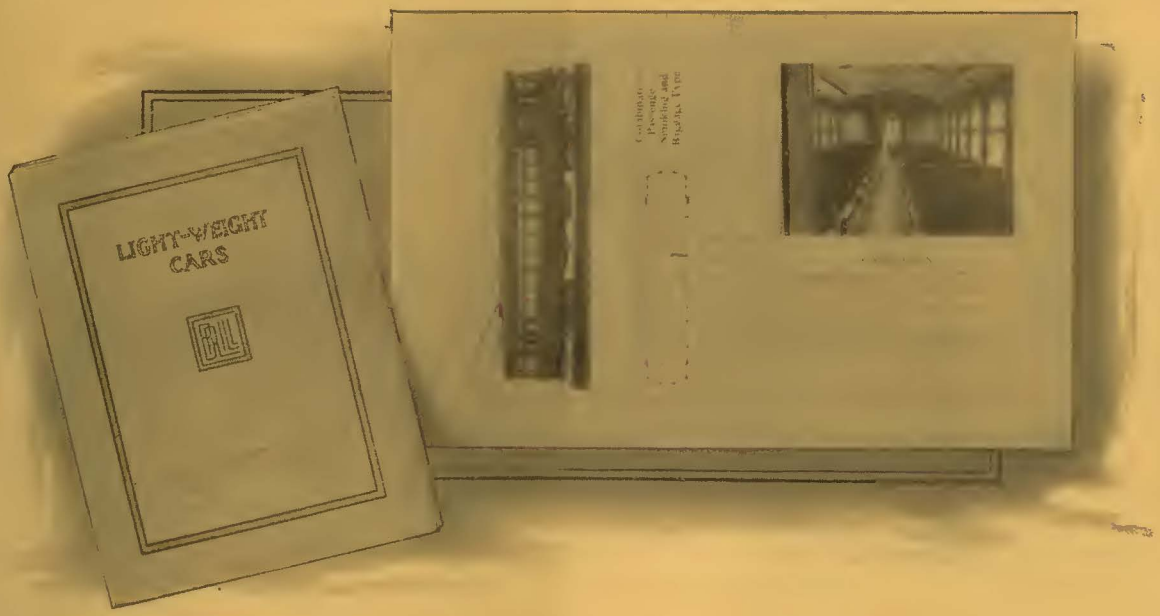


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