

ELECTRIC RAILWAY JOURNAL

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The Connecticut Company

met with such outstanding success in the operation of its three Republic Knight-Motored Buses in New Haven, that two additional Buses of this type have recently been installed in feeder service in connection with the Company's rail operations in Hartford.

Test service, under closest observation, usually reveals a degree of satisfaction, economy and public approval that results in Republic Knight-Motored Buses being installed in regular feeder service as adjuncts to Railway lines.

* * *

The experience of The Connecticut Company with the Republic Knight-Motored Buses is similar to that of other important Traction lines throughout the country.

Public Utility Companies are cordially invited to discuss their feeder service problems with our Public Utilities Division, without obligation.

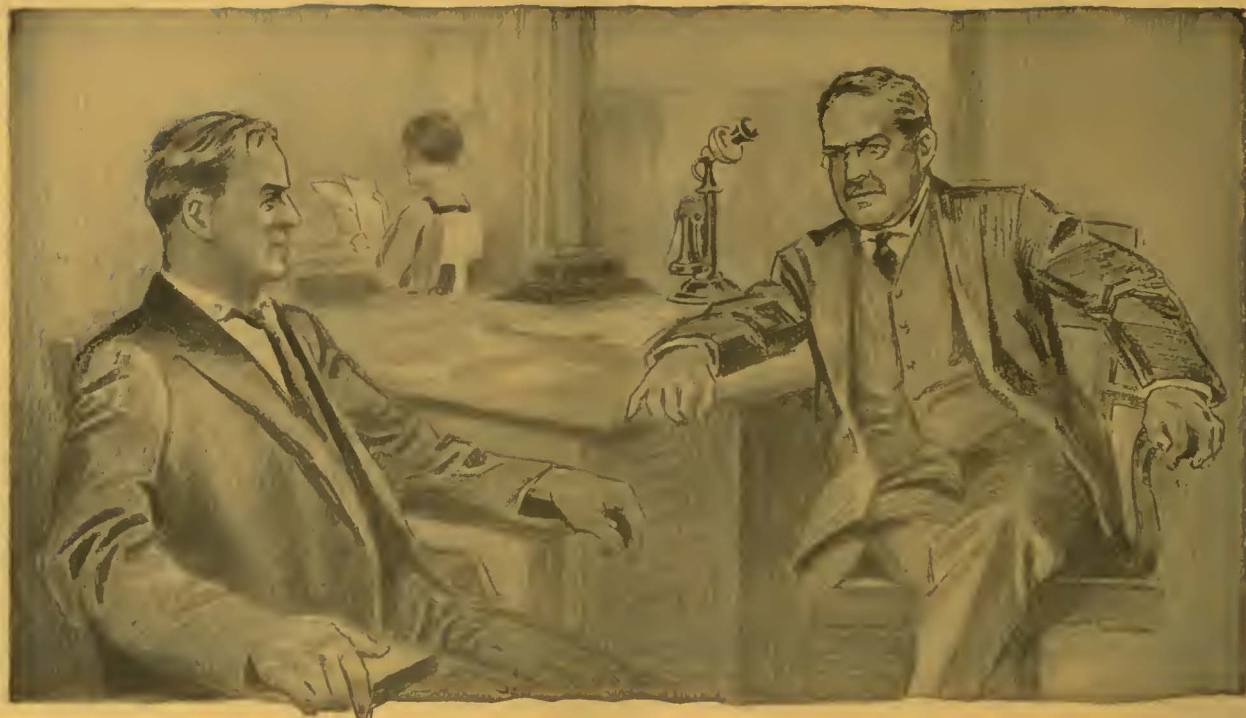
Republic Truck Sales Corporation, Alma, Michigan

REPUBLIC KNIGHT-MOTORED BUS

TRANSPORTATION IS A NATURAL



MONOPOLY, SUBJECT TO REGULATION



Joe Makes A Recommendation

"Boss" said Joe to the Vice President, "did you notice what I said in my A.E.R.A. Convention Exhibit Export about that Westinghouse No. 510 Motor?"

"Yes, Joe," answered the Vice President, "I read it at home last night, and I would like to know more about it."

"It's the greatest little 35-hp. motor on the market" answered Joe. "Just what we want for the light-weight, double-truck city cars we have ordered for rush hour train service. Its strong, rugged and neat appearance caught my eye at once, and as stated in my report, the shaft, bearing, housing and brushholder construction are all improvements, and the latest wrinkle in ventilating paths makes the motor run cool."

"I think you are right, Joe," said the Vice President. "If this No. 510 motor is all you say, it will be just what we need for those light-weight, double-truck cars that we decided to equip with Cabinet Control."



Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



Westinghouse

ELECTRIC RAILWAY JOURNAL

HENRY W. BLAKE, Editor

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That is, he's right or wrong, or neither, or both. In any case, the railway can assume that the customer wants a two-cent transfer, not \$10,000, and that he really had no smaller change than a double eagle.

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Design and Construction of Streets for Street Railway Traffic788
At this second meeting of the Engineers' Club in Philadelphia on the paving and railway engineers, track foundations were considered and the relative merits of different types were discussed.

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The Editors' Code of Principles

THE EDITORIAL principles of the *Electric Railway Journal* have always been of the spirit if not the letter of the code of ethics or "Standards of Editorial Practice" adopted by the editorial conference of the New York Business Publishers' Association on June 17, 1921. The *Journal* is perfectly willing that its performance should be checked by this code and hence reprints it below. This "yardstick" affords a means by which the readers can determine how nearly it is living up to these ideals:

STANDARD OF EDITORIAL PRACTICE

The editor of a business paper should dedicate his best efforts to the advancement of the industry which his paper represents in all ways consistent with the public welfare, as well as to measures of public service, and to this end should pledge himself:

1. To consider first the interests of the subscriber.
2. To work for truth and honesty in all departments of his paper.
3. To publish in an impartial way, free from personal opinion, the news of the industry in which the paper circulates.
4. To disregard advertising considerations in the editorial conduct of his paper.
5. To be a leader of thought in his editorial columns and to make his criticisms constructive, with the object of bringing his industry to higher levels of thought and practice and to a greater measure of public service.
6. To support in his columns such worthy measures of public interest as their importance justifies and the space available permits.
7. To give proper credit for articles taken from other publications, and to avoid unfair practices in competition with them.

Reference to this column in the issue of Feb. 4, 1922, where the publishers' standards were printed, will show a close similarity between the codes of principles of the editors and the publishers. Exactly the same principles guide both groups. Their slogan is, in substance, "Serving the reader first, serves everyone best—reader, advertiser, publisher, editor."

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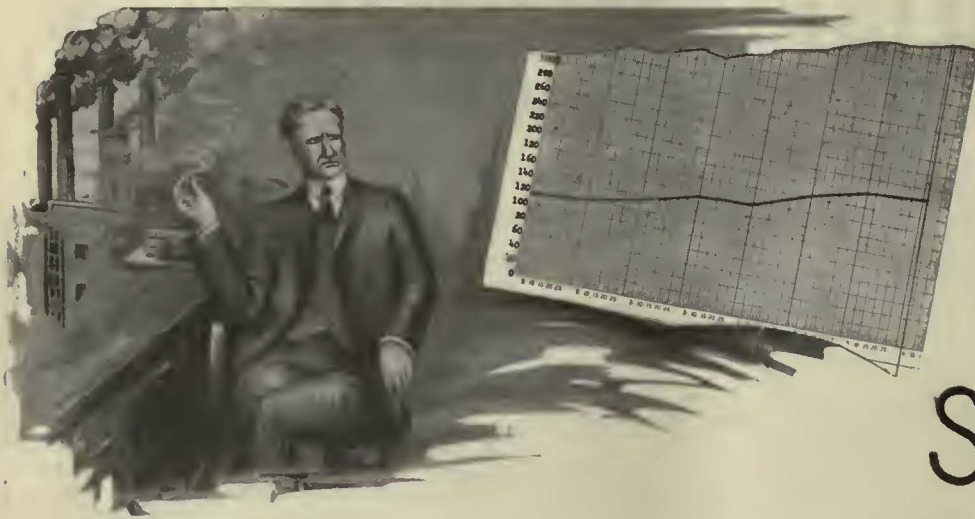
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Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal-Press
Ingenieria Internacional
Bus Transportation
Electric Railway Journal
Electrical World
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Journal of Electricity and Western Industry
(Published in San Francisco)
Industrial Engineer
(Published in Chicago)
American Machinist—European Edition
(Published in London)



The Cost Sheet Tells

SAVES POWER

USERS of Westinghouse-National air compressors have only to refer to the monthly production cost chart to find evidence of a substantial saving in power.

Insofar as the compressor is concerned, there is no vexatious upward curve to indicate expensive waste.

Westinghouse-National motor-driven compressors are the most satisfactory units built for all classes of industrial service, and are particularly adapted for the railway shop, car barn or power station—or for portable track construction outfits.

Furnished in all types and sizes, always with the famous *automatic control* feature, which is responsible for the *positive saving of power* that is distinctive of Westinghouse-National machines.

Pictured below, Westinghouse-National 3VS Air Compressor, furnished in low pressure sizes of 250 to 520 cu. ft. displacement, and in high pressure sizes from 150 to 335 cu. ft. An ideal unit for railway shops and power stations.

Westinghouse—
National
3VS Compressor

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

OFFICES:

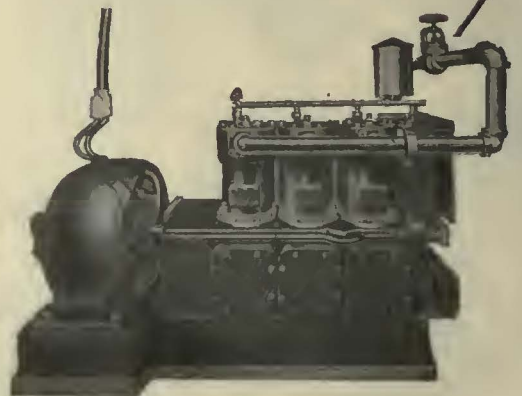
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Denver, Colo.
Houston, Tex.

Los Angeles
Mexico City
St. Louis, Mo.
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Pittsburgh
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Seattle
San Francisco



Write for literature giving full details of Westinghouse-National Compressors and the power-saving Automatic Control with which they are equipped.





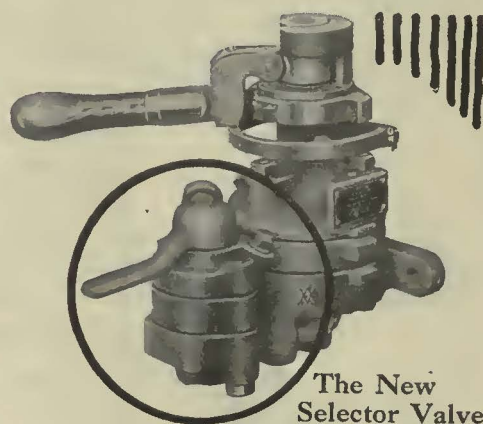
“Solves the Door Control Problem”

IN operating double-passageway Safety Cars, why throw *both* doors open at *every* stop?

The new Selector Valve obsoletes this practice and adds greatly to the advantages of double-door operation by providing a quick, easy means of independent door control for entrance only, exit only, or both at once, as occasion requires.

Independent door control is a valuable aid to the motorman in regulating the flow of passengers in such manner as he deems best suited to the conditions of one-man operation.

And in cold weather especially, a material saving in heat, as well as better protection for passengers, will result from a system which makes it unnecessary to open both doors at every stop.



The New Selector Valve

The above illustration shows the new Selector Valve (outlined in the black circle) as incorporated in the pipe bracket of the standard M-2B Safety Car Brake Valve.

We furnish the Air Brake and Safety Car Control Equipment which *makes* the Safety Car

SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



Insurance plus Marsh & McLennan Service

Have You Finished the Job Right?

Your personnel has been chosen wisely; your plant has been planned carefully; your methods are the last word in efficiency and your products find an insatiate market. Have you finished the job right?

If fire can damage your plant or accidents disorganize your personnel and drive your customers to waiting competitors, you cannot rest secure.

Insurance is the final and fitting step of the wise executive who finishes the job right. He takes care of today and has the vision to protect himself against the emergency that may come at any time. He is prepared against all contingencies by having adequate insurance for his business in all its branches.

As carefully as you choose your banker, just as carefully should you choose your insurance broker. The one assists, the other safeguards your business.

"He who serves best profits most."

MARSH & MCLENNAN

175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit

Denver
Duluth
Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London



O-B Base—Form 1—Patented

Service shows the stuff that's in O-B Trolley Base

It takes more than thick black paint and bright red ink to sell a trolley base to a mechanical man. He has been on too many car roofs to forget that a base has lots of work to do and lots of punishment to take every day that it is in service.

We're glad of it. It is easy enough for us to find individual features of O-B Base which appeal to mechanical men, but if we can just get a fellow to equip a car or two and watch results, there isn't any more argument. From then on his company's specifications read

"Bases O-B"

or he has to be shown why.

There is one fundamental reason for the way O-B Bases make good—they fit operating requirements—fit like an arm chair fits a fat man.

They require little attention but it is easy to give them what they need. They wear slowly but it is easy to renew the parts that do wear.

O-B Bases follow the wire sensitively. They have unusual current-carrying capacity. They provide uniform pressure on the wire at all heights of the pole.

Shall we arrange a trial on your cars at our expense?

Here are just two features of O-B Base



New Base for a few cents

All points of principal wear have renewable bushings—shown dark on the photograph. A few cents and a few minutes puts an O-B Base which has seen strenuous service back in perfect condition.



Accessible

One man can lift the O-B Base off its stem casting and expose every vital part for inspection and lubrication. Because it is that easy, O-B Base is sure to get whatever attention it needs.



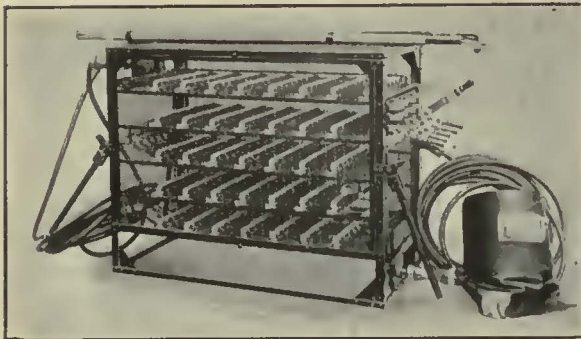
The **Ohio** **(B)** **Brass** Co.
Mansfield, **(B)** Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators



Makes every old joint as good as new

No excuse exists for a railway track full of rough and broken joints. You don't need to let them go until they break. With modern welding and grinding equipment, especially designed for efficient work on the track, it is now cheaper to keep joints smooth than to let them go.



AJAX Electric Arc Welder

One or more of these rugged and practical machines should be in the track equipment of every electric railway. Built to give ample current even at the lowest voltage encountered on long isolated lines. Therefore, a strong, enduring weld can always be obtained. Light in weight, 155 lb., it is easily carried by two men, and small enough to ride on passenger car platforms.



ATLAS Rail Grinder

An efficient, yet inexpensive machine, for track grinding work. Especially suited to following up welding operations, smoothing off surplus metal and making a smooth run-off. Large rubber-tired de-rail wheels make it easy for the crew to roll it off the track in order to let the cars pass by without delay.

Write for details and quotations

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St., Philadelphia, Pa.

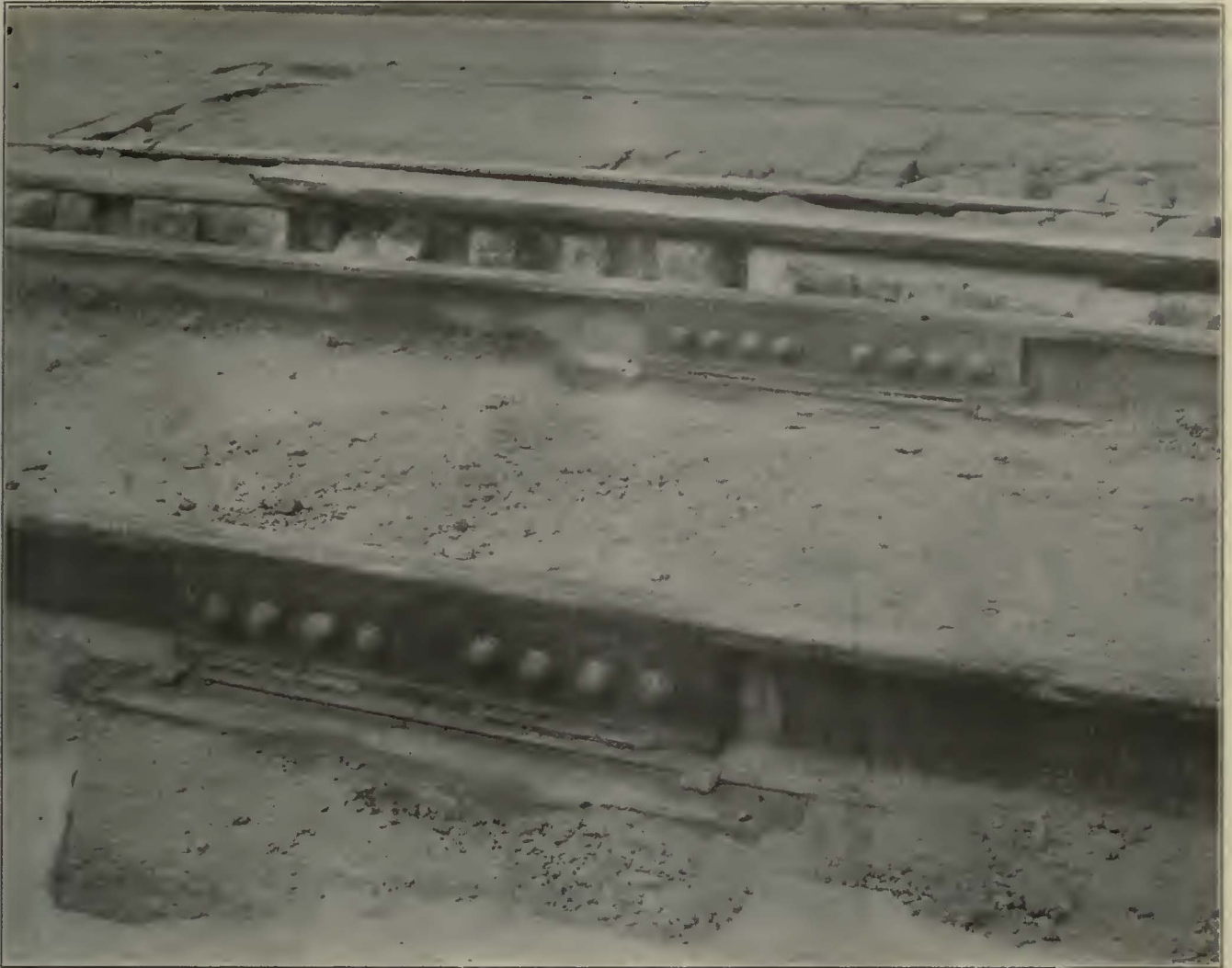
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Chas. N. Wood Co.
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Atlas Railway Supply Co.
Chicago

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New Orleans



There are 468 square inches of bearing in each plate of a steel twin tie.

THE TIE-PLATE IS PART OF THE TIE

To help increase the life of wood ties by preventing rail cutting, many Engineers favor tie-plates.

The principle involved has been extended and developed in STEEL TWIN TIES in which the tie-plate is part of the tie.

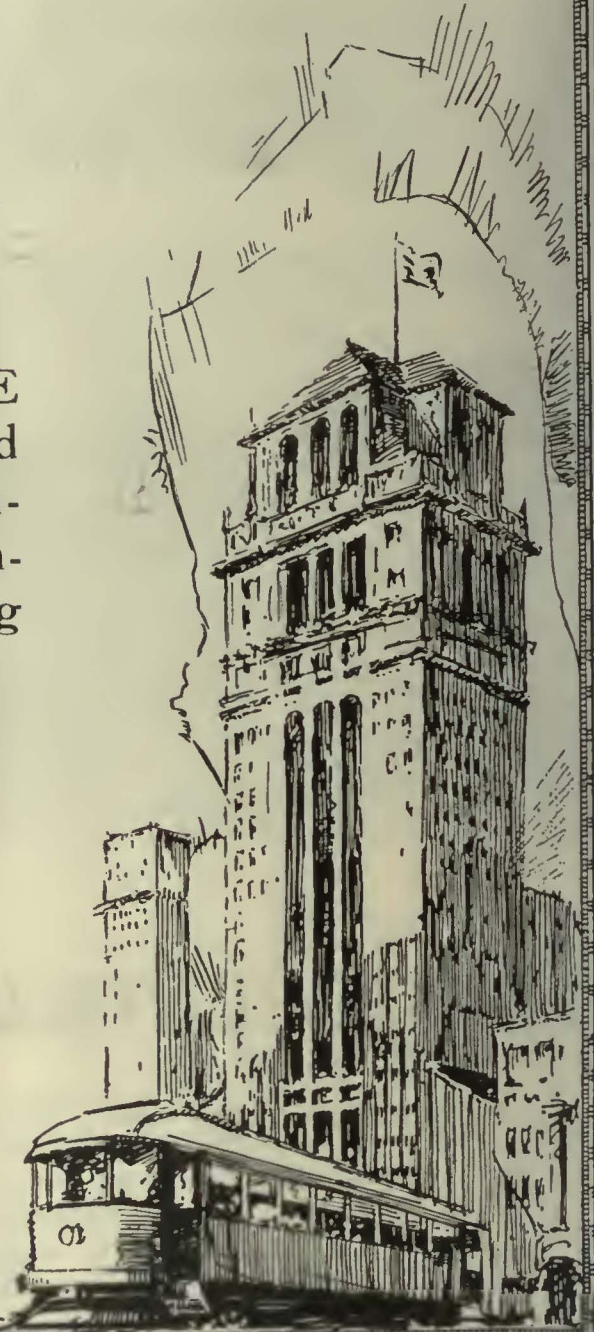
The plates provide a larger bearing

than is possible with wood ties on two-foot centers. They distribute the wheel loads on top of the concrete of the track foundation instead of at some point six to eight inches below the base of the rail. Hence there is more concrete in bearing with less total concrete required. The ultimate result is better track at a lower first cost.

THE INTERNATIONAL STEEL TIE COMPANY
Cleveland, O.

Steel Twin Tie Track

COLLIER SERVICE sustains car card space value by maintaining a nation-wide organization of car advertising experts.



CANDLER BUILDING, THE HOME OF COLLIER SERVICE.



Barron G. Collier

INCORPORATED

CANDLER BLDG NEW YORK

LIGHT

Safety Car Lighting Fixtures



The flexibility of the metal fingers provides for expansion and contraction of the reflector, and also cushions the glass against any severe jolt of the car. Notwithstanding this flexible grip, it is impossible for the reflector to fall or rattle in the holder.



KEYSTONE Car Specialties

Air Sanders
Air Valves
Golden Glow Headlights
Illuminated Destination Signs
Steel Gear Cases
Safety Car Lighting Fixtures
Motormen's Seats
Faraday Car Signals
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Shelby Trolley Poles
Samson Cordage
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Cord Connectors
Rotary Gongs
Standard Trolley Harps
Standard Trolley Wheels
Automatic Door Signals
Trailer Connectors

When days grow shorter—

riders have more of an opportunity to notice the lighting systems of your cars. Rattling, globeless lamps will be more conspicuous than ever.

So will good lighting and firm, quiet fixtures.

This latter fact has been proven where Safety Car Lighting Fixtures have been installed. They enhance the interior attractiveness of your cars and afford your riders greater eye comfort.

The use of Safety Car Lighting Fixtures in your cars will eliminate broken glassware and decrease installation and lamp renewal costs. These fixtures when used in combination with proper reflectors and Mazda lamps reduce the number of lighting units required to properly illuminate the car. Thus a saving in current consumption over bare lamps is also effected.

Safety fixtures fit all types of cars, being made in straight pendant form with round or square bases (illustrated); in angle base pendant form and in bracket form. Made in various sizes to use with standard 23, 36, 46, 56, 72 and 94 watt Mazda series lamps.

ELECTRIC SERVICE SUPPLIES Co.


Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA NEW YORK CHICAGO
17th and Cambria Streets 50 Church Street Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

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T. S. Q. means this 

234

THE TRAMWAY AND RAILWAY WORLD

May 18, 1922

THREE-COACH ELECTRIC TRAINS OF THE LONDON AND NORTH WESTERN RAILWAY.

The extensive electrification work carried out in recent years by the London and North Western Railway Company on their suburban lines represents a very important advance in the gradual process of conversion to electric traction of the London suburban railway communications. The lines in question are operated with direct current at 630 volts, the current being collected from third and fourth rail. As traffic unit, a train composed of one motor coach, one trailer coach, and one driving trailer coach has been adopted; two of these traffic units can be coupled together, when required.

It is proposed, in this article, to describe these three-coach electric trains, which present several new and interesting features. ~~The~~ motor coaches for these trains are each equipped with four motors having each a one-hour rating of 250 h.p. The motors are geared to the axles and suspended in the usual way with rubber compression pads between suspension lugs and the transom. A train speed of 44 miles per hour can

be executed under very difficult conditions, as manufacture and erection were carried out to a great extent, during the war.

Owing to the many conditions imposed by heavy suburban traffic, it was necessary to go into the whole question of electrical equipment very thoroughly. In the case of motor as well as of apparatus, special design was adopted, which, in many ways, departed considerably from standard practice; all these modifications proved, however, entirely satisfactory. It may also be added that the Oerlikon Company evolved a new system of multiple control for these coaches.

The first train units under the original contract were already in service in 1915, and gave excellent results. Owing to the exigencies of the war, the manufacture of the underframes, bogies, etc., and the coach bodies under the second contract had to be suspended until the end of the war. The material under this contract has now been delivered and stored at Saltley and Wolverton, and the equipments are in course of erection.

A brief summary of the very exhaustive and complete specification issued by Lieut.-Colonel F. A.



to motors are fitted with noses held between compressed rubber blocks attached to the transom. The gearing has a ratio of 1 to 3.3. Both gear wheel and pinion are made of tempered tool steel; the gear wheel is in one piece and pressed on to the axle. The gearing is running very quietly and giving entire satisfaction.

The motors when developing 250 B.H.P.—their one-hour rating—and with a supply pressure of 575 volts, have a speed of 620 revolutions per minute, and an efficiency of 87 per cent., including losses in gearing.

*"Tool Steel"
Cincinnati Ohio
Entire Satisfaction
after running
since 1915*

Tool Steel" Quality T. S. Q. "Tool Steel" Quality

Tool Steel Gear and Pinion Co.

Cincinnati, Ohio



What puts this little car ahead?

Speed with Safety!

Necessity is the mother of invention, they say, and necessity demanded something to get ahead of the jitney. Remember how they used to run ahead of the old slow starting, hand-signalled trolley, and pick up all the fares?

Necessity required action to save millions of invested capital from ruinous competition. Resourcefulness, ingenuity and inventive ability came to the rescue and produced the modern safety car, fast, quick-starting and safe. With it, and as part of its essential equipment came—

National Pneumatic

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

As Applicable to Old Cars as to New!

Investigate Now!

National Pneumatic Company, Inc.

Originator and Manufacturer

50 Church St., New York

McCormick Bldg., Chicago

Works: Rahway, N. J.

Manufactured in Canada by
 Dominion Wheel & Foundries, Ltd.
 Toronto, Ont.

The Columbia Foundry

Any Kind of Castings Made

Our large modern foundry—in separate departments for iron and non-ferrous metals—has a combined capacity of nearly 20 tons daily. Most of the output is devoted to electric railway specialties. We have annual contracts with many companies to supply their castings at a fixed pound rate. We will gladly submit quotations on any standard or special castings to your specifications. Our staff of competent metallurgical experts, ensures satisfactory alloys to meet any analysis test.

Bearings Are Our Specialty

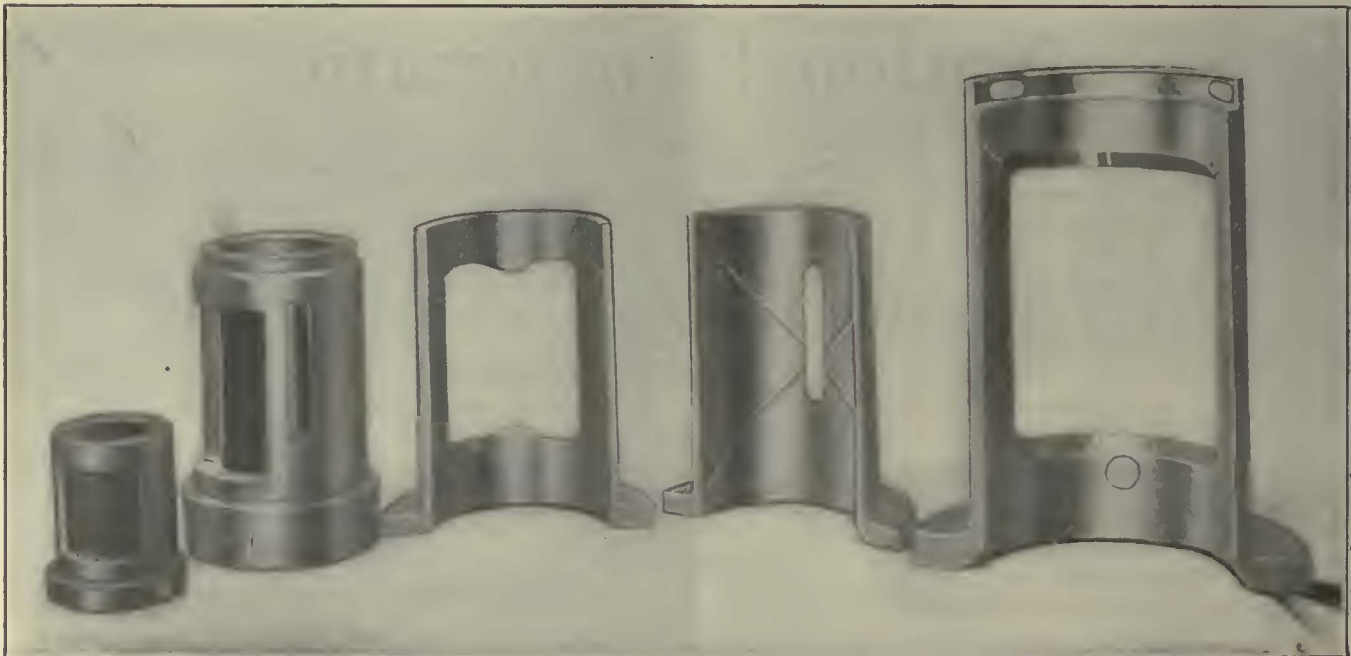
By far the largest part of our non-ferrous work is in the form of armature and axle brasses. When a customer furnishes specifications as to alloys they are followed exactly. For unspecified work, we use our own special mixture developed from long experience and widely used by our electric railway customers with economical results. Our bearings are furnished to exact fitting, interchangeable halves.



The Columbia Machine Works and Malleable Iron Company

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*“still in the
lead”*

Guaranteed

There's no "ifs, ands or buts" - no guesswork - about "P & H" Guaranteed Penetration Process Poles. You **know** what you're getting.

It's down in black and white in the written guarantee that goes with every shipment — "impregnated with the preservative to a uniform depth of one-half inch" throughout the ground-line area—and "the Butt-Treating price will be refunded on any pole that does not show the full specified half-inch penetration."

The "P & H" Guaranteed Penetration Process

—is the original guaranteed penetration process. It gives you the most for your money—the longest pole life. Insist on the genuine "P & H."

We can fill any pole needs—for Butt Treated and untreated Northern White and Western Red Cedar poles—or for any form of Butt-Treatment.

Prompt shipment assured by the convenient location of our yards in the North Central and Western States.

Get the facts—write for interesting folder on the Butt-Treatment of cedar poles.

Copyright 1922, by P. & H. Co.

*"P & H" Guaranteed Penetration
Process poles in lines of the Kansas City
Power & Light Co., Kansas City, Mo.*

PAGE AND HILL CO.

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Omaha, Neb., 513 Electric Bldg.

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"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases—this is the privilege if not the practice of all modern manufacturers."—*Vauclain.*

Bulletin No. 7



Steel Tires

Steel Tired
Wheels

Solid Forged
and Wrought
Steel Wheels

Rolled Steel
Gear Blanks

Steel Axles

Steel Springs

Steel
Forgings

Steel and Mal-
leable Iron
Castings

Rolled Steel
Rings

Steel Crusher-
Rolls and
Shells

Steel Pipe
Flanges

TO ARRIVE AT A DECISION

Comparison through experience is costly and involves long elements of time.

Comparison through tests is incomplete - hence inconclusive.

There are, however, standards of judgment by which our products may be quickly, economically, completely and conclusively compared with others in the fields we supply.

May we send you the particulars?

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

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ST. LOUIS
HAYANA, CUBA

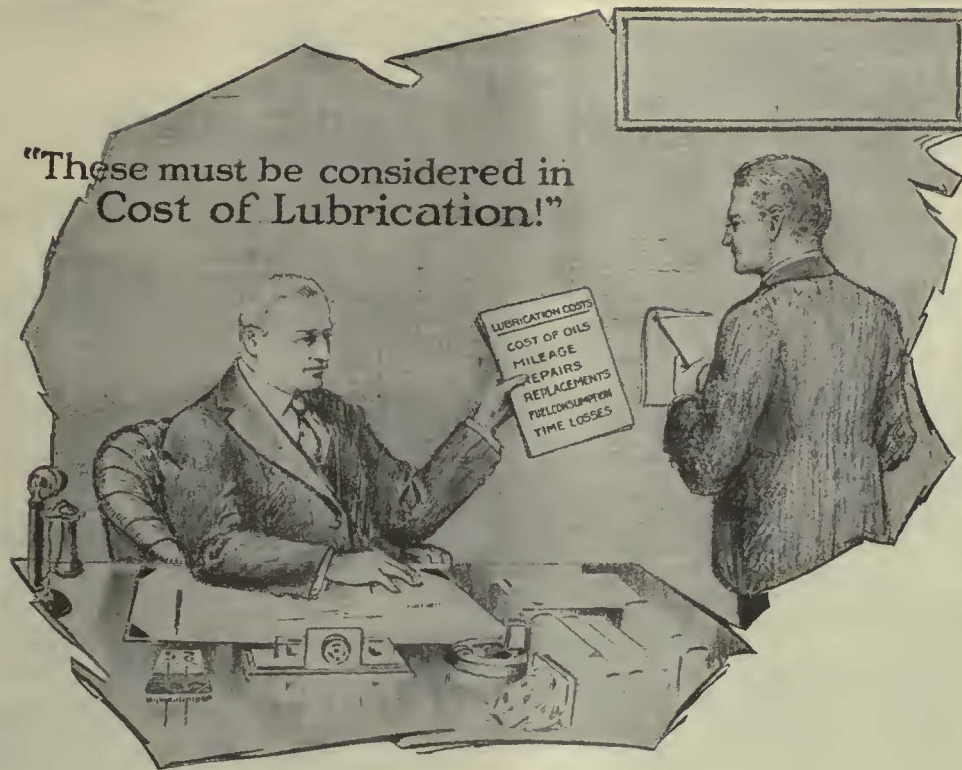
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WORKS: BURNHAM, PA.



Analyze Your Lubrication Costs

WERE "cost of oils" the only item involved, it would be a simple matter to figure the exact cost of lubrication.

But it stands to reason that expenses arising from causes plainly traceable to deficient lubrication are as much a part of lubrication cost as the oil itself.

Practical executives are awakening to the fact that cheap oil means anything but cheap lubrication; that the losses in mileage, repairs and replacements of bearing parts, depreciation and labor—

always evident with their use—make the purchase of cheap lubricants a most expensive proposition.

Every street railway has, in its own records, the means of checking up and ascertaining the correct cost of lubrication as accurately as it can determine net income.

The ultimate economy of Galena Lubrication is plainly apparent when SERVICE, the true determining factor of values, is recorded.

"Galena Service is an insurance of efficiency and economy!"

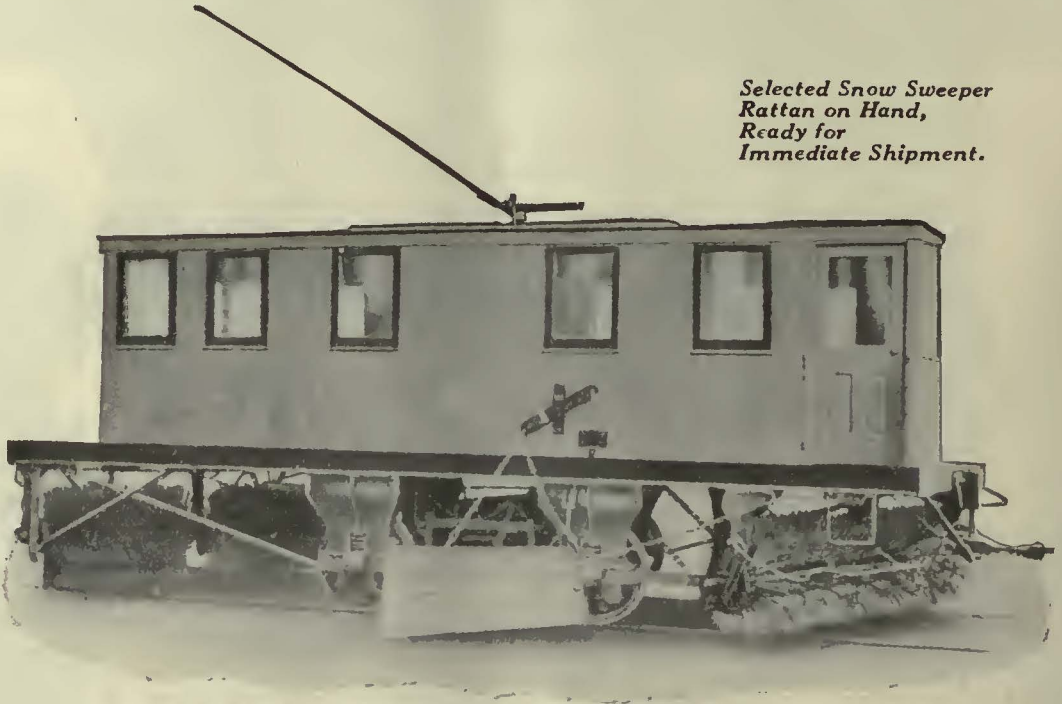


Galena-Signal Oil Company
 New York Franklin, Pa. Chicago
 and offices in principal cities



Snow Fighting Equipment

*Selected Snow Sweeper
Rattan on Hand,
Ready for
Immediate Shipment.*



Standard Single Truck, Steel Underframe Long Broom Sweeper

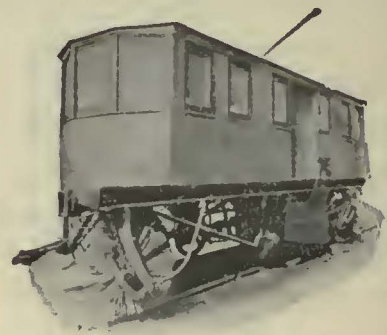
Approximately ninety-five per cent of all the electric snow sweeping equipment, which is used in the United States and Canada, is of McGuire-Cummings make.

The car illustrated here is one example. The brooms are so arranged that they will clean both rails ahead of the car; the side plows will clear 4 ft. 0 in. outside of rails.

It requires two 25-hp. motors to propel the car, and one 25 to 40-hp. motor geared to drive brooms at 300 to 350 r.p.m.

Blueprints and specifications will be submitted on request.

*End view of Standard Single Truck
Sweeper.*



McGUIRE-CUMMINGS MANUFACTURING CO.

GENERAL OFFICES

111 WEST MONROE STREET
CHICAGO, ILL.

City and Interurban Cars and Trucks, Safety Cars, Combination and Work Cars,
Snow Sweepers, Electric Locomotives.

The spirit of true leadership is not merely to get to the front but to stay there



G-E-800
1894

G-E
258
1922

Yesterday and Today in Railway Motors

The GE-800 of 1894 weighed 1930 pounds, which was at that time a comparatively light-weight motor.

The GE-258 motor of today weighs but 885 pounds and is capable of as much work as its distant predecessor.

The old motor was fully enclosed and had no commutating poles, whereas the self-ventilation and commutating poles of the GE-258 give it so liberal an overload capacity that it has become the favorite motor for safety cars and light-weight interurban cars where schedule speeds combined with maximum reliability are controlling factors.

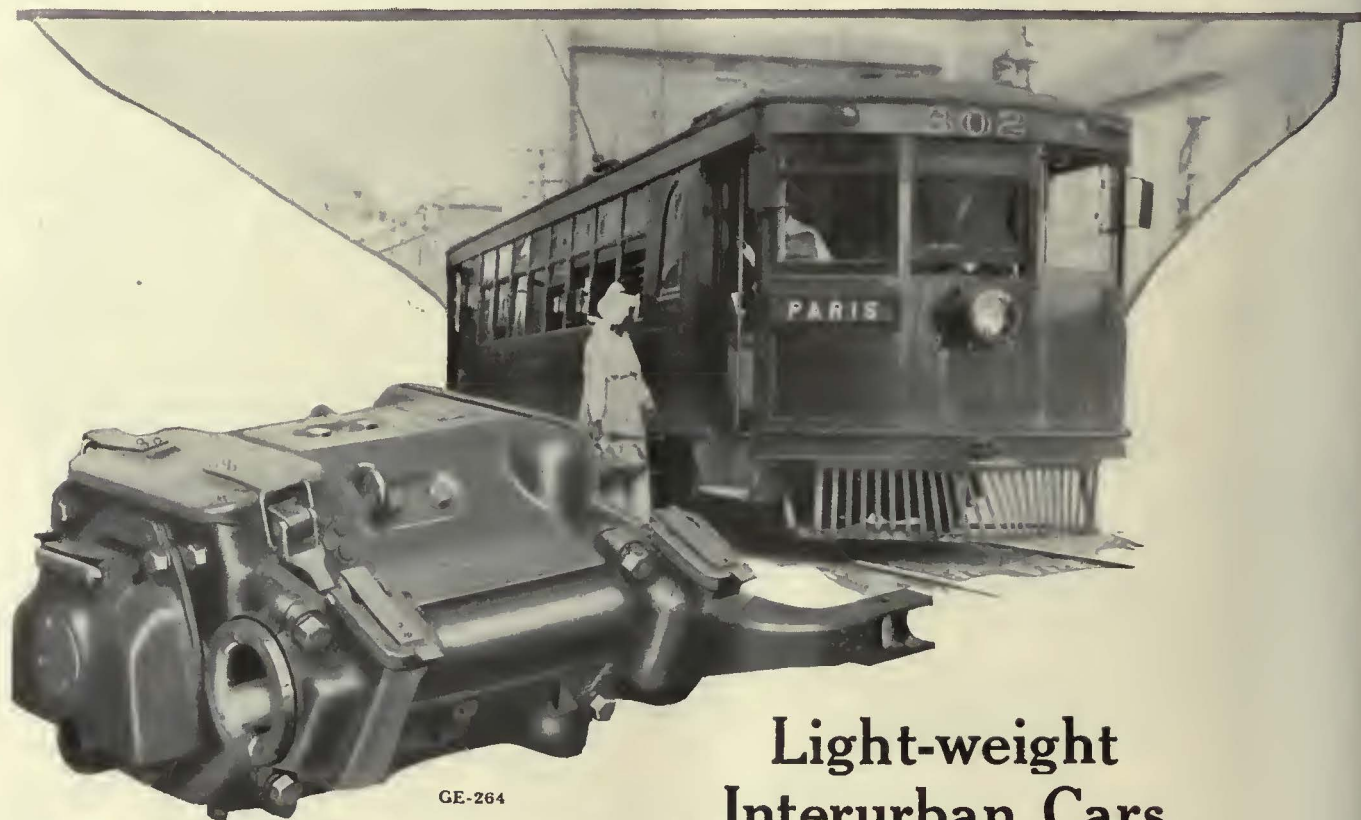
General  **Electric**
Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities



Working Wonders With Operating Costs



Light-weight Interurban Cars

GE-264

	No. of Cars
Kentucky Traction & Terminal Company.....	10
Cincinnati Lawrenceburg & Aurora.....	7
Union Traction Co., Nashville, Tenn.....	6
Cincinnati, Milford & Blanchester Trac.....	3
Pittsburg County Rwy., McAlester.....	3
Toledo & Western R.R.....	3
Youngstown & Suburban R.R.....	2
Portsmouth (Ohio) St. R.R. & Lt. Co.....	6
Dayton, Springfield & Xenia So. Rwy.....	2
Bangor Railway & Elec. Co.....	6
Interstate Public Service Co.....	5
City Railway Co., Dayton, Ohio.....	30
Boston Elevated R.R.....	100
Eastern Mass. St. Railway Co.....	10
Tampa Electric Co., Tampa, Fla. Cincinnati, Georgetown & Portsmouth R.R.....	4
Androscoggin & Kennebec.....	5
	1

The electric railway that adapts its equipment to conditions will remain master of mass transportation in its territory.

For instance, the Kentucky Traction & Terminal Company: Two months after it replaced its two-man, 76,000-lb., 52-seat cars, operated at 90-min. intervals, by one-man, 25,000-lb., 45-seat cars on an hourly schedule, the busses paralleling its route discontinued service.

Ten of these 12-ton cars, equipped with GE-264 motors, K-35 control and CP-27 compressors, are in operation. They have proved popular with the riding public and extremely economical for the company.

Installations of cars of similar design, also G-E equipped, are in successful operation on the interurban roads listed. They point the way to profitable operation for hundreds of medium-traffic lines.

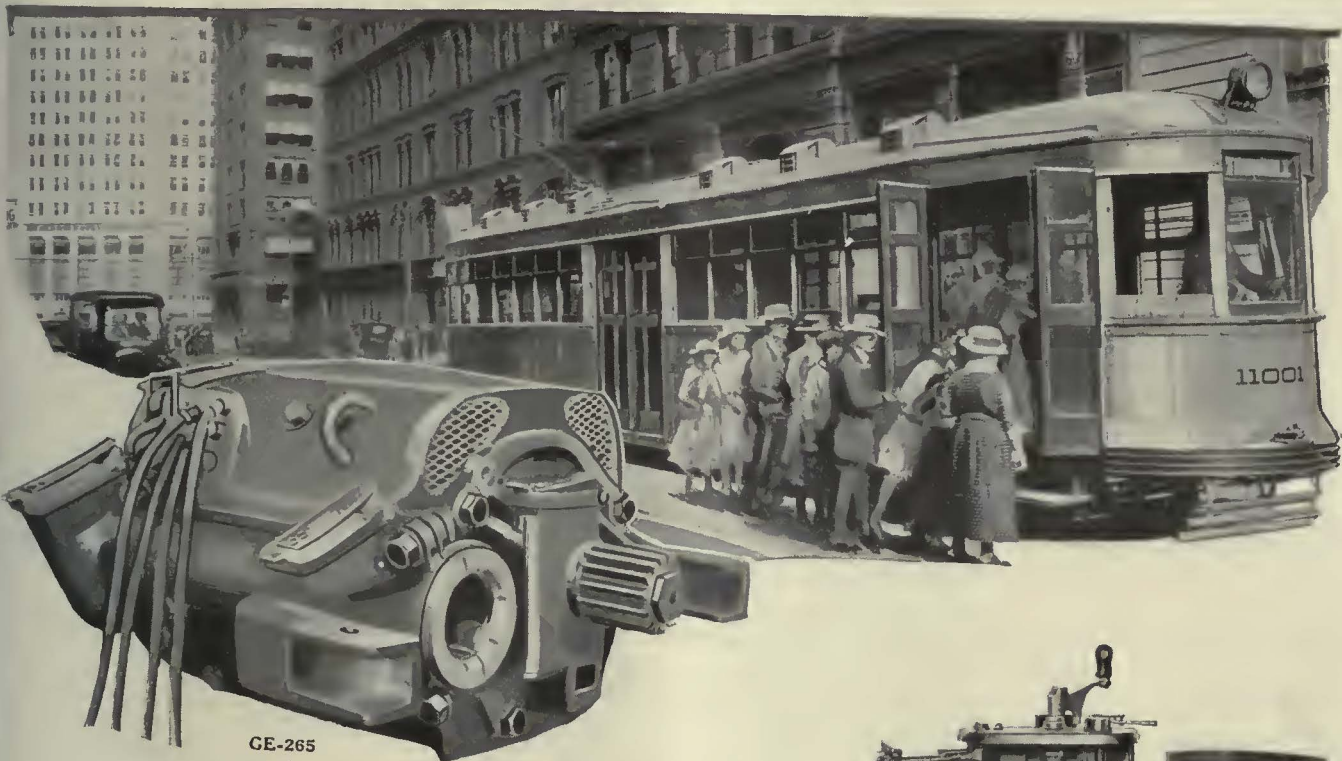
General Electric Company

General Office
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Sales Offices in
all large cities



Detroit's 200 New Cars Making Good



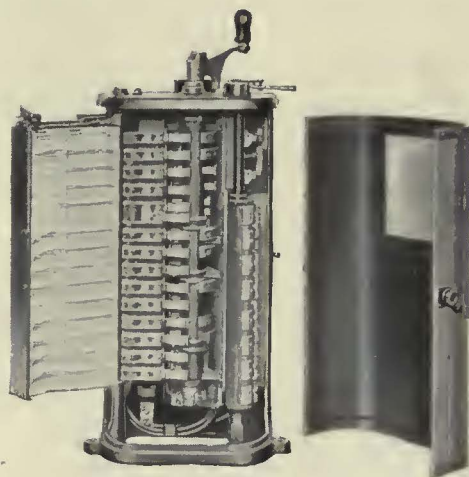
GE-265

Light-Weight City Cars

The rehabilitation of the Detroit Street Railway is being undertaken with the most modern equipment. For instance, 200 new light-weight, double-truck cars are being equipped with GE-265 motors and K-35 control. CP-27 air compressors are also used. This equipment duplicates that on 50 cars which have been in successful operation for more than a year.

This same equipment has been selected for light, double-truck cars on the following railway properties:

	No. of Cars
City of Detroit.....	250
United Railway Co., Providence, R. I.....	150
Georgia Rwy. & Power Co., Atlanta.....	20
Dallas Interurban Railway Company.....	7
Western Ohio Railway Company.....	10



K-35 Controller



General Electric Company

General Office
Schenectady, NY

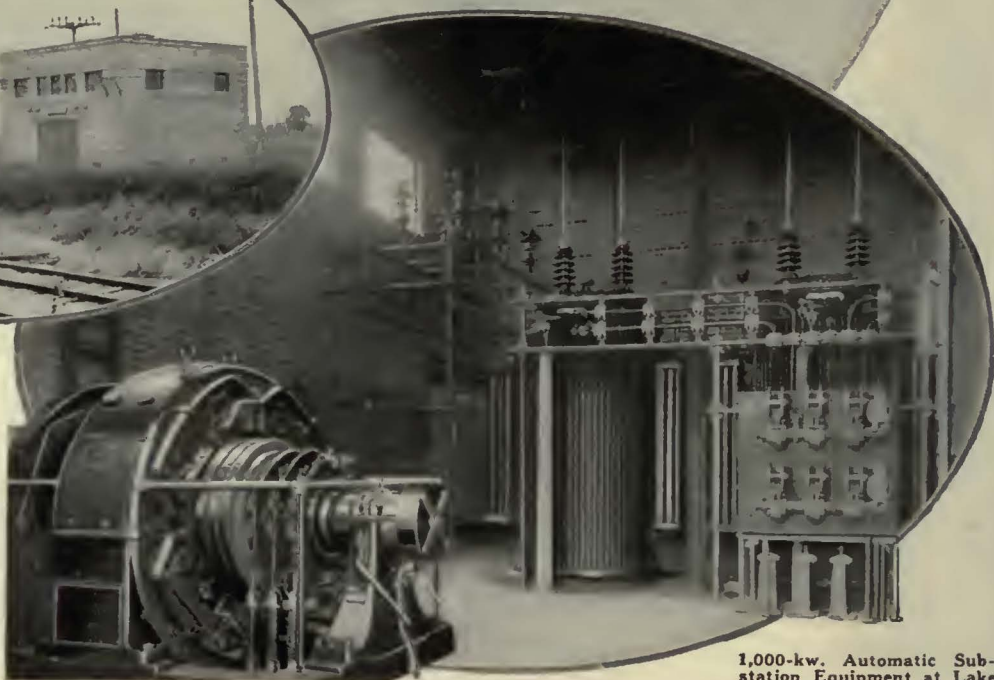
Sales Offices in
all large cities



"The Road of Service" uses Automatic Stations



Automatic Substation, Chicago, North Shore and Milwaukee, Beach Station.



1,000-kw. Automatic Substation Equipment at Lake Bluff.

And G-E Supervisory Control

Steam road, boat, and motor competition have not retarded the growth of the Chicago, Milwaukee and North Shore Railroad, with a management that has set new and better standards.

Maintaining schedules punctually on an 85-mile, double-track interurban calls for the best possible distribution system. Low voltage cannot be permitted. A solution was found in the automatic substation.

More than 5 years of automatic substation operation are being followed by installations of G-E supervisory control. These pioneer installations have been made for the Lake Bluff and Ravinia Stations, placing the substation apparatus under the direct supervision of the train dispatcher.

Confidence in this new G-E automatic control equipment for the North Shore has been established by its stations now in operation: 7 automatic substations, 7 manually operated, and one portable, totalling 15,400 kw.—all G-E equipped.



General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

ELECTRIC RAILWAY JOURNAL

Consolidation of *Street Railway Journal* and *Electric Railway Review*

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Managing Editor
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Volume 60

New York, Saturday, November 11, 1922

Number 20

A Prompt Inauguration of Committee Work Will Help the Industry

PRESIDENT EMMONS of the American Association and his colleagues the presidents of the affiliated associations are making their committee appointments and the prospects are good for immediate resumption of committee activities. The earlier the committees can get started to vigorous work the better, because the period is all too short between now and July 1, when reports must be completed.

There is another good reason for starting committee work soon after the annual convention. The presentation of reports there and the resulting discussion furnish a certain amount of stimulus to renewed effort. This stimulus dies out with time, and if the organization of the new committee work is not started within a few weeks of convention time the committees have the task of getting up fresh interest as well as laying out their detailed duties. There is, furthermore, a certain snap to promptness which helps in getting up speed.

After all, the annual convention and the mid-year meeting form only the more spectacular part of the association functioning. The steady grind of committee work is the basis of the association's greatest usefulness, and every week lost in getting started is a real loss to the association.

Trackless Trolley to Be Given Real Trial in Near Future

AS LONG as discussion about the trolley bus related to installations in far Shanghai, or even comparatively nearby England, it provoked only casual interest in this country. The situation has changed materially during the past few months. This is largely due to the fact that reputable manufacturers have recognized this field as a reasonably attractive outlet for their product and they have put enough real development work into the trolley bus to render it appealing to transportation interests. The subject was considered important enough by the members of the American Institute of Electrical Engineers to induce them to devote the opening meeting of the New York section to it this fall. An attendance of several hundred men at the meeting indicated that the program committee made no mistake in selecting this topic.

The most convincing proof that the trolley bus will operate satisfactorily is that it is operating well on Staten Island, New York City; in Windsor, Ont.; in Toronto, Ont., and in Baltimore, Md. After having had experience with eight buses for a year or more, the Department of Plant and Structures of New York City on Nov. 4 put fifteen more into commission. The head of that department is enthusiastic for the trolley bus and says that it is the most economical form of surface transportation today. It will take time, and the data that come with time, to determine the accuracy of this assertion. Until the data are forthcoming, this type

of vehicle will receive, and is receiving, much favorable attention partly for the reason that the overhead lines which feed it give an appearance of permanency to its route. Whether the savings of the bus trolley will offset the lower first cost of the gasoline bus remains to be considered. Some railway men, at least, think that they will. For example, the management of the New York State Railways has concluded that the trolley bus is the thing for certain crosstown and extension service in Rochester, and some of it heavy service at that. This conviction has taken the form of an application to the City Council for a franchise and construction will be pushed immediately such franchise is granted. The Virginia Railway & Power Company, long a believer in the possibility of this type of vehicle, has just placed an order for a couple of buses for Petersburg. All of this indicates that the merits of the vehicle are now in rapid process of determination.

What the Elections Mean to the Railways

ON THE national aspects of the Nov. 7 elections there is no need for comment here, but in some of its local phases, the election does have an intimate bearing on the work of some of the utilities. In Chicago the machine backed by Mayor Thompson, which has consistently fought the street railways, has been dealt a heavy blow, though this particular election is of interest only in its relation to the prospect of Thompson's re-election. In New York the people have returned to the governorship Al Smith, a Democrat, and have repudiated Governor Miller. The utility issues there were the water power matter and "home rule" in utility regulation. It is doubtful whether the voters over the State were sufficiently well informed on the water power matter to let it weigh with them, but in New York City it is probable the voters succumbed again to the 5-cent fare fetish of Mayor Hylan, whom they re-elected to office a year ago.

When Mr. Smith was Governor before, in 1919-1920, he realized that the electric railway problem was an economic one, and although measures of relief came grudgingly at first, still they came. When Governor Miller went into office, he insisted that a constructive policy be followed in dealing with utility regulation and as a result the utility commissions were reorganized and work started of unifying the traction systems in New York City and establishing a proper fare. A good beginning has been made on this program, but the real fruition of the work remains to be seen. The vote gives concern to the prospect of any real accomplishment on account of the hostility of the Governor-elect to the Transit Commission. In his talks on the stump Mr. Smith was of course bidding for votes, but should the attempt be made by him to abolish the Transit Commission or otherwise change the commission law, the conclusiveness of the vote in his favor would seem to

indicate that the Republican Legislature will not hold out against him. In such event all the work of the Transit Commission would probably go into the discard. This would be a crime against the city and would throw the traction situation back into chaos.

In New Jersey the case in some of its aspects is somewhat similar to the result in New York. There also a Democrat and a pronounced advocate of 5-cent fares has been elected Governor, but he has with him a Legislature of the opposite political faith.

There was also a water power issue in California, but it was in the form of a constitutional amendment which would have pledged the credit of the State to the extent of \$500,000,000 to engage in the business of developing hydro-electric power. The measure appears to have been lost by a vote of nearly two to one. In San Francisco, however, an amendment to the city charter was passed which opens the way to the purchase of the United Railroads by the city, if a price can be agreed upon.

Even late popular idols with the public were brought up with a halt on Tuesday, for in Detroit, where Mayor Couzens recently put over municipal ownership of the car lines, the vote was two to one against his proposal to oust the Detroit United interurban cars from the city streets, the proposed amendment to relieve the municipal railway of the cost of paving between the tracks was defeated and an issue of \$5,000,000 of bonds to extend the municipal railway was voted down.

Problems of Rush Hours and Slack Hours Differ

THE problems of the rush hour and non-rush hour in city transportation service differ radically. In the former the chief purpose sought is to carry quickly and safely to their destinations all persons who present themselves for passage. As a rule some slight discomfort in travel is not considered by the public so important at these hours as speed and safety, and most passengers will board the first car or train which comes along in preference to waiting, even if they are reasonably sure that there is a seat on the following car.

During the non-rush hours conditions are different both with the company and the public. The latter, while perhaps just as critical of delays as during the rush hours, is more insistent on comfort in travel. In these hours, also, the company has more opportunity to build up travel. It also has more incentive to do so because it can thereby fill in the valleys in its daily traffic curve.

Many rules as to economical car operation apply to both rush-hour and slack-hour traffic. Such rules include through routing and means for increasing running speeds, such as reduced street congestion, rapidity of passenger interchange and double berthing on crowded streets. Other rules are more applicable to one period than the other, and among these is accurate timing of runs. In the rush hours, indeed, it is less easy to maintain schedules exactly. But in the non-rush hours, much can be done and should be done along this line. It helps traffic in two ways. An unusually long gap between cars will not only send prospective passengers walking but will crowd the delayed car so that it is likely still further to be put off its schedule. This means that the need for accurate time operation, especially in the slack hours, should be drilled into the operating force.

Picking Men for Jobs in All Electric Railway Departments

FOR many years past the American Electric Railway Association and its subsidiaries have shown an active interest in the subject of selecting and training employees. Committees on education, on apprenticeship and on selection and training of employees have studied the field, tried experiments and written reports. These committees have been continued for a time, discontinued and later revived, usually in modified form. The problems with which they have struggled are never-ending ones, so that this cycle may be expected to continue for all time. This year the American Association has decided to continue the recently revived committee on education, while the Transportation & Traffic Association will discontinue that on selection and personnel of transportation department employees. The action of the latter association does not imply that the subject has been exhausted, but merely that effectiveness seems to demand concentration along somewhat different lines this year.

This committee, during its short career, has done much to stimulate interest in the human side of electric railway operation and has left a number of tangible records of its activities. Besides the record forms, outlines of procedure, etc., which the T. & T. Association committee has prepared, it has done the following general things which are of value: First, it has emphasized the need of greater care in the selection of employees. In fact, as the studies of the committee have progressed, this phase of the subject has seemed to assume greater and greater importance. It has become clearer than before that much money and effort can be saved by eliminating the unfit and less fit individuals while they are still in the applicant stage. Second, the committee has shown that science can be of help in the selection of employees, without the use of academic or high-brow methods. This idea has only been partially impressed upon the industry, but progress is being made in the selling campaign. Third, the committee has furnished some excellent illustrations of the ways in which rational selection methods have been used on a number of properties. While experiments made so far have possibly shown more of what ought not to be done than what ought to be done, they are none the less valuable because of this fact. By a process of elimination faulty methods will be discarded and the proper ones continued until finally there will be reasonable assurance of a high average in selecting employees.

During the past year or so the psychological aspects of employee selection have come to attract a good deal of attention. It is to be hoped that something tangible will come out of this interest. It is obviously just as important to pick out a man with a good brain as one with a good arm, and psychology ought to be of help in doing this. However, this is only one aspect of the subject, and those which are less spectacular ought not to be lost sight of. During the coming year electric railways ought to, and doubtless will, try out many of the suggestions that have been made by the committee with a view to assisting them in picking employees intelligently. This will result in an accumulation of valuable data. Later, when the subject is again taken up for discussion, either under the wing of the parent association or of one of its subsidiaries, considerable progress ought to be in evidence. While the Transportation & Traffic Association has recently taken the initiative, the subject is one of general importance.

Expediting Traffic at a Busy Beach

New York State Railways Builds Loading and Unloading Terminal on City Property at Charlotte Bathing Beach in Such Form as to Facilitate Rapid Handling of Passengers with Minimum of Obstruction—Sightliness an Important Feature of the Design



LOADING PLATFORM, SHOWING SHELTER, TURNSTILE STATION AND CHANCE BOOTH



GENERAL VIEW OF UNLOADING PLATFORM, SHOWING WATER BARRIER AND TURNSTILE

ON THE shore of Lake Ontario $6\frac{1}{2}$ miles north of the business center of Rochester, N. Y., the city has recently acquired property which it has turned into a small park. The beach at this point is of fine, clean sand and is wide and gently sloping from the street level to the water. The city has provided bathhouses and automobile parking spaces and has beautified the spot until it is one of the most attractive in the city.

All of the above has much to do with the transportation problem which the development of the bathing beach has imposed on the New York State Railways. The beach is located at the end of Lake Avenue Boulevard, one of the principal north and south streets of the city on the west side of the Genesee River, on which street the railway company has a double-track line. This track leads directly to the business center of the city. It is located in large part inside the curb line, a location which minimizes vehicular interference.

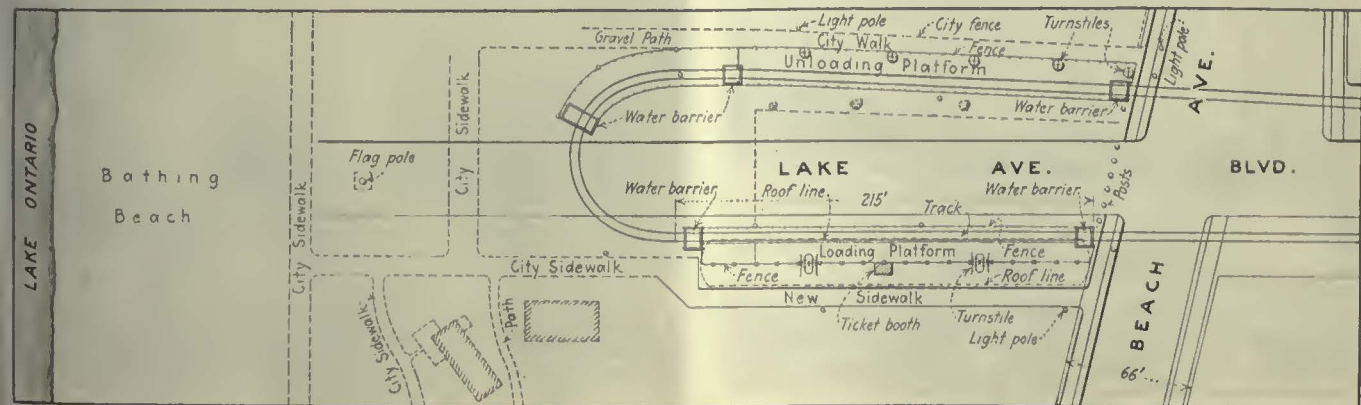
During July and August, 1922, the number of fares collected to and from Charlotte was 500,170, indicating that 250,085 persons trolleyed to the beach monthly. The maximum number of fares collected on one day was on July 15, when the number was 23,785. The track has

ample capacity for handling this large traffic but the problem of handling the people at the terminal was a serious one. It was, however, successfully solved, in co-operation with the city authorities, during the season recently closed. The accompanying pictures and drawings show how this was done.

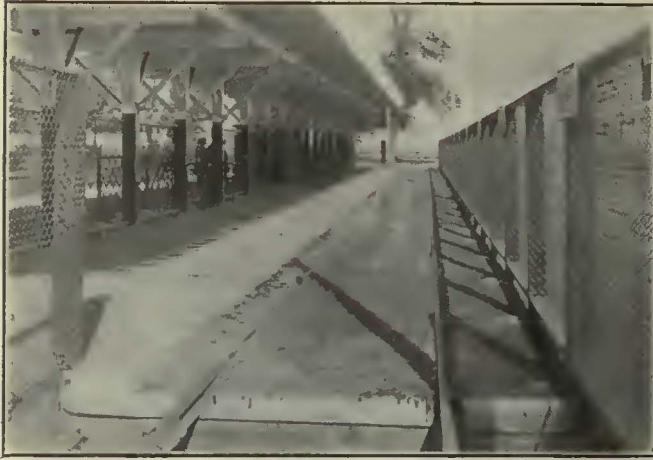
LOADING AND UNLOADING ON OPPOSITE SIDES OF STREET

The first step was to build a single-track loop with the two sides on opposite sides of the street and of a length within the park sufficient to permit the simultaneous loading and unloading of four cars or two trailer trains. The unloading platform was located on the outbound side of the street and the loading platform on the inbound side.

The unloading area was fenced in with large-mesh woven-wire fencing, 4 ft. high, this type being adopted to offer as little obstruction as possible to the view of the park and the lake. A form of cross-woven fencing was selected on account of its flexibility and attractive appearance. A stone screenings platform 12 ft. wide was provided between the track and the fence, and in the fence turnstiles constructed of iron piping in the company's shops were installed. To prevent ingress



GENERAL LAYOUT OF CHARLOTTE BATHING BEACH TERMINAL OF NEW YORK STATE RAILWAYS, ROCHESTER LINES



LOADING PLATFORM FROM TRACK SIDE WITH WATER BARRIER IN FOREGROUND



CLOSE-UP VIEW OF FARE COLLECTOR'S STATION, SHOWING TURNSTILES, AUXILIARY FENCE AND ONE PANTOGRAPH GATE

from the park to the unloading platform, water barriers were installed across the track at each end of the unloading platform. These barriers consist each of a cement basin, 10 ft. square and 18 in. deep, with top flush with the ground, partly filled with water, the water level coming just below the rail base. Where a tie rod is exposed over the barrier it is covered with rubber hose to prevent injury to a person who steps into the basin by accident.

Warning signs were conspicuously placed to supplement the warning which is furnished by the presence of the barriers, and the barriers are well illuminated at night further to prevent accident. As an extra precaution against the entrance of passengers to the unloading platform from the park end, the unloading platform was extended at the far end nearly to the curb line of the street, and an extra wide barrier was installed across the space at this point from fence to fence.

LOADING PLATFORM DETAILS WELL WORKED OUT

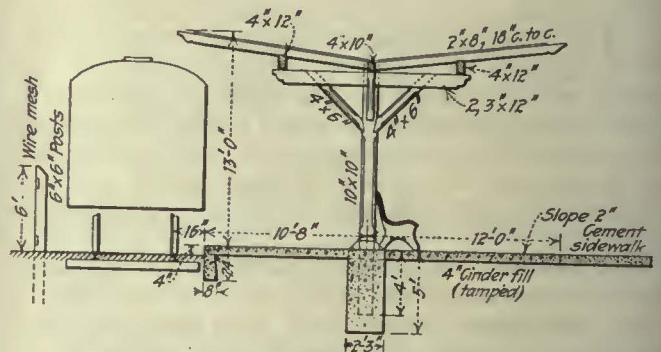
The loading platform is 10 ft. 8 in. in width and raised 4 in. above the rail level to facilitate boarding of the cars. It is a fill of stone screenings, edged along the track with a concrete curbing 2 ft. deep.

Water barriers of the same type as those used on the unloading side of the terminal are used on this side, only one being used, however, at each end.

The loading area was fenced in with more substantial fence construction, the fence being 6 ft. high as compared with the 4-ft. fence across the street.

Along the outside fence line an attractive and substantial shelter was erected, the roof being supported on a single line of posts. The total spread of the shelter roof is 24 ft. and it slopes from the outside edges to the center, which is 1 ft. 3 in. lower than are the edges.

The accompanying cross-section gives the details of construction, which is necessarily substantial on account



CROSS-SECTION OF LOADING TERMINAL PLATFORM AND SHELTER AT CHARLOTTE BATHING BEACH

of the anticipated heavy snow loads. The columns are 10 in. x 10 in., long leaf yellow pine, spaced on 11-ft. centers, and set 4 ft. deep in a concrete base 5 ft. deep and 2 ft. 3 in. square.

The roof of the shelter projects on one side over the car roof and on the other over a stone screenings platform 12 ft. in width. The latter platform, in turn,



SITE OF THE NEW CHARLOTTE TERMINAL BEFORE THE BEGINNING OF CONSTRUCTION



GENERAL VIEW OF THE TERMINAL AS SEEN FROM THE PARK SIDE

abuts on a wide concrete walk leading from Beach Avenue past the shelter to the beach.

Two turnstile entrance stations were provided, a "close-up" of one of these being shown in an accompanying illustration. The design of these stations was carefully studied to provide for facility of entrance, ease of fare collection and control of ingoing stream of passengers so as to prevent overcrowding. In the plan these stations are shown in diagrammatic form only, but the details can be appreciated from the picture. A station occupies the space between two adjoining posts, and in the center is a railed stand for the fare collector. A fare box (not shown in the picture) hangs on the railing in front of him as he faces the incoming stream of passengers.

On each side of the conductor's station is a pipe turnstile, made in the company's shops, which can be unlatched by means of a pedal in the floor. Thus the collector controls one turnstile with his left foot and one with his right.

In front of the turnstile station is a substantial

pipe-framed fence, with the ends flared slightly away from the line of the posts and with pantograph gates at the ends. This furnishes control of the ingoing streams of passengers, only enough of whom are admitted at one time to fill three cars comfortably.

In the main fence, also, is located one 10-ft. gate, which is kept open when the turnstile stations are not in use. Out of the bathing season there is not enough traffic at the beach to warrant the operation of the turnstile stations.

Midway of the length of the entrance platform is a change and ticket booth, an essential feature of the operation of the terminal because the local fare is 7 cents or a 6½-cent ticket.

On the north side of Beach Avenue the city has installed a number of posts to prevent vehicles from going farther north on Lake Avenue Boulevard than this point. This permits pedestrians to use the street as a walk. Some of these posts, however, have been made removable, so that vehicles can be admitted to this space if desired.

Printing Interurban Tickets as Used

Cash Register Adapted as Ticket Printing and Issuing Machine Materially Expedites Ticket Selling—Accounting and Auditing Greatly Simplified

BY T. B. MACRAE

General Auditor Chicago, North Shore & Milwaukee Railroad

A NOVEL departure from the customary method of selling railroad tickets was recently instituted by the Chicago, North Shore & Milwaukee Railroad. Tickets are now printed and issued by a cash register at the heaviest stations on the line. This scheme, which is being followed in eighteen stations, at two of which two machines are required, has proved to be practicable from both the ticket selling and auditing standpoints. Besides materially expediting the speed at which tickets can be sold, the agent is relieved of the tedious task of checking his sales when the ordinary type of ticket was in use. In a few of the stations change makers are used in conjunction with the register to make possible a still quicker transaction.

The ticket machine is essentially a cash register with additional features built into it for issuing railroad tickets. It is not yet a stock machine, but is manufactured upon order only. The tickets printed by it are much larger than we desire and this disadvantage has not yet been overcome. The ticket delivered is perforated so that there is a stub portion, which is torn off by the conductor and used for a hat check, and a ticket portion that is collected and sent to the auditor's office in the usual way. The detachment of the stub automatically invalidates the ticket. The machine prints the destination on both the stub and the ticket in numerals, the amount for which the ticket was sold, the date of sale and the number of the ticket. The reading portion of the ticket and the signature are printed from a die which can be changed at any time. We anticipated that passengers would object to a number being used for the destination, but no trouble has arisen on that score. On the contrary, the fact that the price of the ticket is also shown has in some cases prevented disputes between the passenger and the con-

ductor as to the destination. Thus the number of the station and the price printed furnish a double check in case of error. The tickets are printed on paper water-marked with the name of the railroad.

A blank roll sufficient for recording the sales of about 900 tickets is placed in the machine by the agent, and as each ticket is issued a record is made on this roll of the number, the destination and the price. It is impossible for the agent to get a ticket out of the machine without leaving this record, and this part of the mechanism is locked from the agent.

With the machines now in use, tickets can be printed for ninety-nine destinations and for any amount up to \$99.99. In selling a ticket the agent presses the number corresponding to the destination, the proper keys for the amount and then touches an electric button and the machine delivers the ticket. For a half-fare ticket the depression of the proper key causes a "½" to be printed on the ticket also. If an agent sells any other form of ticket, for example a mileage book, a ticket is printed with the number of the selling station as the destination, while the amount shown is that of the price of the book. The ticket issued is kept by the agent and forwarded to the auditor with the daily report as evidence of the transaction.

At the close of the day's business the agent removes the carbon record from the machine to accompany his report. The difference between the commencing and closing amounts is shown by the tabulator in the day's sales. To insure the accuracy of the report it is only necessary for the agent to check each amount recorded against the destination. A simple form of daily report is required which takes but a few minutes to prepare. As a daily report is required from each agent on the line, this machine, which eliminated an elaborate report

and insured accuracy, met with instant favor on the part of the agents. The tape sent in requires more clerical help to audit than the regular form of report, but this is more than offset by the reduction in accounting along other lines.

When we started to use the ticket machine we were not confronted with the problem of issuing round trip tickets and, instead, a passenger is given two tickets good in either direction. We abandoned the use of round-trip tickets some five years ago to reduce the stock of tickets required and had the tickets printed so as to be valid between two points in either direction. For use in an emergency each station is supplied with a sealed ticket case and when the seal is broken the fact is immediately reported to the auditor's office.

The adoption of the cash register was the result of much study on the problem of improving the ticket-selling system and reducing the cost of that item. It is steam railroad practice, in general, to appoint an agent for each station and to hold him responsible for the proper accounting of that station. Due to the difference in operating conditions on most interurban

him, the objections of the agents were overcome and a substantial reduction in expenses in the auditor's office was contemplated.

This plan, however, was abandoned when the auditor was approached by a representative of the National Cash Register Company with a proposition to install a machine to print tickets as they were required. An experimental machine was bought and installed in the station at Wabash Avenue and Adams Street, Chicago. The operation of this machine was carefully watched by both the operating and accounting departments. Some apprehension was felt at first that the machine would slow up traffic, but actual operation showed that an agent could sell tickets much faster with this device than from a ticket case. The record of this particular machine is 2,200 tickets in a period of eight hours or nearly 300 an hour. The cash register will deliver in an hour almost as many tickets as an ordinary agent will sell in a day. Our heaviest station is now selling about 500 tickets per shift of eight hours. As a result of this initial test, all of the heavy stations have been provided with these machines.



LEFT, TICKET-ISSUING CASH REGISTER AND, CENTER, CILANOE-MAKER IN WABASH AVENUE STATION, CHICAGO. RIGHT, SAMPLE TICKET —AR DESTINATION "2" SHOWN IS NUMBER OF ISSUING STATION AND NO PRICE IS PRINTED. THE TICKET IS NOT GOOD FOR TRANSPORTATION

railways it is not practicable to appoint an individual agent for each station. It has been found necessary to have two or more agents for each station and each agent naturally objects to any one else selling from his ticket case, for in the event of a shortage it would be impossible to place the responsibility for the loss. Each ticket seller, therefore, has to be provided with a ticket case, and following this practice there are at least three cases at each station on the North Shore Line. Each regular agent has one and the third is for an extra agent who might be sent to the station in the absence of the regular agent. Three times as many ticket accounts must be kept in the auditor's office as would be the case if there were only one person responsible, and a much larger stock of tickets must be carried. In addition the extra ticket case has to be audited each time an extra agent is sent to the station.

In order to overcome these conditions, the accounting department worked for a long time on a scheme to place rolled tickets in each station. This plan provided for a sealed carton constructed in such a manner that tickets could be removed in any quantity but none could be replaced. As the rolled tickets were to be supplied by the traveling auditor and sealed in the carton by

The accounting department is now experimenting with a tabulating machine, also manufactured by the National Cash Register Company, which, it is claimed, will greatly reduce the clerical help required to audit and compile the statistics, not only from the register tape records, but also for the regular daily ticket reports. The results secured so far appear to bear out the claim.

Arkansas Utilities Exhibit at State Fair

THE Arkansas Utilities Association saw the opportunity to sow good seed with a display at the Arkansas State Fair. Every branch of the public utility industry was represented. On Oct. 11, Utility Day, addresses were made by Governor McRae, former Governor Brough, Mayor Brickhouse of Little Rock, State Director of Public Information Earle W. Hodges and others. The importance of the utilities and the fact that their interests and those of the public are linked were points emphasized by the speakers. So successful was the program that Director Hodges was asked by the fair management to arrange part of the program for Saturday, when Rev. H. G. Knowles made an address on public utilities.

“The Customer Is Always Right”

That Is, He's Right or Wrong, or Neither, or Both—In Any Case the Railway Can Assume that the Customer Wants a Two-Cent Transfer, Not \$10,000, and that He Really Had No Smaller Change than a Double Eagle

BY FRANK H. WARREN

Claim Agent of the Chicago, South Bend & Northern Indiana Railway
South Bend, Ind.

DURING the course of our recent business indisposition, when the funeral notice was almost on the press, the electric railway industry has been beset by a rapidly shifting multitude of high-sounding, plausible maxims, each warranted to rescue any business from the slough of failure and set it upon the highest pinnacle of success and prosperity. Among those with which we have been bombarded in these recent years are advertising salesmanship in transportation, merchandising transportation, operators as salesmen, local investors, zone fares, and numerous others. Just now we are urged to cultivate public good will as the most important asset we can have. It reminds me of the allopath and the osteopath and the homeopath and the chiropractor and the divine healer and the rubber and the surgeon and all the other varieties of healers of human physical ailments. The truth is that all the methods suggested have some merit, but none is a cure-all.

In our business distress we have looked with hopeful eyes upon every fair sounding catch phrase, and have gone from one to the other, getting a little help here and there, while nature in the form of general labor, business and economic conditions, has been busy, and the patient is improved. Just how much of the improvement is due to the medicine and how much to nature we know not. We have faith that all have done some good, but if the medicine has done nothing more than sustain our hope and courage while nature produced the cure, it was worth taking.

Out here in the Middle West, if not elsewhere, we have been tendered one prescription which some have been reluctant to try, because some of the ingredients look dangerous. This policy is the one on which Marshall Field is said to have founded the greatest retail business in the world, “The customer is always right.”

Now the fact is that any given situation will be one of three: First, the customer is clearly and indisputably in the right; second, he is clearly and indisputably in the wrong; and, third, it is uncertain whether he is right or wrong, or he is partly right and partly wrong.

In the first instance our application of the policy can be prompt and decided. It is the height of foolishness to try to defend an indefensible position. But every industry has an occasional man who considers it criminal and traitorous ever to admit of an error. Such a man has no usefulness whatever in meeting complaints. An immediate acknowledgment of the justice of the customer's contention is the first step, followed promptly by the correction of the mistake. And in this correction we can well afford to be generous.

My position is that of a claim agent, and when a man comes into my office, having invested 5 cents with us as a passenger, and makes demands of me amounting to from 100 to 100,000 times his expenditure with us, it is simply out of the question for me to be

generous according to his standards of generosity. No business, be it public utility or private, can do otherwise. Spend \$10 with a shoe dealer and then demand of him a thousand or ten thousand dollar damage and see how generous he is. Observe how the policy “The customer is always right” works then. But limit your demands to the amount of your purchase and the policy will become active.

When a customer makes a demand involving the

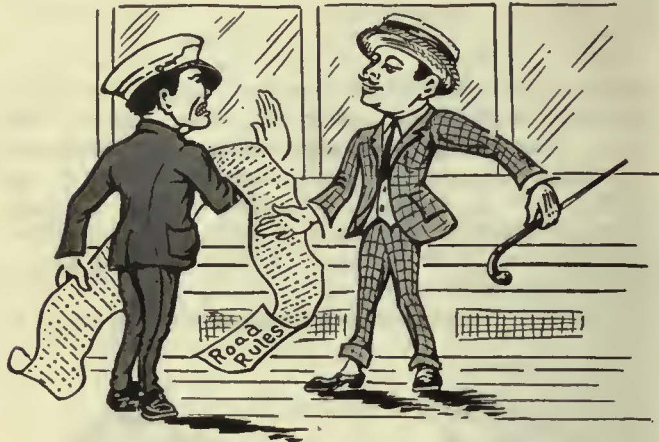


IT SHOULD NOT BE NECESSARY TO ASK THE OUIJA BOARD WHETHER THE PASSENGER IS RIGHT

amount of his expenditure with us—5 cents or 10 cents—we can be as generous with him as can any private business in the world, not excepting Marshall Field & Company. We can be more generous because our sales unit has so low a value. This is where the transfer question comes in. When a customer comes into the office with a transfer that has been improperly rejected, we can take up that transfer, give the passenger his 5-cent or 7-cent fare or a new transfer and send him on his way rejoicing. Or when he has a story of a refusal to give him a transfer, we can punch one for him and send him out happy and friendly. We do not need to question him like a criminal; we do not need to delay him with a long investigation. We can surely assume here that the customer is right and treat him accordingly.

In the second case, where his own story shows that the passenger is wrong, it is perfectly proper, as any private business would do under the same circumstances, to try moderately to show him where he is wrong. Failing in this effort, we could place him in class one for the purpose of this particular instance and deal with him exactly as we did with the class one man. But do we? We do not. We hold him to the rules. Lord, how close we hold him to the line. He is up against a wall of steel, cement and reinforced concrete. Not a fraction of a hairbreadth do we move. And the money involved is 5 cents or 10 cents or the value of a transfer! My grocer would not hesitate one second to take the opposite course; I tried him and he attempted to make me take back a 10-cent overcharge

of which he had no knowledge. Recently a young man came into an office and complained that he had been refused a transfer because he rode past the transfer point while interested in a conversation. He was wrong under the rules, and the rules were just as rigid in the office as they were on the car. An explanation and a transfer would have sent him out a friend, and he possibly would never have made another similar



THE RULES ARE THERE, BUT THE CONDUCTOR NEED NOT ABUSE IN FOLLOWING THEM

complaint. He got the explanation but no transfer, and left the office an enemy to that company. If the office man who met him had accepted the policy that the customer is always right, he would have handled the case much differently and much better.

In private business the enforcement of this policy lies among the other duties of supervisory or administrative officers; it cannot be left in the hands of clerks. To at least an equal extent it must rest with similar officials of a street railway.

The application of the policy lies almost exclusively in the handling of complaints. In private business, complaints may be broadly divided into those about merchandise and those relating to service. From this division alone it is at once apparent that a business whose merchandise is service will occupy a peculiar position as to this policy. My experience in private business is almost entirely limited to that of the purchaser, and from that experience it seems that the policy operates as to merchandise complaints and has little or no application to service complaints. As applied to merchandise it means the practical guarantee by the seller that merchandise shall satisfy the purchaser according to the latter's own standards of quality. If the purchaser says the shirts are bad and not as described by the seller, and if he persists in that opinion, his position is accepted as correct and the transaction handled accordingly. The firm that goes farthest in operating on this principle is usually accorded the highest business standing.

Is this principle of business practical for the street railway industry? If it isn't practical, the sooner its suggested use is abandoned the better. If it is practical, just how and where can we use it?

We have no merchandise in the sense that private business has, and therefore we can have little if any use for it in its commonest field in private business. We cannot redeem our merchandise because that presupposes a return of the article. Nor can we exchange articles, for the same reason. We might replace them

perhaps, but that act with us would require a sacrifice that no private business would make.

To be perfectly fair about this thing and not thoughtlessly charge the street railway man with lower business ethics than the man of private business—if the merchant could not get back the complained-of article, if the customer had had full use of it, if the shoes had been worn out although they did pinch the wearer's toes and cause corns—would there be any refunding, or replacing or exchanging by the merchant? I rather imagine the answer is no. But this is just the situation in which every street railway company finds itself in complaints about its "merchandise," and the commonest of all applications of the policy is closed to it. This is so fully appreciated by its patrons that I have seldom known of a street railway being asked to refund. Unused tickets are not in point. We are asked to redeem them and we do redeem them, but while our patrons unhesitatingly demand this of us, it takes an unusual amount of "nerve" for the customer of a private business to demand his money back just because he decides he doesn't want what he bought. It's too much like branding himself as an imbecile.

There is a field for applying the policy in the handling of certain kinds of complaints about the operator's refusal to issue or refusal to accept a transfer.

When the complaint is directed at the conduct of employees, this policy can hardly be followed. Such complaints are nearly always personal matters. Private business will not follow the policy in similar complaints. Complain of your serving of meat at a good hotel and the meat will be promptly changed; complain of the discourtesy of the waiter and you will be told that the management does not uphold such conduct and will take up the matter at the earliest convenient time. They cannot accept the customer's judgment there, and neither can utilities. Or, rather, while they may be able to accept the patron's judgment, they cannot apply the prompt remedy as in the meat instance. Such a course is incompatible with maintaining an organization, is not fair to the employee, and would in the end be opposed to the best interests of the patron.

All of this refers to the attitude of supervisory offi-



TAKE THE BILL AND GRACIOUSLY ASSUME THE PASSENGER IS REALLY CAUGHT WITHOUT CHANGE

cial, but that is by no means the limit of use of the policy. Clerks in stores cannot refund money or replace inferior or defective articles; they can only refer the customer to the proper person. Nor can operators on cars issue or accept transfers contrary to their instructions, redeem transfers with money or do anything that

requires the payment of money or the giving away of our merchandise. But they can know the company policy and they can refer the customer to the proper person. It would be highly valuable for these men to know that the company is anxious to make things right and say so without committing the company to definite action in a specific case. Any clerk knows what is the policy of the company he works for, he is certain of



WHAT'S THE HARM IF THERE IS ROOM, AND IF NOT, HE CAN BE APPEALED TO AS A GENTLEMAN

his ground and need not hesitate to express himself. Our operators should have equal knowledge and confidence.

In many cases the operator himself can apply the policy. It is a change of mental attitude more than anything else. "The customer is always right" should mean to the man on a car that when a passenger comes up and says "I wanted to get off at that street. Didn't you hear the bell?" the customer is right—he did want to get off there, he did give proper notice, he has performed his part absolutely right, and the operator assumes this to be the fact even when he knows it is not the fact. He assumes that the bell didn't work, or he didn't hear it, or he forgot it, and says, "Oh, I beg your pardon!" stops the car at once, and lets Mr. Passenger off. "The customer is always right."

When an operator is tendered a large bill in payment of a 5-cent fare, this new policy prompts the operator to believe that the passenger is compelled to tender such a bill. Instead of assuming that the passenger is trying to ride for nothing or is just plainly mean or contrary, he assumes that the passenger is doing his very best and that for any one of a dozen reasons he has been caught without small change. The one thing he does not assume is that the annoying act of the passenger is intentional. This attitude of mind will provoke the correct handling of such a situation unless the operator is utterly unfitted for his job.

It may be that not every situation an operator faces can be met on this theory, but it is certain that a great many of them can be so met. In a series of meetings held on this property recently those presiding at the meetings had presented to them many specific cases, and there were few, if any, to which practical transportation men could not apply this policy. Operators using this policy show a consideration for their passengers that others do not have.

The objections to all this are two—the first one is that it can't be done, that it isn't practical for a street railway. The second—but little different—is that such

a letting down of the bars would result in serious financial losses and the breaking down of all our organization by letting the customer run the business. The only real proof of the practicability of such a policy is its actual successful use somewhere, and sooner or later somebody will put on a satisfactory demonstration. As to the second objection, it seems no more valid in the street railway business than in private business. I have no doubt that when the policy was first proposed and discussed in the Marshall Field & Company organization it met with strenuous opposition, and there were predictions of enormous losses through abuse by their customers. No doubt there is some abuse, but the gains far outweigh the losses.

This standard can be applied to specific transactions, but hardly to general company policies and plans. Extensions of lines, frequency of headways, types of cars, financing and other similar matters cannot be handled according to this standard. The customer cannot be the judge here, although his opinions are entitled to consideration. No private business could let the customer decide whether or not a new store should be opened, additional clerks employed, the stock of goods increased or diminished, the building remodeled, a stock company, corporation or partnership handle the business, and similar matters that are essentially the problem of management.

Introducing and extending this standard of business dealing should be an aid in the creation of good will. We have demanded and taken our pound of flesh these many years, and, like Shylock, have paid the penalty. It is time to consider the other tack.

Power Plant Uses Barge for Oil Storage

THE New York Central Railroad has two power plants which supply the New York terminal electrified zone. One is in Port Morris, New York City, the other at Yonkers. To avoid any possibility of a coal shortage tying up the power supply, several boilers were recently changed over from coal to oil fuel. To insure prompt supply of oil to the boilers at Yonkers, where six boilers have been remodeled for oil burning, an 8,000-bbl. barge loaded with Mexican crude oil was engaged for an indefinite period, as floating storage, and tied up to a dock alongside the plant.

Steam was carried from the plant through a 2-in. flexible connection to the barge, where it passed to the oil-heating coils and to a small simplex oil pump, both the coils and the pump being part of the permanent equipment of the barge. Another flexible connection ran from the pump discharge to the oil main, which extended through the wall of the boiler-room basement. After being heated to 160 deg. in the tanks of the barge, the oil was forced into the main by the simplex pump and made the circuit of the boiler-room basement. The pressure of 80 lb. at the pump allowed the burners to operate at 75 lb. A steady flow of oil was maintained considerably in excess of that required by the burners, the portion not used coming back to the dock through the return side of the main and passing to the barge tanks through a flexible connection. This excess flow was necessary to prevent the oil from cooling below a workable temperature.

Since the first oil-fired boiler started operation on Sept. 27 it has been running daily, while the other five were being changed over one at a time. On Oct. 24, when the accompanying photographs were taken, three



FLEXIBLE OIL AND STEAM CONNECTIONS BETWEEN
BARGE AND POWER HOUSE

boilers were running on oil and a fourth was practically ready to put on the line. At the same time the work on the settings of the fifth and sixth boilers was well along, and the installation of the inside oil-handling equipment was nearly completed.

This inside equipment is now in operation, and the oil is pumped directly from the barge to three tanks, each of 2,500 gal. capacity. These are located in the basement and will soon be surrounded with a concrete wall 12 in. thick. The space between the tanks and the wall will be filled with sand to reduce the fire hazard. After being heated from 160 deg. to 180 deg. by thermostatically controlled coils submerged in the tanks, the oil gravitates through a twin strainer to a pair of 7½ x 5 x 6-in. duplex pumps connected in parallel. These force it through a heater, where its temperature is raised to 190 deg. before it passes to the burners.

As no outside storage, aside from the barge, has been



OIL BARGE TIED TO POWER PLANT DOCK FOR OIL STORAGE

provided, it will be necessary for the present to keep the barge tied up to the dock whenever fuel oil is burned, replenishing the supply from time to time from other barges. At some future time, if operation with fuel oil is continued, two 30,000-bbl. tanks may be installed outside, probably on a foundation made by driving piles and building up land in an adjoining docking space.

These changes were supervised by the electrical department of the New York Central Railroad under the direction of E. B. Katté, chief engineer of electric traction.

Letters to the Editors

Further Reference to Way Committee Report on Substitute Ties

Nov. 7, 1922.

To the Editors:

It seems most regrettable that the mix-up in the way committee's report should be further held up to the light. It was the hope of all concerned that the withdrawal of the unfortunate statement regarding substitute ties before the presentation of the report would, to a considerable extent, effect this; but in view of the fact that the report with the statement had already been distributed, the editorial of the *Journal* in the issue of Oct. 7 was inevitable.

The comment of the sponsor of the way committee, however, in the issue of Oct. 28 cannot be permitted to pass unchallenged. The editorial columns of the *Journal* are not the place to settle differences of opinion of committee members, and in fact the serious feature of the situation is less with regard to differences of opinion than with the far more important fact that the way committee report as issued, if not a minority report, was far from a unanimous one, as was evidenced by the unanimity with which the members at the convention agreed to the withdrawal of the statement in question.

The reports of the committees of the American Electric Railway Association have in the main had high prestige, due very largely to the extreme care taken to prevent radical unconsidered action. If the association is to maintain the same standing for these reports there must be the same regard that nothing is said or done that is not solidly based upon fact as indicated by a material consensus of opinion in the committee having the matter under consideration, and, where difference of opinion arises, by the display, equally prominent, of the opinions and the beliefs of those in opposition.

The grave facts in the case at issue are that what at best was a minority opinion was allowed to appear, even though it was later withdrawn, without making equally prominent the fact that there was at least a minority which disagreed. It is in this fact that far more mischief lies than in any other feature. Incidentally, without attempting to argue pro or con the criticisms in the *Journal* editorial of Oct. 7, these are facts:

1. There will be found not a few who question whether or not incasement of wood in concrete, in the way that ties are incased, does materially increase its life as effective tie material.

2. Whatever the beliefs of individual members of the committee, the statement of alleged economy or lack

of economy should not appear in a report unless substantiated by good evidence.

3. Statements regarding the behavior of materials or methods should be entirely frank, particularly where a comparison is involved. There will be found very few maintenance of way engineers of electric railways (or for that matter of steam roads, although on the steam roads the conditions are radically different from those in the tracks in which substitute ties are usually laid) who will contend that a wood tie is "thoroughly suitable."
"ENGINEER."

Journal Criticism of Substitute Tie Report Reinforced

NEW HAVEN, CONN., Nov. 6, 1922.

To the Editors:

Referring to Mr. Cram's letter in the *Journal* of Oct. 28 on the subject of substitute ties, it seems to the writer that it is an unfortunate and untimely reopening of a supposedly closed incident: unfortunate, in attempting to explain something which has been repudiated by the committee; untimely, because the committee withdrew the part of the report commented upon before the matter came up formally at the convention. The letter therefore calls attention to something which it might have been best to let drop.

It may be well, however, in view of the fact that the letter has been published, to add another comment, and, as a member of the sub-committee on this subject, the writer desires to do so.

The basis of the report, as stated in your editorial and as printed in the report, was a questionnaire—a "personal solicitation" to "companies that might have experimented with some form of tie other than wood," and 40 per cent of the replies were from companies having had no experience on which to base an opinion.

How it can be inferred from your editorial that the report was "discussing steel ties in particular," as stated by Mr. Cram, is not clear, as you simply state the volume of business of two steel tie companies as an indication that there was a visible demand for substitute ties.

To take up Mr. Cram's remarks on your numbered criticisms in detail:

1. Incasing either wood or steel in concrete will undoubtedly prolong its life from decay or corrosion, but the life of a wooden tie does not depend entirely on its liability to decay, as there are instances of track failure from tie failure where the ties are as free from decay as when they were placed. While steel ties are invariably incased in concrete, this is not necessarily true of wooden ties, which may be covered only on the top and two sides, or possibly, on the top and part of two sides, in which case it is doubtful if the concrete does afford full protection from decay.

2. Since it must be assumed that the railway companies will purchase their ties, whether they are of steel or wood or any other substitute, the committee must have been thinking of "buying features" and therefore "selling features" are implied.

If it is not clear that the use of substitute ties does not call for an added investment, the information can be obtained from some of the companies which have used both kinds.

3. "That the steam roads are still searching for the proper form of substitute tie" has little bearing on the matter and only beclouds the issue, since a track built

in a permanently paved street is not comparable with one built on private way for steam road operation. Is it true that the wood tie is ideal except for decay and scarcity? I doubt it, and believe on the contrary that it has few virtues for paved track and is a makeshift.

4. Are there any data at present available showing that a greater labor expense is entailed in rerailing track laid on substitute ties over the same operation where wooden ties are in use? Is it not true that where a steel tie forms an integral part of the substructure it acts as a reinforcement, and by increasing the bearing area on the soil makes for less liability for track settlement?

5. Assuming that there are 40,000 miles of single track in operation, it by no means follows that there are 105,000,000 wooden ties in use. These figures are based on a 2-ft. tie spacing. This spacing is not universal even for wood ties, and certainly does not hold where substitute ties are used; nor does it take into account the mileage where no ties are installed, but the track is supported on yokes. This figure then must be materially reduced—if it has any bearing on the subject.

The editorial does not state that only 140 companies out of a total of 950 companies use substitute ties, but says that one tie manufacturer has sold its product to 140 companies during the past twelve years, and as there are at least three other tie manufacturers who have also been selling their product during all or a part of this time, the number of railways using substitute ties must be in excess of 140.

The report as originally printed did, unintentionally or otherwise, reflect on the present forms of substitute ties, and was changed at the convention for that reason, and also because it did not agree with the "general experience of the committee members." In other words, the paragraph deleted was a minority report, which through error was incorporated in the printed report. This paragraph created much adverse criticism among the members.

WILLIAM R. DUNHAM, JR.,

Member Committee on Way Matters, 1921-22
Member Sub-committee No. 4.

Interesting Figures on Vehicular Movement in Baltimore

THE UNITED RAILWAYS & ELECTRIC COMPANY
OF BALTIMORE

BALTIMORE, MD., Nov. 3, 1922.

To the Editors:

We have recently made a very comprehensive check of the vehicular movement in and out of the delivery district of Baltimore and the results obtained are very interesting. For instance, our records show that, between the hours of 6 a.m. and 12 o'clock midnight, there were 76,234 pleasure automobile movements in and out of this district, not to mention 37,024 commercial automobile, 21,036 street car, 4,224 bus and taxicab, and 13,821 horse-drawn vehicle movements.

In order to give the industry the benefit of this study in its entirety, J. A. Stoll, superintendent of traffic, will prepare an article for you to use, which will be illustrated by sketches, etc.

It is our intention to inaugurate a "Traffic Counting Day" in Baltimore—an annual affair, so to speak—and the comparisons from year to year will be interesting.

H. B. FLOWERS,

Second Vice-President and General Manager.

Electric Railway Publicity

Devoted to How to Tell the Story

From Abuse to Popularity

Three Years Ago Muskegon Mobbed Its Railway and Junked the Property—Today the Company and Public Are Partners

THE Muskegon Traction & Lighting Company, Muskegon, Mich., has proved that a public service corporation can win the confidence of the public if the proper campaign is conducted.

Three years ago in August the feeling against the Muskegon company was so bitter that the citizens staged an all-night riot. A mob held the city from early in the evening until the next morning. It started over an increase of fare from 5 to 6 cents, put into effect without any publicity.

Buses soon started operating while the cars were being repaired and new rolling stock purchased. Attacks by the city officials and politicians, which had been directed against the company during all campaigns, were renewed with the old bitterness. Troubles seemed to have reached the limit of endurance.

John Ross, then president of the local company, insisted that the American Light & Traction Company, the parent organization, send a trained traction man to Muskegon to act as manager. The company sent George W. Steinwedel to take charge of the situation.

THE CARDS FACE UP ON THE TABLE

The fight to win public confidence for the corporation, something it never had held, was started. Mr. Steinwedel decided the way to do this was to place the cards on the table. The people, however, refused to believe the figures given out by the company, even when prepared by auditors chosen by the city. The new manager used extensive newspaper publicity to place his case before the public. Mr. Ross had held that if the public had received proper notice of the increase in fares in August, 1919, there would have been no riot and mob rule. He believed that the people had been misguided. Mr. Steinwedel freely admitted the company had made grave mistakes in the past; that it had failed to make extensions when it had the money and that there was a real basis for some of the complaints against the service. But he told the people it was not a question of yesterday, but of tomorrow; a question as to whether the people wanted street cars or jitneys.

He reorganized the company's personnel in line with his policy to serve the public. He hammered away at the point that courtesy was demanded and that the public was entitled to all the consideration.

Then came the show down. Jitneys were taking a great portion of revenue from the company, and the company asked permission to stop operating its cars. The Public Utilities Commission granted this permission with the provision that the city must vote on whether it desired the jitneys or street cars on competing lines. A spirited campaign followed. The jitney followers packed the halls and brought in speakers. Indications pointed to a victory for the jitneys.

During that campaign, however, the real estate men, merchants and business men brought out facts regarding the probable reduction in property value once the street cars were eliminated. The city administration, which had changed at about the time the new manager assumed control and was now in the hands of business men, was also a factor in convincing the public of the value to the city of an electric railway. When the votes were counted they stood five to one for the traction company.

The public began to believe the company reports. It liked the new policy, and was convinced that the company did consider it a partner in the business. Finally the fare was increased to 10 cents cash or four tickets for 30 cents, and the public did not object. People are riding the cars once more. At one time, however, the feeling was so bitter that many walked to avoid patronizing the company.

The company notified the city recently that in view of the changed attitude of the people it would borrow money and make many needed improvements. It is laying new steel rails and is considering the purchase of several new cars. The city rebated the penalties on taxes for two years because the company maintained service at a loss. The action was generally approved, but three years ago this would have caused much feeling. The company has notified the city that during May and June it made a profit over both operating expenses and interest charges.

Conductors and motormen have the new spirit. In the old days the public cursed the company and the employees tried to defend it. That caused the patrons to continue the arguments.

In hundreds of ways the company today is showing the public that it wants to give service. It follows up all complaints and is constantly striving to improve service with the resources available. The public has joined and is aiding the company. The people today talk for the company, and it is seldom that a critical word is heard, whereas previously few dared openly to defend it.

"We have proved that the public wants to be fair if it knows the facts and is treated fairly," said Mr. Steinwedel, now president of the company. "The public will go half way any time."

Seven Words Turn the Trick

A SLOGAN developed by the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., is a direct shot into the ranks of automobile riders and at the same time is an appeal to the pocketbook of the taxpayer. "Ride the trolleys and preserve the pavements," is the legend appearing in company advertisements. These seven words present a problem and solve it, and put the idea into the reader's mind that it is somehow, his duty to ride on the trolleys. Seven words could do little more toward winning passengers.

Humanize the News

The Addition of Four Seats on the 8:20 A.M. Car Is More Important to the Commuter Than a Technical Article on Kilowatt-Hours and High-Tension Lines

HUMANIZE public utility information and it will be sought by newspapers for front-page, leading column stories. Let trained newspaper men, and not engineers, handle the news as directors of public relations. Give all the information, give it correctly, and give it first. These points have been emphasized recently by Fuzzy Woodruff, feature writer of the *Atlanta Constitution*, and by J. S. S. Richardson, city editor of the *Philadelphia Public Ledger*, in addresses to utility men. Mr. Woodruff said in part:

What could be of more vital interest to any member of the great masses than a story that an extra service had been added to his particular car line in order that he would be able to devour his matutinal egg and drain his morning cup without decorating his shirt front and scalding his insides in his hurry to catch the last car that would get him to work before the boss arrived on the scene of action? What could be of more intense interest to the housewife than a yarn to the general effect that the power of a mountain stream is being harnessed in such quantities that every curling iron and every electric pressing iron in Georgia could be kept hot twenty-four hours a day without using enough water to fill more than half of the bath tubs in Atlanta once a week?

Then why haven't the newspapers long ago realized the news value of the public utilities? For the simple reason that public utility men are not newspaper men. They've wasted precious time and untold labor and Lord knows how much white paper in sending out to the public startling information to the effect that the U. S. Geological Survey says that Georgia is developing so many more kilowatt-hours than Alabama, and that Alabama has so many thousands more undeveloped horsepower than Georgia, about which the public doesn't care a damn, and accordingly for which the newspapers care hardly enough for the news editors to open any letter received from a public utility.

The public utility has been talking in terms of the kilowatt-hour and high-tension lines, which are as far removed from the public heart as the internal affairs of Timbuctoo, and have forgotten all about the new street car that holds four more passengers and has aisle accommodations for six more people and some sort of a contraption that allows the conductor to make change one-fifth of one second faster and accordingly gets a man to work two minutes earlier than he is accustomed to, which is as close to the public as the watch in the vest pocket of a fat man is to his general cosmogony.

Then the question is, "How are you going to get this message over?" I think the technique is fairly simple. Quit sending in a lot of stuff to newspapers on forbidding looking and formal stationery that tells the editor more surely than if the words were shouted by megaphone that somebody is trying to put something over on him.

When you've some news that's real news, call the newspapers. Tell the city editors you've a yarn. Be sure you have it and when the reporter arrives be sure he gets the human viewpoint of the yarn in question. Don't write it for him. Let him write it himself. He'll put more individuality in it than you will, because his job depends on doing that thing. And pretty soon, you'll find that your office has become a house of call. Pretty soon the reporters and the city editors will be fighting for your news. You won't have to fight for space. You won't have to ask for display. If your stuff carries the human appeal and the personal touch you'll get both in great big gobs.

Public utilities haven't any publicity problems, if the heads of the utilities will only remember that an engineer and a traffic expert and an electrical genius and a financial wizard may be splendid engineers and invaluable traffic experts, and glowing electrical geniuses and wondrous financial wizards, but they are not newspaper men and their training hasn't told them the value of humanizing news.

Always "tote fair" with reporter or editor. If there are some facts you want suppressed, tell the newspapers why those facts should not be published. Pretty generally they will accede to your view, but never give a newspaper inaccurate or incomplete information. The newspaper is bound to find it out. All your work in building up confidence is then and there destroyed.

There's no such thing as "no news" in a public utility office, according to Mr. Richardson. The news is there, but the man to see it is too often lacking. He said:

In company with other reporters, I have called at the executive offices of gas companies for information which, from the viewpoint of the public and from the viewpoint of the public utility concerned, was of great importance. All too frequently we received the old reply, "Nothing to say," when that reply meant a pronounced and serious setback to public relationship with the company. Gentlemen, if you value the friendship of the public, which I am certain you do, guard against that statement: "Nothing to say."

It should not be necessary to dig up facts about the public utility business. Every company represented here is a veritable mine of interesting news matter that should be on tap at all times through a liaison officer of the organization, who appreciates the vital relationship existing between a community necessity and the people who are dependent upon it.

Don't wait for the newspapers to ask you for the facts. Make the news readily available to them. Withholding the facts until forced by public opinion to release them is not a good way to make friends. Beat the public to it. The public likes it.

If you have a man in your office who has the God-given faculty of winning a man's confidence and can handle a matter of publicity or non-publicity, as the case may be, give him the authority to speak for you. He will soon get acquainted with the men of the papers and they will learn to trust him.

The Pennsylvania Railroad, said Mr. Richardson, receives more advertising in the form of news than any other public utility in the world. He continued:

Even on a highly perfected and carefully organized system such as the Pennsylvania, wrecks occur, in spite of all that can be done to prevent them. Prior to ten years ago a newspaper city editor got his information of such an occurrence from any one of half a dozen sources, a correspondent near the scene of the catastrophe, the friendly interne of a hospital to which had been sent a summons for aid, a telephone operator or even a subscriber. Never the railroad. Nowadays when there is a wreck, nine times out of ten, the first information comes from the railroad.

Baltimore Plans Trolleyhikes

ANOTHER company has been quick to realize that—paradoxical though it may seem—hikers are potential trolley riders. The first instance noted in the *Electric Railway Journal* was that of the Philadelphia (Pa.) Rapid Transit Company, which suggested in posters that the street railway provided rapid and easy approach to hiking territory. Now the United Railways & Elec-



TROLLEYHIKE NO. 1.
Catoonsville to Wandsor Hills; About 6 Miles.

Take Catoonsville car (Route No. 8) to Bloomsbury Ave.; cross car tracks at Edmondson Ave. (start may be made here from Ellicott City car) pass standpipe to Johnnyeake Rd. (1½ m.); turn left to Ingleside Ave. (100 yds.); turn right; cross old covered bridge (1.3 m.) to Franklin Hotel; turn right on Dead Run Rd. to quarry at Gwynns Falls Park (2 m.); turn left along Gwynns Falls to Wandsor Mill Rd. (¼ m.); turn right, cross concrete bridge to railway bridge; stairs to waiting station at left. Edmondson Ave. or Hillsdale car taken here to Walbrook Junction, connects with North Ave. and Garrison Ave. cars.

THE UNITED RAILWAYS & ELECTRIC COMPANY IS TURNING HIKERS INTO RIDERS WITH INTERESTING "TROLLEYHIKE" SUGGESTIONS

tric Company, Baltimore, Md., in its issue of *Trolley News* for Oct. 1, maps out four "trolleyhikes," and illustrates these with scenes en route. The hikes are made to appeal to those in search of pleasure and those in search of health also. And after the hike, the hikers are to "get on a car for home." The directions explain what car lines are available and the transfer points.

Iowans Discuss Practical Problems

Sioux City Convention Has 100 per Cent Representation of Companies—Monthly Commutation Ticket, Relations Between Department Heads, Car Maintenance, Current-Collecting Devices, Energy Saving, Lightning Protection of Cars, Lifeguards, Automatic Doors Among Topics Discussed

LAST week the operating men in Iowa and some few from more distant points in Illinois and Wisconsin flocked to Sioux City for the mid-year meeting of the Iowa Electric Railway Association. Approximately 100 delegates attended the two-day meeting Nov. 2 and 3, representing every city in Iowa having electric railway service. With such an excellent turnout of the men who are operating the mechanical and transportation departments, and with the able direction of Chairman John Sutherland, this fall meeting will be recalled with a feeling of time profitably and most pleasantly spent.

The formal program included five papers dealing with problems uppermost in the minds of operating men. Frank V. Skelly explained the introduction and results of the identification card system of fares on the Tri-City Railway, Davenport, while the subject of public relations was dealt with by Joe Carmichael, director of the recently established Iowa Committee on Public Utility Information. Among the visitors was B. W. Arnold, Eastern Wisconsin Electric Company, Oshkosh, Wis., who addressed the meeting on the relations that should exist between a manager and his master mechanic. Henry Cordell, master mechanic, Chicago, North Shore & Milwaukee Railroad, presented a paper relating his experience in maintaining trucks. A paper on current collection was prepared by C. M. Feist, Sioux City. Discussion on these varied subjects was animated and instructive.

Besides the entertainment at the banquet, which developed into a short-story contest, those present were taken to the shops of the Sioux City Service Company, where C. M. Feist presides. Much interest was manifested in a new snow sweeper designed and built in the shops. In the construction of the revolving sweepers ordinary broom straw attached to blades was used in place of the conventional rattan broom. This was described in *Electric Railway Journal* for Dec. 18, 1920, page 1252.

As a fitting climax to the meeting it was announced on the last day that E. L. Kirk, formerly general manager Sioux City Service Company, had been elected president of the Sioux City Gas & Electric Company following purchase of the service company by the United Gas Improvement Company, which owns the gas and electric company. The merger of the two companies was completed on that day.

The convention was concluded Friday with the election of an executive committee. M. Welsh, Waterloo; W. C. Jacobi, Omaha; E. R. McMahon, Des Moines, and L. C. Lemon, Davenport, make up the railway members of the

committee. Manufacturer representatives on the committee are Robert Deneen, Chicago; F. R. Grant, Des Moines, and Nic Le Grand, Rock Island.

The executive committee is empowered to select its own chairman for the year. The newly elected chairman will succeed Mr. Sutherland. Selection of next year's meeting place also is left to the committee. It is probable, however, that the convention will be held at Des Moines.

EXPERIENCE WITH THE MONTHLY COMMUTATION TICKET

In relating the results of the monthly identification card on the Tri-City Railway, Frank V. Skelly mentioned that the card had been subject to some misuse because of the holders splitting the tickets in two. The same misuse has been experienced by the Cedar Rapids & Marion City Railway according to F. M. Ford of that company. This is possible because the cards, which are printed on both sides of thin cardboard, are thick enough to be sliced in two. Mr. Ford said he had spoiled five cards before he was able to split one when he tried the trick. To overcome this feature it was necessary to send all the remaining tickets back to the printer in order to have one side of the cards blanked.

E. J. Anderson, Davenport, added that in cities where the identification card system had been adopted people will use the cards and then pass them out of the windows to friends in order to save three or four cents. In connection with this abuse the presenting of expired transfers by passengers is another evil that is quite prevalent. He described a container for holding transfers that is designed to make this misuse very difficult. The holder, made of aluminum, has several compartments in which are placed the pads of transfers, a different color being used for each direction of travel. Instead of punching the time, the conductor tears off the transfer at a length varying with the hour.

CAR MAINTENANCE KINKS

The reading of the paper by Henry Cordell opened the subject in which master mechanics were interested. The problem of detecting defective axles came up. W. G. Lamb, Waterloo, claimed that the scheme of smearing white lead over the axle was very effective in locating cracks in the axle. It has been his experience that cracks most frequently occur in the fillet adjacent to the gear seat. Mr. Cordell said the same method was used on the North Shore and all axles with even a slight crack are scrapped. He added also that it is his practice to scrap axles when the collar wears down to

$\frac{3}{8}$ in., which is a safer limit than that set by the M. C. B. rules.

The relative brakeshoe cost for cars in city and interurban service as told by Mr. Cordell was illuminating to those who thought that city service gave the worst possible conditions. The city cars of the Chicago, North Shore & Milwaukee Railroad have a brakeshoe cost of 27 cents per 1,000 car-miles, while in the interurban service the cost is about \$1 per 1,000 car-miles. Although the number of stops in the interurban service is less than in city service the braking is done at a high rate from high speed.

In its relation to motor maintenance C. M. Feist, Sioux City, claimed that field coil testing is extremely important. In his shop it is the practice to test the field circuits with a low reading voltmeter after the failure of a motor, to determine if its breakdown was caused by some abnormal condition in the electrical circuit. With this instrument it is possible to detect a short circuit of only one turn in the field.

T. E. Wood, Omaha, said he had had excellent results from the dipping and baking of armatures. As a result of treating armatures in this manner, 50 per cent less were removed from the motor, there was an 82 per cent reduction in the number of open circuits and there was an 80 per cent reduction in the number of armatures rewound. These figures were arrived at by taking the record of 168 armatures one year before and one year after dipping and baking.

The question of how to insure against failure of brake rigging brought out two different methods. Mr. Cordell said that he believed it better to increase the factor of safety by using a very large rod of the best steel obtainable. To avoid any charge of failure Mr. Lamb said that he had installed double rods for brake rigging on fifteen interurban cars of the Waterloo, Cedar Falls & Northern Railway.

Although Mr. Feist did not touch on sliding collectors in his paper, those present were anxious to hear what his experience had been on the North Shore Line. Mr. Cordell said that the line wear with the Miller trolley shoe installed on all the high-speed equipment was very much less now with heavier cars and about ten times the traffic than when all wheels were used on the old lighter equipment. Mr. Cordell makes a practice of building up the old shoes as fast as they are worn out. This is done by building up the grooves by welding with the hardest metal that is available and then case hardening the shoe. After the shoe has been restored the additional life of these shoes is about 4,000 miles, as

against about 6,000 for the new shoe. trolley tension of about 35 lb. is used.

DEPARTMENTAL CO-OPERATION

Commenting on Mr. Arnold's paper, V. Skelly added that monthly meetings of the department heads were first started on the Tri-City Railway some time ago and that these meetings were found so valuable that it soon became necessary to hold them weekly. He claimed that this getting together of the heads of the various departments was most effective in furnishing opportunity for difficulties to be ironed out and for each one to gain a better understanding of the other's problems.

As a typical instance of what can result from keeping the department heads well informed, Mr. Arnold cited an instance that occurred recently on his property in Wisconsin. At one of the weekly meetings he had mentioned that it was his intention to connect with a bus line the towns of Plymouth and Fond du Lac, which are the terminals of two interurban lines. Shortly after, one of those whom he had told of his plan heard that an independent bus operator was soon to operate over that same route and besides parallel the interurban for some distance. With this information at hand Mr. Arnold said he immediately leased a bus and had it running the next day.

Besides the formal papers the program included a number of subjects for informal discussion. The first of these was the experience with lifeguards. Mr. Cordell said all the safety cars of the North Shore road were equipped with the H. B. lifeguards. Installed in the customary way, the guards would be tripped by the snow and hit the rails. As a result of this there was a large breakage, and to overcome this a chain has been attached to each end so that when the guard is tripped it is held a few inches from the rail. He claimed that the guards were just as effective when held a few inches from the rail as when skimming along the ground.

F. B. Hudson, Omaha, said that he had found the extended fender very bad in traffic because the fenders themselves introduce a hazard to pedestrians at congested corners when people were walking in front of the car. In Waterloo, Mr. Lamb said the cars were originally equipped with extended fenders, which were in such constant need of repair that one or two men were required to keep them in order. Not only was the maintenance cost high but the space occupied in each bay of the car-house would have permitted two more cars to have been housed. For these reasons he has converted the lifeguard to a type similar to the H. B. lifeguard by installing them under the cars, and in this location their maintenance is practically nothing.

Mr. Arnold does not have much faith in lifeguards, for he said if the car doesn't kill you the fender will. He said the H. B. lifeguard was the only one that had been approved by the Wisconsin Railroad Commission and that he, like Mr. Cordell, uses a chain to

keep them from dropping on the rail. Also, the front end of the guard has been bent up like a shoe so that it will skim along the ground and not get caught.

In talking about automatic doors, the question revolved around whether the doors should open inwardly or outwardly. The consensus of opinion seemed to be that a folding door should swing out. Mr. Anderson was of the opinion that traffic can be handled with more speed when the doors open outwardly because he has observed that many passengers will set down bags, bundles, etc., on the platform, which prevents the closing of a door opening onto the platform. Mr. Wood said the maintenance of a door opening toward the street was high, while Mr. Lamb said he would not sanction the use of a door opening onto the platform. In Waterloo, a door swinging beyond the car is an indication to automobilists that passengers are about to alight and therefore that they cannot pass. This rule is enforced very rigidly and so a stop sign was painted on the car door, which, of course, shows only when the door is open.

LIGHTNING ARRESTERS ON CARS GIVE RESULTS

Where, when and how to install lightning arresters was a moot question in Iowa, the same as anywhere else. Mr. Dugal, General Electric Company, said that lightning protection is a problem of spending a limited amount of money to the best advantage to protect property and to insure continuity of service. The three important units of an electric railway system which need protection are the power house, substation and the cars. It is generally conceded that the best protection available is none too good for the power house and the substation, and for their protection fairly reliable lightning arresters have been developed. However, when it comes to protecting the electrical equipment on a car from lightning, he said that it is established that an arrester on every pole of the line would not give immunity. He remarked that the Illinois Traction System had concentrated its protection on the cars and that now it is not losing any more hangers or insulators with no arresters on the line than when the line was protected. Furthermore, the Illinois Traction System has not lost a single armature from lightning during the past two years. Mr. Dugal's advice was to locate the arrester as near the source of power as possible and connect it to ground with the shortest direct circuit.

Mr. Anderson said that lightning arresters are now being located on the roof of the city cars of the Tri-City Railway. Nearly every one was convinced that the roof of the car was the ideal location for obtaining the maximum protection, but balanced against this was the difficulty of inspection and its unsightly appearance on the roof. Practices varied as to whether or not the arresters were removed in the winter.

The lines of the Tri-City Railway are also equipped with pole arresters, which

are tested three times a year. Their trouble has been that whenever lightning passed through an arrester it always blew it all to pieces.

DISCUSSION ON ENERGY SAVING

On the subject of kilowatt-hour meters for determining car energy consumption, F. J. O'Brien, Chicago, explained that there is a wide difference in the efficiency of unchecked motormen, a difference approximating 30 per cent between the average good man and the average poor man. Meters serve to improve operating efficiencies, particularly with the poor men. This induces substantial saving in car energy consumption. Energy input, he said, is the correct measure of the relative efficiency of different men operating under similar conditions. He added that more than 100 street and interurban railways are completely equipped and the saving resulting in many cases has more than wiped off the capital charges plus operating expenses of the meters in the first year.

William E. Rolston, Sioux City, said he believed that measuring kilowatt-hours was fundamentally the correct principle because it was kilowatt-hours that the cars used. The measurement of coasting is not a correct way of determining power consumption and, in fact, it often may be most misleading. He cited a certain instance where the motorman had formed the habit of coasting down one hill and up the other, but not applying power until the car had reached a relatively low speed so that the coasting distance would be a maximum. Such operation increased the energy consumption while improving the man's coasting record. A kilowatt-hour meter on a car, he believed, was just as important as having a carbon dioxide recorder on a boiler.

When he was connected with the Chicago, Lake Shore & South Bend Railway, Mr. Rolston said an occasion arose when it was necessary to supply the Interstate Commerce Commission with figures showing the cost of handling freight. Although it was known that the energy consumption in the heavy freight service of the New York, New Haven & Hartford Railroad was about 30 watts per ton-mile, no one had any idea how much energy was being consumed by the two 70-ton locomotives which were in question. However, for this purpose two a.c. meters were installed and it was found that the engineers were using 65 watts per ton-mile. By giving these men a little instruction it was found possible to reduce that energy consumption to 52 watts per ton-mile in a month's time. In several months time the figure was lowered to 45 watts per ton-mile.

Further, Mr. Rolston explained why he was convinced that the energy consumption of a car was a more accurate index of the work done by it than the mileage run and consequently such a unit is the logical one on which to base inspection and maintenance periods. While in Kansas City he had found from tests that cars on one line were using 40 per cent more energy than those on another for the same mileage.

Monthly Identification Card Beters Public Relations*

BY F. V. SKELLY

Superintendent Tri-City Railway of Illinois, Rock Island, Ill.

THE identification card plan of fare, which is the invention of Richard Schaddelee, vice-president and general manager United Light & Railways Company, Grand Rapids, Mich., the holding company for the Tri-City Railway of Illinois, was first used on the lines of the Mason City & Clear Lake Railroad, Mason City, Iowa, a city of 30,000 population. Its use was begun Aug. 15, 1920, in connection with a fare increase from 5 to 10 cents, at which time a charge of \$1 per month was made for the card. This was reduced in June, 1921, to 50 cents per month. In November, 1921, its use was begun at Muscatine, Iowa, 15,000 population, the card being offered in connection with an increase in fare from 7 cents to 10 cents. The street car patrons at Muscatine were highly pleased with this form of fare, its use becoming immediately popular and remaining so.

The application of a readiness-to-serve charge to street railway fares has been a comparatively recent development, despite the fact that electric companies and telephone companies had been using this form of rate for a long time. Regardless of whether a transferable weekly pass, or an identification card of the type used by the railway subsidiaries of the United Light & Railways Company is used, the principle is equitable, in that it gives to the regular patron—the person whose constant riding helps to make the continuance of street railway service possible—a reduction in his average cost per ride, varying in degree with his use of the cars. There is also a psychological effect in connection with the identification card system, in that the purchaser of the card, as soon as he has paid the demand charge, feels that he is riding for a 5-cent fare. We are sure that this has added considerably to the popularity of the plan.

At the start-off a vigorous advertising campaign was conducted announcing the change in fares and stressing the savings available for users of the identification cards. It was readily seen that the sale of these cards by the operators on the cars would produce much confusion the first few days of each month, and it was therefore decided to place them on sale in various mercantile establishments throughout the tri-cities, announcements to this effect being made in the newspapers. No difficulty was encountered in securing the co-operation of these business houses; in fact, several who had not been interviewed requested that they be allowed to handle them. No commission or other payment was made for this service. During the last week in February each car also carried a full-sized window card giving the names of firms which had these cards for sale.

Fare boxes which had been used in the days of the 5-cent fare, but which

had been discarded after the 7-cent fare became effective (as it was found that certain passengers were "rushing the box" and depositing varying number of pennies instead of the full 7 cents), were again placed on the cars and the operators instructed in the method of registering the new fares. The new system was somewhat more complicated than the former one, as there were three classifications of adult fares in place of one; i.e., the 10-cent cash fare, the 8½-cent token and the 5-cent identification card fare. The overhead registers remained on the cars, but in place of ringing up all fares, the operator now rings up only the 10-cent cash fares on one dial of the register and the tickets and employees' passes on the other. Tokens are recorded as such by the token-registering dial of the fare box, and the difference between the amount of money accounted for by the reading of the overhead registers as to 10-cent fares and the amount of money in the fare box is considered to be passengers using the identification cards. A separate record is kept by the operator of the 4-cent children's fares. This method of accounting is perhaps the simplest form that could be devised for this type of work, as it requires a minimum amount of attention to operate.

The identification card has been in service for eight months. The number of cards sold per month is as follows: March, 8,516; April, 9,395; May, 9,327; June, 9,379; July, 9,033; August, 9,029; September, 9,765; October, 9,966. The downward trend during the summer months is to be expected, as the valley of the yearly passenger curve usually occurs in July or August, with the peak in December. We confidently expect sales will be in excess of 10,000 cards in November.

The average daily number of rides per identification card outstanding for the month of March was 1.75, or 54.27 per month. The average fare paid by identification card passengers for March was 5.87 cents, a considerable reduction from the 9-cent fare in force prior to that time. The percentage of identification card passengers to total for March was 52.54, and these passengers contributed 42.06 per cent of the passenger revenue. In September the average number of rides per card per day was 1.79 or 53.75 per month; the average fare paid, 5.85 cents; the percentage of identification card passengers to total passengers, 57.66, producing 47.68 per cent of the passenger revenue. The maximum cost per rider occurred in the month of April, 5.91 cents per ride. The average receipts per revenue passenger were highest during the month of March, at 7.33 cents, gradually decreasing, as the number of identification card passengers increased, to 7.07 cents in September. The passenger revenue, however, remained about the same.

The drop in revenue through the re-

duction in the average receipts per revenue passenger, from an average of 8.6 cents with the 9-cent fare, to a rate of 7 cents with the identification card, was not quite as great as had been calculated, due to the increased patronage. This loss in passenger revenue was, of course, offset to a considerable degree by the reduction in operating expense as a result of the use of one-man cars so that the net operating revenue of the company remained at about the same point. Industrial conditions in the tri-cities are, of course, at a very low point, and even the slightly improved business of the past two months has been reflected in the number of revenue passengers carried.

For the convenience of the public, the identification card had been printed on both sides, so that it would not be necessary to turn the card when showing it to the operator. Some ingenious individual conceived the idea of splitting the card and using half for himself and half for another person, and by inserting the card in a case this trickery could not be uncovered by the operator. To obviate this, the company had the unnumbered side of the card blacked out, and future orders will be printed on one side only. The cards vary in color from month to month, the month being printed in a color which contrasts with that of the card. It has been our experience that but three combinations of colors can be effectively used; i.e., a yellow card with the month printed in green, a white card with the month printed in blue, and a red, or salmon, colored card with the month printed in green. The dark-colored card with the month printed in a contrasting light color, such as a blue card with a yellow month, is not at all effective.

It is possible that some few of the cards may have been passed out of the car window for the use of those awaiting to board the car, but in such cases the company received at least 5 cents in revenue. The wording of the card covering this point states that "this card is not transferable and will be taken up if presented by any other than purchaser." The effect is, of course, purely psychological, for although there is a space provided for the purchaser to sign his name, this is rarely done. It would be quite difficult for an operator to determine whether or not the holder of an identification card was the purchaser, unless he was acquainted with the passenger and had time to make a minute examination of the card, which is, of course, impracticable. The passenger has an advantage, however, if the card is signed, for in a number of cases a lost card with signature has been returned to the owner.

The introduction of the identification card, with its attendant low cost per ride, has had a market effect upon the public attitude toward the company. When the 9-cent fare was in force complaints on the part of the public and the newspapers were frequent. Since the change there has been little, if any, complaint regarding the 10-cent fare, the answer to this being that it is pos-

*Paper presented at mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

sible to obtain a fare approximately 5.5 cents through the purchase and frequent use of the identification card. Even as few rides as sixteen per month, or two round trips per week, using the card, will bring the average fare to 8.1 cents.

Employees of the firms selling cards have aided the company materially. One salesman, by the use of a little diplomacy, changed altogether the attitude of a woman who called for "one of those street car licenses" by explaining the advantage from the patron's standpoint of the use of the

card, so that she went away in an entirely different frame of mind.

Under existing industrial conditions the officers of the company are well satisfied with the manner in which the card system is working out, and the increase in the number of passengers carried is much greater than has been found to be the case in other cities where an equivalent reduction in fare has been made. This points toward the belief that the public is much better satisfied and consequently more willing to patronize the cars than would be the case with the flat rate of fare.

Practical Kinks in Truck and Motor Maintenance*

BY HENRY CORDELL

Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

DON'T forget that the electric roads of today have more and keener competition than ever before and we have got to be up on our toes and doing things every minute if we expect to stay in the game. The traveling public won't stand for irregular service, hard riding cars, discourteous treatment, poorly ventilated cars, and a lot of things which could be pulled on them any ten years ago. I quote the expression, "Them days is gone forever," and we should know it.

Look around and see the progress in the field of manufacturing. New tools, new ways of doing work, higher standards of workmanship, greater production—all with the one idea to sell the public what it wants.

Have we done this in the electric railway field? To a certain extent, yes; largely, no.

What has been the result as to the patronage of your road? You are better qualified to answer this than I am. Now, then, what should be done to build up the traffic? You know, or ought to know, that a road advertised as a road of speed, safety, comfort and punctuality, when these are not backed up by actual performance, soon becomes the laughing stock of the public, and your competitors (be they team roads or bus lines) get the business.

In order that we may analyze the subject at hand, let us see what kind of car construction will give us maximum service and minimum expense in operation:

1. Frame of such construction that members will carry the load without stressing.

2. Springs designed so that a car will ride equally well under light and full loads.

The live load on an electric car is large compared with the empty weight of the car; therefore the spring problem is one which is difficult to solve. This condition was taken care of on the North Shore Line by the installation of a third set of springs which are in action only under heavy load. The first truck with this arrangement has been in service for about three years with satisfactory results.

*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

3. Brake rigging so designed that chattering is prevented.

Chattering usually results when brake rigging is hung incorrectly. Brake shoes should be located no less than 2 in. below the center line of the wheels. Levers and hangers should be at 90 deg. angle to the center line of the brakeshoes when the brakes are applied, and the angle should not exceed 120 deg. with worn-out wheel and shoes.

Hanger supports should be of as rigid construction as possible. All brake pins should be case-hardened and holes in levers bushed. A clearance of .005 in. is recommended. We have found that double-lever brake rigging gives the longest life, keeps the brake-shoes on the wheels and, due to perfect alignment, eliminates twisting which causes breaking of bolts and shearing of cotter keys.

When the job of bushing brake levers is started, care should be taken that levers are properly laid out to give the required braking pressure. I mention this because, with unbushed levers, the holes are likely to be elongated, and if drilled the chances are the drill will follow the worn hole and every lever will be drilled with a different spacing, which, of course, would be detrimental to the proper braking of the car. Filling the worn hole by means of electric and acetylene welding and re-drilling to proper size for bushing is entirely satisfactory and better than plugging the hole in the old blacksmith way. I have yet to see a plug properly welded to the walls of the hole.

Truck brake lever pins or bolts should be shoulder bolts or bolts properly machined with threads cut just far enough to allow the nut to pull up to the proper distance, allowing clearance for levers. The cotter pin hole should be drilled close up to the nut.

Several methods of connecting pull roads to the circle bar have been resorted to. On the later type trucks we located the circle bar as near as possible to the transom, where the swing of the truck is least. In this case the connection is causing no trouble in going around sharp curves. However, when the circle bar is located over the end of the truck, trouble is encountered by brakes being pulled up due to the roller sticking in the depression

made in the circle bar by wear. There is also likely to exist too small a radius, which tends to set the brakes on curves. The circle iron should be of an exact radius, using the king bolt as a center. We discarded the roller idea and installed a sliding contact, which works well and has none of the objectionable features of the roller.

4. Renewable wearing plates and shims on pedestals, oil boxes, bolster, center plate and motor suspension lugs.

You will find it a great advantage to use case-hardened wearing plates where excess wear exists. Not only is there a saving of expensive parts, but lost motion affects the riding qualities of the truck, causing nosing if play exists at pedestals, journal bearings and in center plates. Lost motion in the truck bolster causes violent surges in stopping and starting a train, which not only wrecks the cars but is decidedly uncomfortable to passengers.

The standard M.C.B. journal brass has been found to permit the axle to roll out of the bearing under heavy braking at high speeds. To overcome this condition we changed the construction, extending the sides of the brass to approximately the center of journal.

I am satisfied that 95 per cent of hot journals are caused by mechanical defects, rather than poor oil, and that most of the remaining 5 per cent are due to improper methods in preparing the packing, which should be a good grade of wool waste. Poor dust guards mean worn journals and bearing trouble. We should insist upon the use of proper style and make, and under no condition permit their omission.

Wheels and axles should be inspected closely and gages furnished the inspectors so that no guesswork enters into the decision as to whether or not a wheel or axle should remain in service. Furthermore, inspectors should be conversant with M.C.B. and A.E.R.A. rules regarding limits of wear, and under no condition be permitted to deviate from those rules.

LOOKING AFTER THE MOTORS

No equipment is subject to harder service than a railway motor, and perhaps none receives as little care on the average. Why? Because of the inaccessibility. Specific rules must be laid down and followed. Cleaning off string bands, checking up brush tension, inspecting condition of brushes, fields, leads, clearances, end play, etc., must be done at regular intervals, based on mileage operated.

String bands should be carefully inspected and if there is sign of oil or carbon deposits, they should be cleaned with gasoline and treated with a light coat of quick air-drying varnish.

Inspectors should be taught to examine commutators carefully. It is a well-known fact that the commutator is the weakest part of the motor, and on it are seen the effects of any field and winding trouble.

Motor leads are of more or less trouble, depending on their location and installation. The longer the leads are, if protected by wire armor so as to prevent chafing, the better service will

they give. Substantial cleats located on the underframe of the car and spaced so that connections are held between them, and protected by means of a rubber-lined canvas hose, meet the condition well.

Dipping and baking of armatures, together with impregnation of the fields, spells continuous and uninterrupted service. Before dipping an armature, care should be taken that it is absolutely dry and that all dust, oil and grease are wiped off. Placing armatures in an oven holding 210 to 225 deg. F. and allowing them to remain until heated through will put them in condition to receive and absorb readily the varnish or insulating paint.

We have changed from a string band to the use of 1½-in. lino-tape tightly drawn with just a few turns of string up against the commutator to hold tape in place until varnish has dried hard. By giving the tape band several coats of good baking varnish and bake the armature between applications you will obtain a result that will insure your armature from front-end trouble.

Banding of armatures should be done in stages. First, temporary bands should be applied after thorough heating, and the coils drawn down, dipped and baked. When the armature is cool, remove the temporary bands and put on the finish bands, and apply a coat of air drying varnish. Before the motor is placed in the truck, a floor test should be made. We run all motors on the floor and at the maximum speed attained in service for a sufficient length of time to ascertain bearing conditions or any electrical imperfection that might exist. A group of car resistance boxes are used and the switch panel is so arranged that the fields are separately excited, causing the motor to run at a constant speed.

The application of pinions should receive more than casual attention. Pinions should be heated by boiling, and bore and shaft cleaned thoroughly before assembling. Loose pinions are expensive and inexcusable.

With the two-point suspended gear pans, we have found that the lugs on the motor shell heads and axle cap, as well as the lugs on the gear pans, wear a good deal and are very hard to keep tight. To overcome this difficulty, we made two-ply thick pads from canvas left over from armature hoods and soaked them in red lead and inserted them between pan supports and pan lugs. This not only saves the wear but keeps the pan from rattling, and the bolts stay tight.

With the approach of bad weather we arrange to put on all covers removed during the summer months and to apply new felt. During the summer months ventilated covers are used. We find that no excessive heating takes place on either ventilated or non-ventilated motors during the winter season with tight covers, but this precaution prevents snow from getting in.

We can eliminate lots of our trouble by scheming and planning, and no detail should be too small to be overlooked. It is the small defects which lead to costly repairs and renewals.

Pay Attention to Your Neighbor's Public Relations*

BY JOE CARMICHAEL

Director Iowa Committee on Public Utility Information, Des Moines, Iowa

NO OTHER business is so strictly regulated by the public as are utilities. If the public is to regulate them wisely it must know something of their business and problems. No one is going to tell them what these problems are unless the utility companies themselves do so. That briefly is the reason for the Iowa Committee on Public Utility Information, which was organized on the first of this year for the purpose of disseminating information about the electric railway, electric light and gas industries of the state.

At a recent meeting of the directors of these committees held at Atlantic City in connection with the sessions of the American Gas Association, and at which were present many of the prominent utility company operators of the country, two things were emphasized as to what the activities of these committees should be:

1. The importance of the work to every individual company in the state.
2. The necessity for putting its work on a businesslike basis.

In connection with the first point, it was claimed that no company can stand by itself. It is vitally interested in the standing and the public relations of every other utility company in its state.

A company is to be commended if its own public relations are good, if it is giving an honest and courteous dollar's worth of service for every dollar received, and if the people whom it serves are boosters for it and not knocking against it. But its managers make a mistake if they take the stand that they have set their own house in order and it is not their business if their neighbor is in bad with his public.

As has been said and generally conceded, the public utilities are more strictly regulated by state law than any other industry. Scarcely a legislature meets but which passes some kind of legislation with respect to the utilities. If this legislation is to be constructive and to tend to build up the industry rather than harass it all the facts must be known not only to the members of the legislators but to the public which tells them what to do.

The company whose public relations are good, whose people are satisfied

*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

that they are getting a square deal, will have little trouble in getting consideration from the legislators who represent those people. You can place all the odium you wish on demagogues, but, as a matter of fact, they usually follow the lead of the people. They grasp opportunities. And if a people are incensed against a public service company, their legislators, even though they may be inclined to be fair to the utilities, will have a difficult time doing so. Their cue is rather to lambaste the utilities and make political capital of their opposition to them.

But the company whose relations are pleasant is as dependent on his neighbor's legislators as he is on his own. It is advisable therefore for him to pay some attention to the public relations of his neighbor. He has a perfect right to urge and insist that these public relations be what they should be.

The other point discussed was the matter of putting the work of the committees on public utility information on a sound business basis. It was generally agreed that the best way to do this was to go into the local newspapers with the story of the utilities and to make advertising contracts with them for directly informing the public. It is worth the money just as much as the coal or other supplies you buy is worth it. You have an opportunity daily or weekly to talk to the people, to explain to them what you are doing, to tell them about your service and what you have to sell. How can you expect wisdom on the part of the people who regulate your business if they know nothing about your affairs except the garbled, false and malicious or ignorant statements of those who are your enemies with a purpose?

There are legitimate news stories in every street railway company office and plant. The newspapers will publish these stories if they are news. It is the duty of committees on public utility information to dig up these stories so far as they affect the whole industry. And it would be valuable for every company to have some one high in authority seek out these news stories and see that the newspapers get them.

But it will be difficult to impress newspapers with the high standing of a utility company if that company has no definite policy on publicity.

Why Current-Collecting Devices Should Be Improved*

BY C. M. FEIST

Master Mechanic Sioux City Service Company, Sioux City, Iowa

IN A trolley current-collecting device it is necessary to provide sufficient area of contact surface, a low-resistance constant lubrication and low pressure per square inch on its bearing in order to overcome or avoid rapid bearing and side wear. Such a construction would tend to distribute localized heat

*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

and decrease resistance. Upon close observation it is found that a trolley has to adapt itself to many sudden variations owing to unbalanced load and changes in track elevation, during which time the wheel bearing position is changed. The side contact is frequently broken as a result of too rapid wear on the side contact springs and washers. The worn metal from the washers and springs and the ends of

the wheel hubs work into the bearings and help to cut out the bearing surface, which results in a wabby wheel that loses its contact. A further destructive effect takes place on the entire trolley device and on the overhead.

It has been the practice of many railways to arrange systematically the current feeder system by which a reasonably high voltage can be maintained on the lines. The return circuits have also been given considerable attention to prevent energy losses, yet the collecting devices have been practically at a standstill in design or efficiency, especially where grease or oil is used for their lubrication. Such a practice adds to the resistance and to the general cost of maintenance.

The following is the result of a test of various trolley contact devices as reported by Prof. D. D. Ewing, Purdue University. The electrical losses per car-mile were found to be as follows:

Speed	Wheel Wire Contact	Bushing Contact	Bearing Friction Losses	Total
10 m.p.h.	10 watts	13 watts	20 watts	43
15 m.p.h.	50 watts	17 watts	26 watts	93
20 m.p.h.	80 watts	40 watts	36 watts	156
25 m.p.h.	125 watts	80 watts	50 watts	255

It is understood that these tests were conducted with new collecting devices and in a personal letter to me Mr. Ewing stated that a worn bearing would no doubt show a loss several times greater. It has been considered, and has worked out very well in practice, to eliminate side contacts owing to their frequently varied position and wear. Upon riding a few miles on top of a car and taking notice of the sudden lateral movements of a trolley, it will be found that a straight line from the center of the car body at the usual height of trolley wire would represent about 10-in. sideways to every 2 in. change in elevation, or other unbalanced condition caused by truck springs or unbalanced load. From the above test it is shown that the energy losses are constant, and when totalizing only a fair percentage of the losses with the

number of car-miles operated on properties in a year's time, including labor and material in the maintenance of the trolley, the total expense would perhaps be larger than the cost of the maintenance of a car body. The fact that the life of trolleys is comparatively short in spite of frequent renewal of parts and other attention demonstrates conclusively that the device has not been designed to keep up with improvements made in other equipment used in electric railway operation.

Trolleys should be designed so as to eliminate all possible arcing. The bearing should be of ample capacity so that the wheel may roll in straight rotation for a reasonable length of time. A combination of correct design, as outlined above, and properly selected material with good workmanship should insure efficiency of a higher standard and be more satisfactory.

The matter of trolley wheel pressure against the wire has also been discussed. It appears that from 25 to 30 lb. pressure is about the average which most companies have adopted on city lines. It is absolutely essential, however, to make and hold a firm contact between the wire and wheel, as we all know the destructive effect of a partial electrical contact. On city span wire lines, where the wire has some relief in the upward direction, a firm contact can easily be secured.

The Sioux City Service Company shows for the year 1921 the approximate cost of operation on complete trolley heads to be 26 cents per 1,000 car-miles.

One car operating 50,000 car-miles or over per year would show a saving of 50 × 50 cents, or \$25; 100 cars, \$2,500; 1,000 cars, \$25,000, and 3,000 cars, \$75,000.

The trolley base plays an important part in the satisfactory operation of railway equipment, as it has to act freely sideways on its center bearing in order to avoid unnecessary friction on the side of trolley wheels, grooves and on the side of the wire.

always be able to obtain from the mechanical department information that he wants and needs. To this end maintenance of proper records by the mechanical department is just as necessary as the replacement of burned out armatures, because without such records the general manager must be entirely at sea as to costs and other essentials. Lack of proper records is often most noticeable in the case of small properties and the responsibility for absence of such records most often rests upon the general manager himself. It is his duty to see to it that necessary facilities are provided for keeping adequate records. Mechanical men as a rule are not partial to clerical work. Such effort is in their opinion entirely outside the legitimate scope of their activity. They often feel that time spent on keeping records is wasted and that it could better be used in repairing cars. This attitude is fundamentally wrong and the "up-to-the-minute" master mechanic of today can give any inquiring official data on every question that has a legitimate bearing upon the work of the mechanical department. Master mechanics that do not realize this fact belong to the days that are gone forever. Of course, it is possible for the record habit to grow and, like any other good thing, the keeping of records may be carried to such extremes as to cost altogether more than they are worth.

I firmly believe that wonderful results can be accomplished by the master mechanic placing responsibility for particular jobs on particular men. Then the responsible men are inclined to be enthusiastic over seeing their particular job done on a 100 per cent basis as if they had responsibility for the success of the entire property.

The continuous demand upon the mechanical department makes it imperative that master mechanics always have in training a likely understudy for every job. The property should never be jeopardized for a single minute by the absence of any man in any department. This applies with peculiar force to the mechanical department.

The day of the "buck passer" is gone. The man who will meet his problems face to face and put them squarely up to his boss is the man who will get what he goes after. Therefore, I believe that weekly meetings of department heads on small or large roads are of real value, and the master mechanic must be made to feel that he is a real factor at these meetings, and his problems should be given fullest consideration. I am convinced that it is the desire of every general manager to have his master mechanic and the men in the mechanical department feel that a close relation exists between them. I believe that the general manager realizes how important a cog in the wheel of operation the mechanical department really is, but I also feel that it is up to the men in the mechanical department to be able and ready to respond to every call of the general manager and to have dependable information available for him whenever he asks for it.

Make Your Master Mechanic an Optimist*

By B. W. ARNOLD

Manager of Railways Eastern Wisconsin Electric Company
Oshkosh, Wis.

WHEN a general manager takes charge of a property his first duty is to study the personnel of the several departments, and I am certain that he devotes more time to his survey of the mechanical department than to his survey of any other department. He realizes that the responsibility of keeping the cars in motion rests upon the mechanical department. No other department more directly affects public relations.

The master mechanic must be made to sense and take his responsibilities and he must be an optimist. Many master mechanics are diffident. The master mechanic should have confidence in himself and in his organization. He

must "know" that things can be done. When the master mechanic has confidence in himself, when he knows that his department can accomplish things, then the general manager can make a much better record on any property, be it large or small. The mechanical department can never succeed when it is headed by a "whining pessimist."

One of the most important factors in the development of good relations between the general manager and the mechanical department is good housekeeping. You can easily imagine how the general manager would feel on being told by the insurance inspector that his insurance premiums were materially reduced because of the efficient housekeeping prevailing in the shops.

Further, the general manager should

*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2-3, 1922.

Design and Construction of Streets for Street Railway Traffic

At This Second Meeting at the Engineers' Club in Philadelphia of the Paving and Railway Engineers Track Foundations Were Considered and the Relative Merits of Different Types Were Discussed

A REPORT was published in the last issue of this paper of the conference on the morning of Monday, Oct. 9, at the Engineers' Club of Philadelphia, on the design and construction of streets for street railway traffic. The conference was continued on the afternoon and evening of Oct. 9. An account of the afternoon session follows:

The chair was occupied by W. H. Connell, and the first speaker was E. M. T. Ryder, way engineer Third Avenue Railway, New York, who told about the plan to test rail joints, for which the American Electric Railway Association had made an appropriation of \$10,000, toward the sum of \$20,000 which will be required to finance the work. Mr. Ryder said that the committee in charge was anxious to get as many engineers and companies interested in this work as possible and have the benefit of their guidance in laying down a program for the tests.

A contribution was then read from Ellis R. Dutton, assistant engineer, Minneapolis, Minn. He told of experience with paving in streets containing car tracks in Minneapolis and said that the best solution of maintaining paving in such streets consisted in separating the paving in the track area from that in the remainder of the streets. Even with the substantial track construction used in Minneapolis, there is vertical movement of the track, which it seems impossible to prevent.

CONDITIONS IN NEW YORK

The next speaker was C. M. Pinckney, chief engineer of the Bureau of Highways, New York City, who said that most of the street railway areas were paved with modern granite block. Its advantages were its durability and because blocks could readily be removed to permit repair of the railway structure and then restored. In Manhattan it is now standard practice to use two rows of granite block on the outside of the rail adjoining asphalt paving. With the underground conduit system in Manhattan the area between the rails of a track is crowned so that the slot rail will be higher than the tram rail. This is somewhat objectionable to vehicles crossing the track. Drainage water had not affected the foundations of the underground conduit system, as it is a very rigid type of construction, but with the overhead trolley and wooden tie construction, it is important to provide drainage so that the water will be cleared away from the rail and not allowed to seep into the foundation.

Paving is affected by street railway tracks in a number of ways besides the vibration from the operation of the cars. If the original track construction is poor or the maintenance is inadequate, the paving will suffer. Track also influences the use of the street by vehicles. Where there are tracks on narrow streets, the average vehicle

runs partly in the railway area and partly outside it and produces a different kind of wear than in streets without tracks. Vehicles do not usually follow the rails unless the paving in the street is poor. Paving is also affected by the type of rail construction, as for instance where tie rods are used. If the track construction was designed especially for the paving, there would be little trouble.

PHILADELPHIA EXPERIENCE

Julius Adler, deputy chief Bureau of Highways, Philadelphia, the next speaker, then presented an address which is published in abstract in another column. He also showed pictures of Philadelphia track, several of which are reproduced herewith. In commenting on these he said: Fig. 1 is an intersection of Germantown and Susquehanna Avenues. This paving is smooth granite block laid in 1915 on a 6-in. concrete base. There is practically no wear on the block away from the crossing. Fig. 2 is also a view on Germantown Avenue where the pavement is wood block and when laid in 1916 was flush with the rail. The pavement was on a 6-in. concrete foundation with $\frac{1}{2}$ -in. cement pad, 1 in 4 mixture. The space along the rail through the entire length of the block shows numerous failures, indicating that there had been a movement all along the street of both rail and tie. In this form of construction, the first evidence of defect is on the outside of the rail, generally about the end of the tie. It would seem that this is the point of greatest movement. The same conditions are found in granite block and asphalt pavements. The deterioration then works in toward the rail and proceeds between the rails. Fig. 3 shows a crossing at Twelfth and Filbert Streets of dressed granite block on 6-in. concrete completed in 1919. The outstanding feature is the bad condition of the crossing in an otherwise good piece of pavement; the granite block was laid with an asphalt elastic filler. So far as we know, all of these crossings were laid on the natural soil. Fig. 4 gives view at Tenth and Walnut Streets, paved with smooth dressed granite block on a 6-in. concrete and completed in 1921. The paving elsewhere consists of wood block on a 6-in. concrete base, bituminous paint being put in the concrete and bituminous filler between the blocks with smooth dressed granite block on the rails, and redressed granite block between the rails. This pavement is now about seventeen months old. The shoulders are intact. The general condition of the pavement along the straight rail is satisfactory. The blocks in places have dropped down something like 1 in. to $1\frac{1}{2}$ in.

Fig. 5 shows the typical present standard track construction in Philadelphia: 9-in. girder rail 140 lb.; no tie

rods; 5-in. x 9-in. ties, 22-in. centers. The view shows the track tamped for final cleaning up of the rubbish from the shoulder ready to place the concrete around the ties to the bottom of the ties and then out on the shoulder in a continuous operation. After the tamping work has been completed, the concrete is placed around the ties, in probably not more than three or four hours or half a day, so that presumably there is little or no opportunity for water to get in and disturb the solidity of the subgrade, as it will in the tamping. When a street is paved, and most of the streets are one-track streets, the paving is laid in the track area and on one side. Then when that is complete the other side is paved.

DISCUSSION

In the discussion H. H. George said he knew of track constructed in various ways, some in concrete and some with ballast, where the paving was much worse than shown in the pictures, although the track had been down for less time. He also knew of track laid on stone ballast with nothing but concrete between the ties and with wood block paving which had been in since 1912 and practically in the same condition in which it was laid, although the traffic was heavy. He thought soil had much to do with the matter.

Mr. Adler said that he knew of some locations in Philadelphia where there was a good gravelly soil and the pavement had done very well along the tracks.

Mr. McIlraith, Philadelphia Rapid Transit Company, said the company is building better tracks this year than before, and not in the way shown in the pictures. For the last year and a half it has been the practice at the street crossings to put in at least 8 in. of first class ballast underneath all street intersections. In 1916 the pinch for men and materials and money was felt, and much of the pavement laid in that year was put in without any track repairing being done. Unless the track is put in good condition at the same time the paving is done, it is manifestly impossible to keep the paving up.

Most of the Philadelphia railway streets are laid with granite block and with sand filler, and of course such paving lets water enter rather rapidly. At one time the speaker said that he was an advocate of solid concrete slab construction on clay soil. Now he believes natural soil is a better track foundation, though if the soil was largely clay, it would be desirable to have under the tie a fine grade of granite grit or something else that would be durable, will pack readily with tamping and will let the water permeate through it and spread over the structure. A depth of 6 in. of grit under the ties on a soft clay soil or any other type of undesirable soil is in his opinion a better construction than concrete. The material inserted will absorb more water than the natural soil would do. It is also better than crushed rock ballast because it gives a greater area of bearing on the soil.

Mr. Ryder of New York, referring to a statement made by Mr. Pinckney



FIG. 1—CROSSING AT GERMANTOWN AND SUSQUEHANNA AVENUES, LAID IN 1915



FIG. 2—CROSSING ON GERMANTOWN AVENUE WITH WOOD BLOCK PAVEMENT, LAID IN 1916



FIG. 3—SHOWS A CROSSING LAID WITH GRANITE BLOCK IN 1919



FIG. 4—CROSSING COMPLETED IN 1921

on the use of granite block in Manhattan, said that it is always used there with asphalt filler, which he considered preferable for the purpose to cement grouted granite.

A representative from Cleveland said that where water got below the crown between the track rails it would tend to heave the paving. Hence in Cleveland the area is dished, so that if water gets under it the tendency is to form the paving in a straight line and not to crack it.

Mr. Ryder pointed out that it is the practice on steam roads not to carry the stone ballast much beyond the end of the ties, so that the ballast can drain out sideways. He said it is inadvisable to use stone ballast where water can stand in it, and he agreed with Mr. McIlraith that instead of stone ballast a material should be used that has the least possible number of voids in it. Track should be drained, and where the sewer is in the center of the street, if the material under the ties is sandy and gravelly or is mixed with a close-filled stone, water will work down into the sewer and take care of itself except where there is a very unusual amount of it. As for water in the groove of the rail, the remedy is to use a T-rail.

Mr. Wysor said that in Baltimore both concrete foundation and crushed stone foundation were used and as good results were obtained from one as the other.

Mr. Adler, in answer to a question, said he thought the winter conditions in the latitude of Philadelphia were such as to introduce special problems in track construction. There are no extended periods of cold, but alternate freezing and thawing. This probably made it harder to maintain streets and roads than in localities farther south or farther north.

Mr. Cram of Brooklyn referred to the report on track foundations of the American Electric Railway Engineering Association and gave statistics of the amount of water which would be

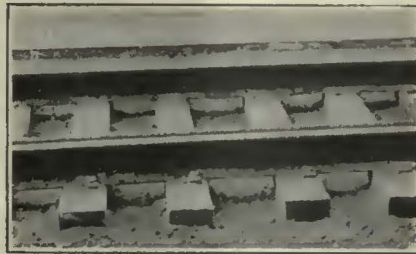


FIG. 5—THIS IS THE PRESENT STANDARD TRACK CONSTRUCTION IN PHILADELPHIA

retained by different kinds of soil. This means that the type of foundation has to be varied with the kind of soil on which it rests. The American Railway Engineering Association and the American Society of Civil Engineers, aided by funds first donated by Mr. Carnegie, have spent \$50,000 studying the stress on steam railway tracks and have reported among other things that a track is an elastic structure and is subject to Hooke's law that when a body is subjected to an external force a stress and an accompanying deformation result. The same law applies to electric railway tracks, and the main point is to control the movement of the track. A recent investigation of the electric railways in the United States showed that while 60 per cent used some form of ballast construction, 10 to 15 per cent laid their track on natural soil and about 25 per cent laid their track on concrete. Most street railway track laid on any form of concrete has been a failure.

In Brooklyn, the soil is mostly a sandy loam with some clay, and the construction, which was authorized by the city highway department after an extended investigation, is practically the same as that followed in Philadelphia. The subgrade is excavated for the tie or slightly above, and the tie is incased in concrete, then the street is paved, generally with granite block. Latterly, sheet asphalt on concrete has been laid in direct contact with the rail. Last summer the company was obliged

to take up a steel tie concrete constructed track which consisted of about 6 or 8 in. of concrete where the track had settled in some places about 2 in. and in other places 3 in. In its place wooden tie construction with the grooved girder rail paved in asphalt was employed, and the speaker believes that it will last twenty or twenty-five years in place of the fourteen years for the other construction, and its maintenance should be about 10 cents per foot per year instead of 89 cents per foot per year.*

In one street along Prospect Park, where the subsoil was bad and drainage from a lake penetrated the soil, broken asphalt was first thrown in the trench. On top of that the company put some cinder and rolled it, and on top of that put an 18-in. concrete mat with Carnegie steel ties spaced about 3-ft. centers. This is a track practically floated in concrete on a quagmire. The speaker said that he hoped it would last during the life of the rail.

C. H. Clark, Cleveland Railway, then presented some pictures of his track construction which he said up to two years ago was solid concrete construction. At present the company is building a great deal of track with wooden ties and some track without any foundation under it. One reason for this, however, is that track improvements have to be charged to capital and the stock of the company has to be sold at par, and as the stock has been below par it has been impossible to raise capital for extensive improvements. Some track is laid on crushed stone ballast, which has been rolled with a roller before the wooden ties are placed on the ballast. The ballast is rolled to about 1½ or 2 in. below the bottom of the tie. The ties are then tamped with slag screenings.

The meeting then adjourned. The evening session will be reported next week.

*For further particulars see article by Mr. Cram in the issue of this paper for last week.

To What Extent Is Paving Affected by Street Railway Tracks?*

By JULIUS ADLER

Deputy Chief Bureau of Highways, Philadelphia

UNDER conditions such as exist in Philadelphia, the presence of street railway tracks almost invariably shortens the life, increases the annual maintenance cost and greatly magnifies the difficulty of keeping street pavements in safe and usable condition.

The influence of the tracks in promoting pavement deterioration is first direct, as evidenced immediately along the rails, and second indirect, with the deterioration occurring both near and at a distance from the rails.

Under the heading of direct wear a considerable portion of the trouble originates with the railway engineer's insistence upon the flexible or non-rigid type of track construction, for the matter of harmonizing flexibility in track construction with reasonable permanency in the abutting pavement construction is apparently an unsolved problem. What is the definition of this term flexibility? How much must a rail be permitted to deflect in order to give reasonable length of service? How much can a pavement be expected to deflect and still maintain its integrity? Unfortunately, there seems to be no exact answer to these questions. Even the most rigid types of pavement do deflect, under heavy loads, an amount capable of measurement with suitable apparatus and without apparent detriment. The less rigid types, such as those on macadam foundations, or bituminous bound foundations, together with sheet asphalt, granite block with bituminous mastic filler and brick with asphalt filler, deflect to a still greater extent under loading in the ordinary course of events.

In the highway field, as in the railway field, there is an active controversy concerning the relative merits of the flexible and non-flexible types; but as applied to pavements, there is one fairly safe rule, namely, when the deflection of the pavement under the ordinary maximum load is clearly visible to the eye, there is trouble ahead. On the same basis, when the vertical movement of railway tracks becomes apparent, there is little hope for the adjoining pavement, be it ever so flexible. Stone block, or other types of pavement laid adjacent to a rail, may be bound together with a flexible asphalt cement, but when the rail begins to work, the frequently repeated movement and the access of water to the foundation will invariably cause the breaking down of the pavement.

At the city paving meeting held here a year ago, E. J. McIlraith of the Philadelphia Rapid Transit Company ably presented the arguments in favor of non-rigid track construction as practiced by his company. Using a 9-in. 141-lb. girder rail laid on 5 in. x 9 in. x 8 ft. ties, spaced 22 in. on centers,

laid on the natural soil, his calculations showed a maximum pressure transmitted by the tracks to the supporting soil of approximately 0.4 ton per square foot, as against safe working pressures of 4 to 6 tons per square foot as used in building foundation construction. Mr. McIlraith concludes: "Is it not then clear that a very safe margin of loading exists, and that any more expensive structure to install, to maintain, or to remove, that would still further blanket the load over a wider area of soil, would represent a waste of money?"

From the paving engineer's standpoint, the method of reasoning and conclusion arrived at are incorrect in several respects.

In the first place the calculations are based on static loads, but the effects of impact, the most difficult of all conditions to deal with in engineering structures, are entirely disregarded. It may be said that when the track structure is properly installed there is no occasion for impact occurring on straight track, free from special work, but this assumes a degree of perfection which, experience shows, is never attained. No ordinary methods of working can produce a subgrade under the track which is of uniform bearing power and free from soft spots, with the result that the track structure described does move perceptibly in places almost immediately after the final tamping. It is further evident that, in service, the head of the rail does eventually develop inequalities which cause impact from the moving wheels.

In the second place, the reasoning employed in Mr. McIlraith's discussion gives scant consideration to the fact that the movement of track structures and the accompanying deterioration of pavement, form a progressive action. A persistent slight movement of the rails will break the bond of the adjoining pavement at least sufficiently to allow moisture to enter slowly. The later movement of the rail, in the presence of moisture, sets up the pumping action so often referred to in track structure, and if the material supporting the track structure is of a character which can readily be pumped (and natural soil certainly is) the support of both the track and the pavement steadily decreases in this locality, the amount of movement in the track increases at a progressive rate, and the breaking down of the pavement follows with increasing rapidity.

The conclusion seems to be that in order to keep paving intact around railway tracks, the amount of possible movement in the tracks must be definitely limited from the very start. This cannot be accomplished by laying the track structure directly on the ordinary clay soil and there must be a slab of concrete of proper thickness and strength placed below the bottom of the ties. We do not claim, however, that

the railway engineer's contention for flexible track structure is incorrect, providing the degree of flexibility is limited. For example, if an intermediate layer of porous material is placed between the concrete slab and the bottom of the ties, flexibility can be accomplished by this means and no harm done to the pavement provided the material so placed is of a character that is not readily pumped (when moist) by a very slight deflection of the track.

The remaining part of our discussion has to do with the indirect influence of railway tracks on the wear and tear of pavements. This is a condition which varies with the width of the streets, number of tracks in the street, amount and weight of car traffic, and amount and weight of vehicular traffic. In Philadelphia unfortunately a very large proportion of the most important streets are too narrow to accommodate properly car traffic and vehicular traffic as they now exist. The headway between cars is so close that during the busy hours of the day vehicles have but little opportunity to use the central portion of the street and are forced to move in a narrow path, usually on one shoulder.

At the city paving meeting a year ago, the opportunity was taken to point out this fact as one of the most serious problems to be contended with in the maintenance of asphalt pavements on railway track streets in Philadelphia. These pavements laid on a 26-ft. cartway free from railway tracks give very satisfactory service, but laid on a street of the same width with a track in the center the concentration of traffic on a narrow shoulder often causes excessive disturbance of the pavement surface. This fact, however, is not limited to asphalt pavements alone, for there is no known type of city pavement in general use whose life is not very much longer under well distributed traffic than under heavy traffic following a narrow path. There are examples in Philadelphia of granite block, wood block and vitrified brick on streets occupied by railway tracks, all showing well defined ruts as a result of the traffic being forced to follow a narrow path.

This general condition, which in a city of narrow streets causes a heavy increase in pavement maintenance costs, is one which must fairly be attributed to the influence of the railway tracks, but unlike the matter of disintegration along the rails, it is a responsibility which must be faced by the city alone. At the present time, at least, it must be admitted that surface railway cars are existing and operating on a big scale in all large cities and are an absolute essential in the development of those cities and in their daily routine of commercial and other activities. The cars are on the streets because they are a necessity, and if the remaining portion of the street suffers from the concentration of vehicular traffic, then the city must assume the responsibility for so improving its design and construction of this portion that the traffic can be carried without undue wear and tear.

*Abstract of address presented at meeting of track engineers at Engineers' Club, Philadelphia, Oct. 9, 1922.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Status in Buffalo

International Files Damage Suits—
Conferences on Restoration of
Five-Cent Fare Started

Papers in a suit for \$4,960,000 damages against the county of Erie have been served upon the County Treasurer by the International Railway, Buffalo, N. Y. The company claims it has suffered to that extent because of rioting in the county since the start of the car strike on July 1. A similar action has been brought against the city of Buffalo for damage done within the city.

DETAIL FIGURES OF LOSSES

The total is made up of these individual items: Damage to cars, tracks, carhouses and equipment through violence, \$10,000; earnings lost through strike, \$2,000,000; damage to good will and franchises, \$2,500,000; suits against the company for injuries, cost of feeding and housing employees and hiring guards, \$450,000.

Herbert G. Tulley, president of the International, refused to appear before the municipal authorities when the later asked for a preliminary examination of Mr. Tulley in reference to the claim of \$3,800,000 against the city for alleged strike damages.

Less than 30 per cent of the platform employees of the International now are being housed in the three camps established by the company during the early days of the strike. About 70 per cent of the new employees are living in private homes, boarding houses and many have moved their families to Buffalo from cities in the South where many of them formerly were employed. Company officials say they do not know just how long the employees' camps will be continued.

R. H. Horton, Philadelphia, represented Thomas E. Mitten, chairman of the board of the International, at the first of a series of conferences between committees representing the company and the municipal authorities in reference to the restoration of a 5-cent fare or the adoption of a service-at-cost plan of operation in Buffalo. President Tulley and Vice-President Dickson were the other representatives of the International.

NOTHING ACCOMPLISHED

Nothing was accomplished at the session nor was any concrete plan for service-at-cost mapped out, as the City Council had just been advised by the city law department that an investigation into service-at-cost disclosed the fact that "a good agreement is not impossible, but only the most skillful negotiations can produce a contract

which will be flexible enough to provide for all emergencies without being so elastic as to be worthless."

The report of Corporation Counsel William S. Rann, who made an extended investigation into the question, denounces the service-at-cost system and says that in almost every city in which it has been placed in operation, except Cleveland, the plan has been disappointing to the public, and in some instances to the operating companies and employees.

Ernest K. Jaggard, president of the Buffalo Jitney Owners' Association, is under arrest on a charge of conspiracy upon complaint of President Tulley of the International. When arraigned in court, Jaggard pleaded not guilty and demanded a jury trial. His trial was set for Nov. 27 and he was released on \$5,000 bail. Jaggard's arrest resulted from John Doe proceedings brought to determine if the transportation corporation law is being violated in Buffalo through the running of jitneys by the Manhattan Transit Company of New York. Joseph H. Hoadley, president, and Henry D. Chapin, officers of the Manhattan company, will be tried on conspiracy charges Nov. 24.

The Manhattan Transit Company operated several hundred jitneys in Buffalo after injunctions had been issued retraining the operation of such vehicles in Buffalo. The company claimed it had authority to operate 10-cent buses because of a blanket franchise granted years ago.

Agreement Sought Without Arbitration

In a formal notice on Nov. 1 the Springfield (Mass.) Street Railway and the Worcester Consolidated Street Railway asked their employees to accept a reduction of 8 cents an hour for blue uniform men and a corresponding reduction for miscellaneous employees under the contract to become effective on Dec. 31, on the expiration of the existing contract. This would establish a maximum of 50 cents an hour for the blue uniform men. At the same time the Springfield and Worcester divisions of the Amalgamated Association asked that wages be increased to the rates in force up to March 1, 1922, which would mean a maximum of 68 cents an hour for blue uniform workers. Request was also made by the men for various changes in the working conditions, concerning which there has been considerable complaint since the last adjustment, especially as relates to the outside spread and guarantee of spare men. Efforts are being made to come to an agreement without resort to arbitration.

Council Decides Not to Go Over Sir Adam's Head

After a debate lasting six hours, the Council of Toronto, Ont., on Oct 26 defeated, by a majority of sixteen to six, Alderman Whetter's suggestion that the city send a deputation to Ottawa to try to buy the city portions of the Toronto Suburban Railway.

The debate was featured by a long explanation from Sir Adam Beck of the whole negotiations. Information not before made public was given to the Council by Sir Adam and Mayor McGuire, both of whom stated emphatically that the city lines could not be purchased separately — legal opinion had proved that; that the agreement to take over the whole system was practically ready for signature, and that the city would soon be able to give West Toronto people relief from their present transportation injustices.

Sir Adam gave the history of the agreement which a certain Toronto evening paper said had been made between the Toronto Transportation Commission and the National Railways regarding the purchase of the city lines. The Hydro-Electric Commission knew nothing of this.

This agreement, it was explained, provided for the operation by the National Lines of the portions in the city on which the franchise had expired, so that the National Railways would not pull up the tracks and leave the district without any service at all. It had nothing to do with the purchase of these lines. It provided for the operation until such time as the Toronto Transportation Commission could get hold of the lines, and provided that any deficits would be paid by the city or the Toronto Transportation Commission. But this agreement was never even executed, said Sir Adam.

In answer to question as to how long it would be after the city passed the by-law approving the agreement before the city lines would be turned over to the Toronto Transportation Commission, Sir Adam said that depended on the speed shown by the new directors of the National Railways and the lawyers engaged.

Ald. Singer wanted to know if Sir Adam would still recommend the purchase of the whole system if the people were given a chance to vote and turned down the waterfront entrance project. Sir Adam's answer to this and other questions was the same. The whole matter would be signed, sealed and delivered before Jan. 1 and these matters would not interfere with the purchase. He had a mandate from Toronto to buy the whole system and would buy it unless the City Council intervened and voted to stop him.

Frankford "L" Opened

Philadelphia Rapid Transit Takes Over Operation of Important Addition to City's Transit Lines

All Frankford, a section of Philadelphia, is celebrating. It started celebrating on Saturday, Nov. 4, with the official opening of the Frankford elevated line, and it planned to continue celebrating until Nov. 11. Frankford waited seven years for its elevated extension, and it decided that after waiting seven years it should celebrate for seven days. At first there were all the delays, the war, change of administrations, etc., incident to the actual build-

ing of the structure by the city, and after the line had been erected the city and the Philadelphia Rapid Transit Company got into a jam over the terms of operation. And so the Frankford elevated stood in mute silence for several years, mocking the passengers taking the long ride by surface line from Frankford into Philadelphia.



ARTISTIC STREET CROSSING ON NEW ELEVATED LINE

ing of the structure by the city, and after the line had been erected the city and the Philadelphia Rapid Transit Company got into a jam over the terms of operation. And so the Frankford elevated stood in mute silence for several years, mocking the passengers taking the long ride by surface line from Frankford into Philadelphia.

Nov. 4 was, indeed, a great day for Frankford, and incidentally for Bustleton, a suburban section of Philadelphia. More about Bustleton later. President Mitten of the Philadelphia Rapid Transit Company and Mayor Moore, together with members of the Council, other officers of the Philadelphia Rapid Transit Company and invited guests from Philadelphia and nearby cities, all participated in the official ceremonies incident to the opening.

The first train left the Bridge Street terminal late in the afternoon, following the speeches at the dedication ceremony. Whistles screeched a greeting to the train which carried the Mayor, Mr. Mitten, officials of the city and the transit company and invited guests.

The only drawback to the celebration was the absence from it of W. S. Twining. An acute attack of indigestion forced the director of the department of city transit to remain at home. The director personally supervised the construction of the city-built elevated and also of the Bustleton surface line.

As indicated before, Frankford was not the only section of the city that held open house and festivities on Nov. 4 because of the beginning of new eras, due to better transportation facilities. Bustleton, too, has a new line and, while

it is not a \$15,000,000 "L," it is a very adequate surface line. Council made an appropriation of \$1,200,000 and authorized the construction and improvement of a double-track surface passenger railway, beginning at or near Frankford Avenue and extending along Oxford Avenue and other streets to the Byberry and Bensalem pike. Later studies of the work showed that the sum appropriated by Council would be inadequate to cover cost of building and equipping 10 miles of double-track road.

During the negotiations leading to the present agreement for the operation of Frankford elevated, it was esti-

can be reasonably done, and by withdrawing such service as will be largely unused after the Frankford elevated is in operation.

The fare for the ride over the Frankford-Market Street elevated, between the Bridge Street terminal, Frankford, and the Sixty-ninth Street terminal, West Philadelphia, will be cents cash, four tickets for 25 cents. The payment of a cash or strip ticket fare entitles the passenger to one free transfer between the Frankford elevated and any connecting crosstown surface line north of Arch Street, or in West Philadelphia between the Market Street elevated and connecting crosstown surface lines, as designated on the transfer tickets. To obtain a transfer, it is necessary for the passenger to make the request at the time the cash or strip ticket fare is paid, and with the opening of the Frankford elevated, the practice of handing out transfer tickets at the exit gates, previously in vogue at certain of the West Philadelphia stations, was discontinued.

The transfer of passengers between the elevated-subway trains and the surface-subway cars at Juniper Street is continued, as is also the exchange tickets now receivable at westbound stations of the Market Street subway.

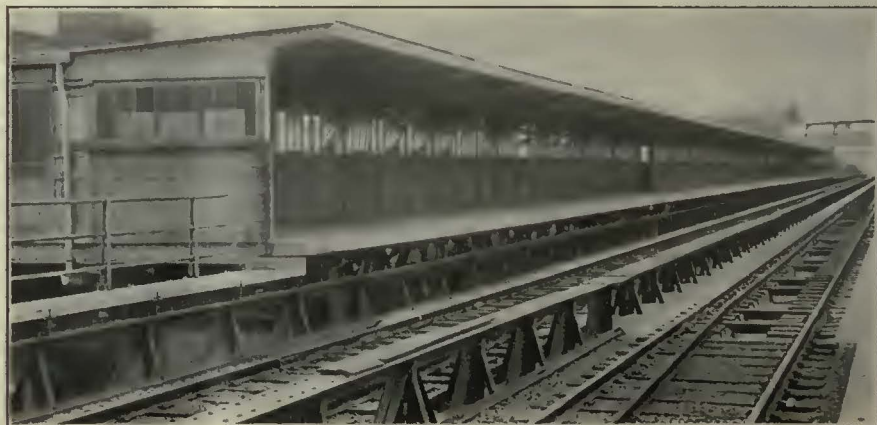
Four motor buses were used by the Philadelphia Rapid Transit to carry its own and city officials to the dedication ceremonies. They represented practically all the types required for city service. They included two Mitten-Traylor single deck vehicles, one of twenty-nine and one of twenty-five passenger capacity; one model L double-decker of the type developed by the Fifth Avenue Coach Company, and one covered double decker, with prepayment rear end, of the Detroit type described in *Bus Transportation* for September, page 479.

While no official announcement has been made by the Philadelphia Rapid Transit, the use of these buses undoubtedly indicates their operation in the near future in conjunction with the existing rail lines. In fact, President Mitten of the Philadelphia Rapid Transit Company has been credited with the intention of making a thorough study of the costs and possible routes where buses might be used.

mated by city and Philadelphia Rapid Transit engineers that during the first year of operation 9,000,000 passengers would be carried on the Frankford elevated if operated by the city and terminating at Front and Arch Streets; and 33,000,000 passengers would be carried on the Frankford elevated if operated by the P. R. T., with free transfers to surface lines and with Market Street subway delivery.

The company says that 24,000,000 additional passengers will use the Frankford elevated because the P. R. T., as operator, supplies the Market Street subway terminal and free transfer with connecting crosstown surface lines.

There will be a readjustment of service and routes in the Frankford general district by combining the service on closely paralleling routes where it



TYPICAL STATION ON NEW ELEVATED LINE

More Trackless Trolleys

Nine-Mile Line Added to System on Staten Island—200 Miles More in Prospect

Staten Island on Nov. 4 had 9 more miles of trackless trolley added to the 6.1 mile system already in operation there. The new line was opened with ceremonies in which Mayor Hylan of New York, Commissioner Whalen and other city officials participated.

The new line operates from the end of the St. George-Richmond trolley line to Tottenville via Fresh-kills Road, over a 20-ft. concrete highway with few grades but many curves. The line is approximately 9 miles in length and for a ride over it a 5-cent fare is charged, with no transfers to the trolley cars at Richmond. Normally, service is given every twenty minutes, but during the morning and evening rush hours more frequent headways are run.

The overhead trolley consists of double construction with a loop at each end of the line, the loop being formed around a block. At the Richmond end of the line the new system connects with the municipal trolley line so that it is possible for a passenger to ride from St. George to Tottenville for 10 cents.

Eight new vehicles were purchased for the route, a 300-kw. generating station installed at Sea View Hospital, an automatic substation put up at Green Ridge, and a carhouse with a capacity of twelve buses built at the same place. For this operation the city appropriated \$177,700.

In general the vehicle in appearance follows the automotive design rather than that of the street car. It was designed by the Trackless Transportation Company, New York. The motors are mounted amidships, while under the hood are placed the resistance grids, the storage battery for emergency lighting and the battery charging generator.

The body, which was built by Osgood-Bradley Company, Worcester, Mass., has steel posts and carlines and outside panels of 20-gage steel. Inside the wainscoting under the windows is of 3/4 in. Agasote. The roof is tongue and grooved hardwood sheathing, covered with No. 12 canvas, on top of which

is a trolley board 18 in. wide that runs the full length of the body. Three foot-holds on the right-hand rear corner and a roof ladder provide access to the U. S. 50-A trolley base and sliding current collector.

The line has its own power supply. At Sea View Hospital, a city institution, a 2,300-volt 300-kw. alternator direct connected to an Erie-Ball engine has been installed. The voltage is then stepped up to 6,600 for transmission to Green Ridge, where a Westinghouse 300-kw. automatic railway substation has been put in to furnish the necessary power at 600 volts d.c. to operate the trolley buses.

Commissioner Whalen is on record

in Altoona and Blair Counties, according to a statement filed by General Manager S. S. Crane of the traction company with Mayor Charles E. Rhodes and the City Commissioners. The statement was made in rebuttal to objections raised by citizens at a hearing before the commissioners. Citizens protested the use of one-man cars.

The Altoona & Logan Valley company operates specially designed one-man, single truck cars on certain lines, and one-man double-truck "owl" cars on other divisions. Passengers enter and leave by the front door.

General Manager Crane in his statement cites eleven reasons for the one-man car, several of them answering



NEW TRACKLESS TROLLEYS DRAWN UP TRAIN FASHION

as saying that the Richmond-Tottenville trackless trolley is only one of the thirty odd lines planned for the borough. According to Mr. Whalen, the plans of Mayor Hylan call for 204 miles of trackless trolley in Richmond.

A year ago Mayor Hylan put into operation two trackless trolley routes in Richmond, one making Linoleumville accessible, the other providing transportation for the city's great Sea View institutions. Both lines have served the public well and have resulted in the building of numerous homes in the sections served.

Advantages of One-Man Car Operation Cited

Accidents have been minimized, schedules better maintained and the service generally improved by the use of one-man trolley cars on the Altoona & Logan Valley Electric Railway lines

citizens' protests. As to a safety measure in dropping sand, he states that the front end operator can drop sand from either end of the car at the same time. As to "on time," the manager states that one-man cars, by accurate records, show a better schedule than two-man cars, with an even better record possible where passengers have the exact fare.

In conclusion Mr. Crane stated that one-man cars were operated on the Tyrone lines ten years ago and that actual experience has demonstrated the wisdom of their use.

"Better service to the greater number has been the watchword in Altoona," said Mr. Crane, "and when conditions warranted extensions were made voluntarily for the convenience and accommodation of the public. Decreasing revenues, however, must be met by decreasing costs and the one-man car maintains the proper ratio without service impairment."



CONCRETE CARHOUSE AT GREEN RIDGE



CLOSE-UP OF A NEW TROLLEY

Utility Questions in the Elections

Candidates Talked Regulation, Home Rule and Water Power—The Arrogant Rebuked and the Compromiser Defeated—California Rejects \$500,000,000 Appropriation

CAUSTIC comments are everywhere in evidence in the daily newspapers on the outcome of the election. These relate to the results in their national significance and to the purely local aspects of some of the upsets. Thus in the plurality given in New York City to Alfred Smith, who has been returned to the office of Governor, the *Wall Street Journal*, than which there is no more outspoken paper in the country, said that it was by no means the first time that New York City had returned like a dog to its vomit. As the *Wall Street Journal* sees it New York State prefers a good mixer to a good business man.

WATER POWER AND HOME RULE

In New York State the water power and the home rule issues received a great deal of attention from the gubernatorial candidates. Somewhat similar issues were involved in New Jersey, while elsewhere throughout the country questions affecting the utilities were involved in the elections, notably in California, in Detroit, Saginaw and other places.

In Chicago there was no direct issue affecting the utilities, but the defeat of candidates having the backing of William Hale Thompson has raised the question whether Chicago's present Mayor can be returned to office.

In New York Mayor Hylan, ever quick on the verbal trigger, read into the election result the end of the traction triplets, the endearing term which he uses to describe the members of the present transit commission, created at the behest of Governor Miller. In this case the wish appears to be father to the thought, for it is most uncertain just how far the new Governor can go in undoing the work of the commission. If Mayor Hylan had his way, his own whole transit program, if such it may be called, would be made possible of completion at once, even including his \$25,000,000 bus program, but Mayor Hylan's way may not be the Smith way. Sight must not be lost of the fact that the ingratiating Smith during his previous administration as Governor in 1919 induced the Legislature, Republican in both its branches, to appoint members of entirely new regulatory bodies. In consequence there resulted a one-headed regulatory transit commission and a one-headed regulatory construction commission.

What Mr. Miller, the defeated candidate for Governor in New York, said during the campaign does not matter now. It is no longer news. It has passed into history. What Mr. Smith said, however, does matter, but it must be read in the light of his appeal for votes. He referred constantly to the so-called Carson-Martin bill, which, he charged, provided that the Public Service Commission can fix the rate of fare without regard to existing fran-

chise. He also repeated many times the interrogation: "By what reasoning does he (Governor Miller) arrive at the conclusion that the State of New York should have anything to do with railroads that are partly the property of the city of New York?" He said the big question was: "What business is it of the State of New York to be regulating this transit question which lies entirely within the city of New York?" Still the records show that outside of the city of New York the electric railways of the State did secure relief from burdensome fare provisions during Mr. Smith's former administration, although the concessions were in a measure wrung from the administrative bodies.

In New Jersey George S. Silzer has been elected Governor. He is a pronounced 5-cent fare advocate. He will be faced by a hostile law-making body, however. As a spokesman for Mr. Silzer a former member of the State Utility Commission, John J. Treacy, stumped the State. Mr. Silzer is a democrat. Opposed to him was William N. Runyon, who flatly put himself on record against the 5-cent fare, saying it was impossible of accomplishment. In this connection it is interesting to note that Mr. Treacy lays claim to being the author of the Bacharach bill, the national measure which would make appeal to the federal courts impossible for utilities seeking relief from commission decisions fixing rates. In one of his speeches Mr. Treacy said: "With a contempt characteristic of that corporation (the Public Service Corporation of New Jersey) it saw fit to flout the State courts and the State Commission. If this practice were to be permitted State regulation of public utilities would soon be at an end, and all that we had gained through the long fight for a public utility law would be lost."

\$500,000,000 APPROPRIATION DEFEATED

In California the people declared themselves in no uncertain terms on the proposed constitutional amendment known as the water and power act, which would have pledged the credit of the state to the extent of half a billion dollars to engage in the business of developing hydro-electric power. Incomplete returns indicate that the measure has lost by nearly two to one. Briefly, the act provided for the control of the water powers of the state by a board of five, to be appointed by the Governor, which would have at its disposal \$500,000,000 to be raised by the sale of bonds and backed by the credit of the state. This money could be used at the discretion of the board to develop and distribute water and electrical energy and, if deemed expedient, for the acquisition of the power plants and distribution systems of privately owned utilities.

Two other measures of interest to the utility industry of California have apparently lost by majorities too large to be overturned when the complete returns are counted. One was an act to bring municipally owned utilities under the jurisdiction of the California Railroad Commission and to give the commission the power of regulation in all matters except the issuance of securities. The other was an act requiring municipally owned utilities to pay the same tax that is required of privately owned utilities.

In San Francisco the plan of the city to purchase the Market Street Railway has apparently been ratified by voters, for an amendment to the city charter has been passed which would exempt from the city debt limit an issue of bonds such as would be required to be issued for the city to purchase the railroad. The railway company has set a value of \$48,000,000 upon its properties, but the city engineer is understood to have set the figure at \$40,000,000. Under recent reorganization plans, the Market Street Railway's bonded indebtedness has been reduced to \$15,000,000. On the basis of the \$40,000,000 purchase price figure, these bonds, together with \$11,700,000 prior preferred, the \$5,000,000 preferred and \$4,700,000 second preferred, could be retired, and there would still remain the equivalent of \$35 a share or more for common stockholders.

In Detroit the citizens by a more than two to one vote, rejected the proposal of Mayor James Couzens and the Council to oust the Detroit United Railway interurbans from the city. Two other measures also sponsored by the city administration, the proposed \$5,000,000 bond issue for municipal street railway extensions, and the proposed charter amendment relieving the Detroit Municipal Railway of the cost of paving between its tracks, also lost by wide margins.

Unofficial figures from Saginaw, Mich., indicate that the franchise calling for the restoration of service by the Saginaw-Bay City Railway was lost by a small margin. A recount will be asked by those friendly to the franchise. It was the largest vote ever recorded on a municipal question in Saginaw.

North American Completed Purchases of St. Louis Properties

As noted in the issue of October 28, the North American Company's offer to purchase the stock of the East St. Louis & Suburban Railway had been accepted by practically all of the share holders. Since that time the North American Company has purchased the stock and has actually taken control of the management of both the East St. Louis & Suburban Railway and the East St. Louis Railway.

W. H. Sawyer, who has been president of both companies under the E. W. Clark management, will continue in that position under the new management. Mr. Sawyer has severed his connection with the Clark interests.

Financial and Corporate

Third Avenue's Previous Year's Deficit Absorbed by Improvement

An increase of more than \$1,000,000 is noted in the net income of the Third Avenue Railway, New York, N. Y., for the year ended June 30, 1922, over the year ended June 30, 1921. After taxes, interest charges, and a 5 per cent interest on adjustment mortgage income bonds the net income amounted to \$207,474. Last year the company reported a deficit of \$876,611. The improvement in the income account is noted in the following table:

	1922	1921	1920	1919
Operating revenue.....	\$14,141,412	\$13,499,226	\$11,752,069	\$10,363,447
Operating expenses.....	10,555,026	11,037,607	9,284,722	7,741,083
Taxes.....	964,970	879,319	816,939	818,060
Operating income.....	\$2,621,416	\$1,582,300	\$1,650,408	\$1,804,304
Other income.....	261,537	213,486	191,909	156,882
Gross income.....	\$2,882,953	\$1,795,786	\$1,842,317	\$1,961,186
*Interest charges, etc.....	2,675,479	2,672,397	2,687,713	2,681,242
Net income.....	\$207,474	†\$876,611	†\$845,396	†\$720,56
P. & L. def.....	\$2,280,591	\$2,488,066	\$1,252,510	\$20,991

* Includes full interest on adjustment mortgage 5% income bonds. † Deficit.

Commenting on the report of his company President Huff said that this betterment in the operation was due not only to an increase in receipts of nearly \$700,000 but also to a decrease in operating expenses of approximately \$400,000.

In his remarks to the stockholders Mr. Huff said that the physical condition of the property was steadily improving and that the engineers of the Transit Commission had reported that the property was being well maintained. Referring to the adjustment bonds he said that the directors felt that the situation was not sufficiently stabilized at the end of the first six months of the year to justify a payment of more than 1½ per cent upon these bonds. But at the end of the second six months a payment of 3¾ per cent had been justified. There remains as interest still unpaid upon these bonds 21¼ per cent.

Property Sale Confirmed

Sale of the properties of the Springfield Terminal Railways operating the Springfield, Troy & Piqua traction line, from Springfield, to Troy, to the Joseph Schonthal Company of Columbus, for \$87,000, was confirmed by Federal Judge John E. Sater in Cincinnati on Nov. 7. The company is expected to junk the line which has been in the hands of a receiver for about two years on application of the Central Trust Company of Illinois. Efforts to sell the line to proposed operators, met with failure after several deals had been ar-

ranged. The receivers were ordered by the court to convey deed to the property upon payment of the full purchase price, and all questions relating to priority of liens upon the funds arising from the sale and the distribution of the funds are reserved for future determination by the court.

Declares Dividend—Suspends Extra Fare

The directors of the Brooklyn (N. Y.) City Railroad at a meeting on Nov. 8 declared a dividend of 20 cents per share on the outstanding capital stock, payable Dec. 15, to stockholders of re-

ord on Nov. 8, 1922, the payments being made out of the surplus earnings.

The directors voted to suspend the collection of a second fare on the Flatbush Avenue Line, and elected General Manager Clinton E. Morgan second vice-president of the company.

The property of The Brooklyn City Railroad was returned to its owners on Oct. 19, 1919, following a default by the lessee, The Brooklyn Heights Railroad, in the payment of the installment of rent due Oct. 1, 1919, in accordance with the terms of the lease, which called for annual payments totaling 10 per cent on the stock of The Brooklyn City Railroad Company.

The earnings of the company since July 1, 1922, the date of the last annual report, having continued to be satisfactory, the directors, it was stated, felt that they could conservatively declare a dividend.

In explanation of the suspension of the collection of a second fare on the Flatbush Avenue Line it was stated that the company, in order that the public might be adequately served, was compelled in 1919 to increase its income by exercising its right to collect a second fare on the Flatbush Avenue Line.

The company having overcome initial difficulties and having put its property in good operating condition, it was said, is gratified to be able to suspend the collection of a second fare on the Flatbush Avenue Line and thus to relieve the traveling public of this additional burden. The second fare has been collected since Jan. 17, 1921, the company's right to do so having been established by the courts.

Manhattan Stockholders Approve Readjustment

The stockholders of the Manhattan Railway, New York, N. Y., on Nov. 8, approved the readjustment plan of the Interborough Rapid Transit Company and the Manhattan Company at the annual meeting of the shareholders of the company. The ratification of the plan, which had previously been approved by the board of directors, was accomplished only after Clarence H. Venner, a minority stockholder, sought to obtain an adjournment on the ground that no quorum was present.

Approval of the Interborough-Manhattan plan would be illegal, Mr. Venner stated, because the lease of the Manhattan lines contained a clause to the effect that the modification of the terms could be accomplished only on the unanimous consent of the stockholders. As long as 1 per cent of the shareholders objected, said Mr. Venner, the plan could not be put into effect, and he added that he, representing more than 1 per cent, did object.

Three new directors were elected, Finley J. Shepard being chosen to succeed George J. Gould; Thomas I. Parkinson to succeed William A. Day, and W. S. Pierce to succeed J. J. Slocum.

27,500 Shares of Common Stock Purchased by Bankers

Purchase of 27,500 shares of common stock of the Washington Railway & Electric Company, Washington, D. C., during the week ended Nov. 4, by Crane, Parris & Company, Washington investment bankers, acting in behalf of undisclosed principals, has created lively comment in financial circles and revived gossip of plans for consolidation of this street railway corporation with the Capital Traction Company and the Potomac Electric Power Company.

While it was stated on behalf of Crane, Parris & Company that there was no connection between the stock transfer and merger plans and that the deal was for investment purposes, the stock of all three of the corporations connected with consolidation gossip reacted upward sharply on the exchange following announcement of the deal.

There are 65,000 shares of Washington Railway common. The 27,500 involved in this deal were acquired by the Washington Utilities Company in 1912 and 1913 with a view toward merger, which was blocked at the time by legislation. The shares were deposited as collateral for an issue of \$1,500,000 short-term notes which were sold to Washington, Baltimore and New York banks. When the Washington Railway suspended dividends in 1919, these notes were defaulted and the stock was taken over by the banks and managed by a noteholders' protective committee. The price paid by Crane, Parris & Company was not made public, but was said to be sufficient to pay noteholders both principal and accrued interest on their investment.

Traffic and Transportation

Compromise Effected

Houston Agrees to Limit Number of Jitneys—Company Will Continue Seven-Cent Fare Operation

The fare controversy between the Houston (Texas) Electric Company and the city of Houston has been settled by compromise. The company some time ago presented a petition asking for authority to increase fares from 7 cents to 9 cents and to discontinue the selling of metal tokens at the rate of four for 25 cents. The request for increased fares was based on the claim that the company had found it impossible to operate profitably in the face of the competition of the jitneys, and that the company's petition to the city to eliminate or greatly reduce the number of jitneys operating had not been granted, but had been referred to the qualified voters for settlement in a referendum election to be held Nov. 7.

FIGHT DATES BACK TO JANUARY

After several proposals and counter proposals, a basis of settlement was finally reached under which the company will continue operation under a 7-cent fare, will continue to sell metal tokens at the rate of four for 25 cents and will resume work on the improvement projects which were stopped when the company filed its request for increased fares.

The city of Houston agrees to reduce the number of jitneys operating in Houston to 150 or less by Jan. 1 and to permit no more than this number to operate thereafter. There are now 187 licensed jitneys in operation in Houston. Eleven jitneys will be eliminated on Nov. 15 when their licenses are canceled by the city. All are operated by negroes and run to the "Black Belt" section of the city.

NINE-CENT FARE APPEARED LIKELY

The fight between the company and the city dates back to last January. The company at that time obtained a fifteen-year extension of its franchise from the city, with the provision that it would sell car tickets four for 25 cents and would within two years spend \$1,200,000 on extensions and improvements under the direction of the City Council. The company so reduced fares and spent, it later reported, some \$600,000 on the improvement program, building several miles of new track and buying many new cars. Then it came before the Council and demanded that jitney competition be abolished, except on two lines originating outside the city and on one line, the Austin, which does not run within two blocks of any car line. The Council refused to do this. The company then presented statements to show that it had not made 1 per cent on its investment in the six months ending Sept. 1.

The company countered by threatening to raise cash fares to 9 cents and abolish tickets if jitneys were not abolished at once. It had meanwhile stopped all improvement work, explaining that its credit was not good to borrow any more money while making only 1 per cent on its capital. The city then proposed that the weekly pass be tried.

Fort Worth Fare Briefs Submitted

Briefs have been prepared by attorneys for the Northern Texas Traction Company and by Corporation Counsel R. E. Rouer in the litigation involving the reduction of fares in the city of Fort Worth, Tex., and these are now in the hands of N. A. Dodge, special master in chancery, who heard evidence on the questions at issue under appointment of the Federal court for the Northern District of Texas. Attorneys have been at work on the briefs for about a month.

When Special Master Dodge heard the evidence in the case, which was concluded about a month ago, he gave attorneys on both sides a month in which to prepare and submit their briefs. He will now consider these briefs in connection with the evidence adduced and will make his report of his findings to the Federal District Court.

The Northern Texas Traction Company is now charging a 7-cent fare in Fort Worth, the company having put this fare in effect early in 1920. The city seeks to force a reduction in fares, such reduction to be measured by the amount which the earnings of the company may be reduced and still yield a fair and adequate return.

The charter provisions of the city of Fort Worth are much the same as in Galveston. The company can announce that a certain fare will be charged, that it is necessary to yield a fair and adequate return, and the charging of that fare can then be prevented only by court action.

Considerable statistical data bearing on gross and net revenues, operating costs, depreciation, replacement value, taxes, etc., were placed before the special master during the hearing.

City Applies for Rehearing

The city of Syracuse, N. Y., through its assistant corporation counsel has filed an application with the Public Service Commission for a rehearing of the New York State Railways one-man car and fare issues. If the application is denied the city will have ninety days in which to carry an appeal to the Appellate Division of the Supreme Court. The recent decisions of the commission with respect to the one-man car and the rate of fare in Syracuse have been reviewed previously in the *Electric Railway Journal*.

Interurban Road Protests Bus Operation

The Chicago, Elgin & Aurora Road has appealed to the Supreme Court of Illinois from the action of the Illinois Commerce Commission granting the Smith Motor Bus Company a certificate of convenience and necessity on Nov. 1 to operate motor buses connecting Batavia, Elgin, Aurora, Big Rock, Fulton and Chicago. A similar order was issued Sept. 1921, but, due to an error in the wording, it was reissued with the correction made.

The electric railway, in its appeal to the Supreme Court, contends that the complainant is already established that it is amply able to take care of the transportation needs of the territory, that there is no necessity for the operation of a bus line, and that the commission has the power to compel the railroad to give adequate service if it is not now doing so. The various arguments were advanced before the commission when the public hearing was called, but the utility board apparently believed that there was a need of the supplementary service that would be supplied by the buses.

Mark Smith, the head of the bus company, started in the business in 1920 with a line between Aurora and Batavia. Complaint was filed by the electric railway soon thereafter and the bus line was compelled to cease operation and ask for a certificate of convenience and necessity. Now that this has been granted, Mr. Smith plans to resume business. He will go ahead with his plans unless halted by a court injunction.

Dismissal of Complaints Brings \$325,000 Into Railway Treasury

Complaints made to the Public Service Commission in 1919 over certain passenger fares charged by the International Railway, Buffalo, N. Y., between Buffalo and Lockport, Tonawanda, North Tonawanda and LaSalle but never prosecuted, have been dismissed by the commission. The commission at the time allowed the increased rates to become operative providing the company issued rebate slips. This continued for a period of months, when the International put a new tariff into effect.

About \$325,000 was set aside by the International to meet the face value of the rebate slips pending a determination of the case by the Public Service Commission. Municipal officers in the cities which made the original complaint were cited to show cause before Commissioner William R. Pooley why the complaint should not be progressed or abandoned and closed on the commission's record. With the dismissal of the case, the \$325,000 goes into the treasury of the International.

There is now pending before the commission a general action seeking lower fares to and between points on the interurban lines of the International. Hearings will be held later.

Six Cents in Galveston

No Other Alternative to Increase in Rates in Famous Case in Which United States Supreme Court Laid Down Rules Governing Fair Return

THE Galveston (Tex.) Electric Company was granted a 6-cent fare by the City Commission, effective on Oct. 28. The 6-cent fare was authorized in an ordinance adopted at a special meeting of the City Commission and carried an emergency clause which made it effective at once. The fare up to that time had been 5 cents.

Adoption of the 6-cent fare ordinance automatically disposes of the fare litigation pending in Federal court, under which the Galveston Electric Company sought to enjoin the city officials from enforcing the 5-cent fare ordinance. An agreement was reached whereby the case will be dismissed and the company will pay all court costs.

The 6-cent fare ordinance was passed on recommendation of City Attorney Frank S. Anderson after he had caused an audit of the company's books to be made and had carefully investigated the questions of earnings and operating costs of the company. The audit as made disclosed the fact that the net earnings of the company for the nine months ended Sept. 30, 1922, were \$12,340, or a deficit on fair return of \$7,259. Mr. Anderson based his calculation on 8 per cent as a fair return. It was this rate of return that was declared fair by the Federal court in earlier litigation. At 8 per cent the fair return for the nine months would amount to \$96,600. It was estimated that a 6-cent fare would produce this return.

The removal of the street car tracks from Market Street in the business district, which has been proposed as a means of lessening traffic accidents, is not involved in the agreement reached in connection with the fare increase, and the City Commission will take up the track removal question on petition of property owners, Mr. Anderson said.

The company's case seeking to enjoin the city had been set for hearing in Federal court on Oct. 30. Prior to his making a recommendation for a 6-cent fare, Mr. Anderson conferred with Federal Judge J. C. Hutcheson and Clarence Wharton, attorney for the Galveston Electric Company in the litigation. The City Charter of Galveston provides that the Board of City Commissioners, upon publication of the company or on petition of citizens of the city, may determine, fix and regulate the fares to be charged by the company, and it was under this Section 8 of the charter that the 6-cent fare ordinance was passed.

HISTORY OF CASE REVIEWED

In reviewing the litigation between the company and the city, the city attorney said:

On June 5, 1919, the board of commissioners passed and adopted an ordinance fixing the fares of the Galveston Electric Company at 5 cents for each adult and 2½ cents for each person for half fare.

In May, 1920, the Galveston Electric Company filed a suit against the city in the District Court of the United States for the Southern District of Texas, praying for an injunction restraining the enforcement of the ordinance above referred to. The issues joined in this suit were referred to a special master, who heard the evidence and made his report thereon to the court.

The period for testing the constitutionality of the ordinance in the hearings before the master was taken by both sides to be the twelve months ending June 30, 1920.

The matters in dispute between the company and the city were, briefly, as follows:

- The present fair value of the property.
- Depreciation allowance.
- Maintenance.
- Allowance of federal income taxes.
- Allowance of brokerage fees.

GOING CONCERN VALUE

Involved in the question of fair value was an item of \$520,000 added to the base value of the property as "going concern value."

The master fixed the present fair value of the property at \$2,167,805, which included the item of \$520,000 going concern value, and an item of \$67,078, brokerage fees.

The case came before Judge Hutcheson upon application for confirmation of the report of the special master, and the court declined to allow the items of \$520,000 going concern value, and \$67,078, brokerage fees, and fixed the fair value of the property at \$1,626,061 as the figure upon which the company was entitled to earn a fair return. Eight per cent at that time was assumed to be a fair return.

For the purpose of rate making the court fixed \$70,000 as the annual allowance for maintenance.

The company contended that the actual maintenance expended during the test period, which was largely in excess of that amount, should be allowed.

The court refused to allow federal income taxes as a part of the operating expenses.

The court fixed the annual depreciation allowance at 4 per cent per annum to be applied to the present fair value, for rate making purposes of the company's depreciable property, to wit: \$1,062,892.

SUPREME COURT CONFIRMS

Upon appeal to the Supreme Court of the United States that court in all things confirmed the findings of the trial court, so that the basis upon which the company is entitled to earn a fair return has been fixed.

Neither the district court nor Supreme Court fixed the rate of fare to be charged by the company. The question determined was: Did the 5-cent fare produce a gross income which, after deducting operating expenses, maintenance at \$70,000 per annum, taxes (less federal income taxes) and depreciation leave a net income equal to 8 per cent upon a fair value of the property?

The court held that under conditions existing during the six months ending Dec. 31, 1920, the 5-cent fare did yield a fair return and denied the application for an injunction without prejudice to review it, if changing conditions warranted.

It will thus be seen that the city has no control over the gross earnings of the company, which are governed entirely by the number of passengers carried.

ASKED INCREASE THIS YEAR

On March 23, 1922, the company made application to the board of commissioners for an increase in fare.

An audit of the books of the company for the year 1921 and three months of 1922 was made by the firm of Ernst & Ernst, public accountants, and from such audit it was determined by the board of commissioners that the company had earned a fair return during the calendar year 1921.

The operations of the company for January, February and March, 1922, showed that the company was not earning a fair return, but the board of commissioners refused an increase in fare based upon the operations for those months, holding that three months was not a fair test period. The courts hold that a longer time should be allowed.

On or about June 1, 1922, the Galveston Electric Company filed suit in the United States District Court for an injunction restraining the enforcement of the 5-cent fare ordinance, contending that it was not earning a fair return and that the ordinance was confiscatory.

An audit of the company's books has been brought down to Sept. 10, 1922, and discloses the following comparative statement of the railway company's income and expenses for the nine months ended Sept. 30, 1922, and 1921:

	1922	1921
Gross income	\$384,562	\$468,058
*Total maintenance and operating expenses ...	330,332	361,017
Net earnings	\$54,230	\$107,041
*This includes maintenance for 1922, \$67,052, and for 1921, \$91,171.		

From net earnings is to be deducted the depreciation allowance and taxes for the year 1922.

The following shows the set-up upon which the court based his finding that the company would earn a fair return for the year 1921, to wit:

Gross revenue	\$618,000
Operating expenses	\$329,411
Maintenance	70,000
Depreciation	45,245
Taxes (exclusive income)	27,475
Available for return	\$145,868

This equals a return on the court's valuation of \$1,626,061 of 8.9 per cent.

Set up of operations for nine months ended Sept. 30, 1922, upon the basis of the court's decision, to wit:

Gross income	\$384,562
Operating expenses (less maintenance)	263,279
Maintenance (nine months at \$70,000 per year)	\$121,282
Taxes (nine months, less federal income taxes)	52,497
Depreciation, nine months	\$68,785
Net income	\$46,270
Deficit fair return for nine months	\$33,930
Net earnings required to produce fair return at 8 per cent	\$12,340
	\$7,259
	\$99,600

Under the provisions of section 98 of the charter, the board of commissioners has the power, upon application of the company, and may of its own motion, determine, fix and regulate the fares to be charged by the Galveston Electric Company, and I call attention to the following extract from the opinion of Judge Hutcheson in the former suit, viz:

"To the litigants and their counsel in this and similar cases before me I commend these expressions, not because of the wisdom of the author, but because they bear the sanction of the authority of the Supreme Court of the United States, adding to them the declaration that if at any time it should appear to me that any order made by me in this or any similar cases now or hereafter pending before me is being used by the parties to it for any other purpose and to any other extent than its terms express; in short, if it should appear to me that a City Council, resting upon a court order, has abandoned its legislative function and is refusing to consider from that standpoint such proper adjustment of the rates as the actual experience of the utility shall show it entitled to; or if a utility, where the order is in its favor, is using such order as propaganda in an effort to unduly increase its rates, this court will, of its own motion, or upon application of the other party, amend or vacate the order so as to deprive the guilty party of its benefits, and to that end the decree in this and similar cases will be drawn."

The Supreme Court of the United States has approved the language of Judge Hutcheson. As to what has brought about the present condition in the earnings of the company, it is not for me to conjecture, but undoubtedly the increase in the number of privately owned automobiles and lack of work along the docks for the past year have contributed largely to the present situation.

Commission Favors Improvements

General Andrews Explains Why Certain Changes in Operating Methods Are of Benefit to Public

A complaint was recently made to the New York Transit Commission in regard to the new "Guardless" Brooklyn Rapid Transit cars by one of the civic leagues in that city. The complaint was directed generally against the practice of operating doors of subway trains by one man for more than one car, "as prejudicial to life and limb of the traveling public and also a cause of great discomfort." The complainant made the five following points:

- "1. In case of sickness, no one in authority.
2. In case of disturbance, no one in authority.
3. In case the device for opening the doors fails to work, no one in authority.
4. No one in authority to direct strangers.
5. No one to announce the stations, the present system of megaphones being in about 75 per cent of the cars inaudible."

The method of operation referred to is one in which multiple-door control provides that one trainman stationed in the center of a unit of three cars opens and closes the side doors for all three of the cars of his unit. The reply was sent by Gen. Lincoln C. Andrews, chief executive officer of the commission, and is reproduced in part below:

The commission is glad to receive the opinions of the patrons of the road in this matter. Multiple-door control is being experimented with under the commission's supervision as one of the advances in rapid transit operation which has been developed by railroad operators under the stress of the necessity for reducing the costs of operation and increasing efficiency.

As you probably know, the commission plans for the unification of all transit facilities and their ultimate operation as a single system with universal transfers and a 5-cent fare. This can only be accomplished under the most efficient administration and operation of the lines as it must include the operation of new lines intended to develop outlying sections and relieve present congested areas. The commission therefore is interested in developing modern efficiency methods. For example, the use of the prepayment turnstile, one-man car operation on surface lines and multiple-door control in rapid transit.

In reality, this multiple-door control is based upon methods of operation which the commission believes insure greater safety to the passengers than the old method of having the guards open and close the doors by hand. The control of the train is now so hooked up that it is impossible for the train to start until all doors are actually closed. This prevents the possibility of any passenger being dragged by being held in a partially closed door when the train starts.

As to the five specific points made in your letter, the B. R. T. is now installing in each of the cars where no guard is present an electrical device plainly marked by which, in case of any emergency calling for the presence of the guard, a passenger may instantly call the guard from the middle car where he is stationed. As to the last two points, directing strangers and announcing stations, it is true that strangers must depend upon information from fellow travelers for information before they embark on the train. We have had no serious difficulties in this connection. The station announcers should be, of course, in good working order. They are constantly inspected with a view to keeping them in good working order and we have had very little complaint from the traveling public along this line.

The commission is watching these developments closely and will continue to do so

with a view to determining their safety and propriety from the point of view of convenience to the public as well as efficiency and operation. It must be kept in mind, however, that in order to preserve the 5-cent fare in the presence of the uniformly high costs of everything that goes into railroad operation economy must be observed by the operators. If the railroads were in a position to be able to make financial profits the public would be justified in demanding more refinements of service. Their financial position is of course no matter of conjecture. The commission has monthly reports in detail of all their financial operations and keeps constantly in touch with them both as to income and expenditure. As you know, the B. R. T. is still in the hands of a receiver, who is of course required to administer the road's affairs with the closest attention to economy and efficiency, with a view to re-establishing its financial stability. The commission, representing the public which is absolutely dependent upon these rapid transit facilities, is interested primarily in seeing that they render efficient service, but must also regard their financial stability in order that they may continue to give service that secures the safety of their riders as well as their convenience.

Hears Arguments on Abolishing Limited Service

The Massachusetts State Public Utilities Commission gave a hearing recently on a petition of the town government of West Springfield for the abolition of the limited car service on the Springfield and Holyoke systems between Springfield and Holyoke and the establishing of a maximum speed of 20 m.p.h. for all cars on that line. It was urged that operation of the limited cars, which make only a few stops on the route, is dangerous to the public and a discrimination against the townspeople, who desire more local service. H. M. Flanders, general manager, submitted statistics showing that the number of accidents on the through cars was relatively lower than on the local cars. The commission reserved decision.

Transportation News Notes

Weekly Pass in Effect.—The Washington & Virginia Railway, Washington, D. C., has installed the weekly pass on its line between Washington & Alexandria. The pass is selling for \$1.60 a week.

Reduced Fares for School Children.—The United Electric Railways, Providence, R. I., put into effect beginning Oct. 12 reduced school tickets to pupils eighteen years of age and under. Tickets are being sold in strips of ten, entitling a pupil to ten rides at the rate of 40 cents per strip.

Extends One-Man Car Service.—The Springfield (Mass.) Street Railway has further extended its one-man car service by changing the Hartford West Side and the King Street routes from the two-men to the one-man basis. Cars for these lines will be chosen from those converted from the two-men type.

Action on One-Man Car Put Off.—The City Council of Danville, Va., has deferred action on one-man car operation, permission for which is being

sought by the Danville Traction & Power Company. The finance committee had recommended the use of the one-man type of car except during rush hours and for a trial period of one year.

Lines Reopened.—Service has been restored on the Marcy Avenue and Park Avenue lines of the Brooklyn (N. Y.) Rapid Transit Company in Brooklyn, closed since the 1920 strike. Federal Judge Julius M. Mayer, the Transit Commission and Lindley M. Garrison, receiver for the company, were all instrumental in having the two lines reopened.

Request All Night Service.—Officials of the Bethlehem Steel Company at Steelton have petitioned the Harrisburg (Pa.) Railways for an all-night service between the east end section of the borough and Harrisburg. The request was made at the instance of the steel mill employees, some of whom finish work at irregular hours and are unable to get transportation home.

Fares Advanced.—Increased railway fares on the lines of the Hydro-Electric Railways (Essex District), Windsor, became effective on Nov. 1. If \$1 worth of tickets are purchased patrons may still ride for 5 cents. Transient passengers can either pay a straight 6-cent fare or buy six tickets for 35 cents.

New Traffic Rules to Have a Trial.—Some new traffic rules will be tried out in Louisville, Ky., which will include elimination of the left hand turn on several of the business corners, while traffic policemen in the future will blow whistles before turning semaphores, thus giving pedestrians a chance to clear the crossing before the change in traffic is made. At Fourth and Walnut Streets the curbs are to be cut back and fenced off, so that pedestrians will have to cross a little behind the intersection, thus allowing vehicles to get clear of the procession stream before having to halt for pedestrians in making the right hand turn. White lines will be painted on the streets to designate the crossing spots. What is needed more than anything else in Louisville is to force pedestrians to obey traffic officers.

Lines Rerouted.—In compliance with the rerouting ordinance passed by City Council several weeks ago, the Cincinnati (Ohio) Traction Company, on Sept. 10, rerouted all of its lines in the heart of the city which will not necessitate the laying of new tracks or switches. Plans for the installation of tracks and switches to accommodate rerouting of all cars, as provided by the city ordinance, have been drawn and the necessary material will be ordered at once. A. Benham, general manager of the traction company, announced. Rerouting proposals were submitted early this year by W. Jerome Kuertz, Street Railroad Commissioner, after a lengthy study of Cincinnati's traffic problem. The new routes do away with left-hand turns in the downtown area of the city except at the beginning or end of the loop in which the cars are turned.

New Publications

The Welding Encyclopedia

A Practical Reference Book on Autogenous Welding. Compiled and Edited by L. J. Mackenzie and H. S. Card of the *Welding Engineer*, Chicago. Published by the Welding Engineering Publishing Company, Chicago, Ill.

This is the second edition of the *Welding Encyclopedia*, and it has been revised to bring it up to date. The alphabetical arrangement of titles facilitates reference to the shorter articles and definitions, and the placing of longer articles at the end is convenient for those who wish to make an extended study of such topics. Long articles on thermit welding, the welding of rail joints, oxyacetylene welding, and other topics of interest to the electric railway engineer are included.

Protective Relays, Their Theory, Design and Practical Operation

By Victor H. Todd, Designing and Manufacturing Electrical Engineer, Westinghouse Electric & Manufacturing Company. McGraw-Hill Book Company, New York, N. Y. 274 pp. Illustrated.

The relay performs one or another extremely vital function in the modern power plant or substation. It has, for example, made the automatic electric railway substation possible. Simple in principle, but involving great care in manufacture and ingenuity in application, it controls the operation of large power units and is largely responsible for their safety. For these reasons a convenient text and reference book on the subject of protective relays should be welcomed to the library of the power engineer. This one, in the preparation of which a number of experts have insisted seems well adapted to its purpose, that of being of assistance not only to the operator and tester, but also to designers. The text is well illustrated and appears to be fair in its references to the work of manufacturers in the field other than the one with which the author is connected.

Digest of Business Statistics

Based on the census of 1920 and other data. Compiled and published by Joseph E. Astrian, New York. 103 pages, fifty-five tables, nine maps and five diagrams.

This book was prepared especially for sales and advertising executives, though it is expected that it will prove valuable also to business executives generally. It gives the latest authoritative information relative to populations, particularly the United States, every state being analyzed separately.

Forms, Records and Reports in Personnel Administration

Edited by C. N. Hitchcock, University of Chicago Press, Chicago, Ill. 128 pages.

This book contains reproductions of forms and records of many kinds in connection with employees, accompa-

nied by explanatory notes. The forms are selected from those used by a variety of companies.

The "Union d'Electricité" and the Gennevilliers Station

By Ernest Mercier. Translated by C. M. Popp. Published by *Revue Industrielle*, Paris.

This is a handsomely illustrated booklet of about fifty pages, giving details of the great power plant now nearing completion in the suburbs of Paris. The plant was described briefly in the issue of the *Electric Railway Journal* for Aug. 12, 1922, page 231.

Electric Transients

By C. E. Magnusson, A. Kalln and J. R. Tolmie. McGraw-Hill Book Company, Inc., New York, N. Y. 1922. 196 pages, illustrated.

Electrical engineers are, as a rule, more familiar with the phenomena of direct and alternating current than they are with what is known as "transient phenomena" in an electric circuit. In electric railway power practice, such transient phenomena are involved in lightning discharges, and in surges produced in lines by the sudden opening of switches, by short circuits or by other momentary disturbances. The theory of the subject is, of course, inherently rather involved, but all power engineers ought to be familiar with the fundamental principles of the subject. They can thus select, install and maintain lightning arresters, reactance coils, coils, etc., more intelligently than otherwise would be possible. They have in the past depended largely upon Dr. Steinmetz's well-known book on this subject for their information, but have now, in this smaller and less mathematical text-book, a second source of information. The book is of excellent quality from the standpoint of the classroom instructor, for whose purposes it was intended. For the practical man it would be greatly improved if there could be added something about the ways in which transient phenomena are brought about in commercial, everyday circuits.

Belt Conveyors and Belt Elevators

Belt Conveyors and Belt Elevators. By F. V. Hetzel. John Wiley & Sons, New York, N. Y. 333 pages. Illustrated.

By confining attention to one part of the field of conveying machinery the author of this book has been able to go into great detail on this subject. His idea has been to present the results of many years of practical experience in this field; at the drafting board, in the shop and in the field supervising the erection and operation of the machinery. For thirteen years he was chief engineer of one of the largest manufacturing companies in the business.

So much attention is being paid at present to the use of machinery in handling materials that a compendium of information like this cannot but be of service to all fields where materials have to be handled in quantity. In the electric railway field this applies to fuel, ashes, track and roadway materials, etc. A perusal of this book will show where belt conveyors and elevators can be applied and, where applicable, how they should be used.

The Forest Products Laboratory

The Forest Products Laboratory. A Decennial Record, 1910-1920. Published by the Decennial Committee, Howard F. Welss, Chairman, Madison, Wis.

On July 22, 1920, there was celebrated at Madison, Wis., the tenth anniversary of the founding of the Forest Products Laboratory. Later the laboratory published an attractive volume containing the proceedings of the decennial meeting and much information concerning the laboratory. The book is illustrated from photographs showing the many activities which are carried on by the laboratory.

The record states that the technical work of the laboratory is divided among seven sections, each unit devoting its attention to certain well-defined fields. In addition to these research sections there are four service units, looking after such matters as finance, engineering, maintenance, etc. The war greatly stimulated the development of the laboratory as is indicated by the fact that the staff was expanded from eighty-four persons, which it contained in the spring of 1917, to 458, the number in employment on the day the armistice was signed.

Of the many subdivisions of the laboratory work those of particular electric railway interest are wood preservatives, wood preservation, grading rules for structural timber, wood technology and kiln drying.

Manchuria: Land of Opportunities.

Published by the South Manchuria Railway, Dairen, Manchuria. American representative: Yozo Tamura, New York. 113 pages, with map, diagrams and other illustrations.

This section of China only a few years ago was known as "The Forbidden Provinces." Now industries have been developed, largely with American apparatus. There are mines, extensive agricultural developments and electric central stations, with electric railways in Dairen and Fushun.

List of Selected and Professional Business Books

For the convenience of persons interested in business literature, Scovell, Wellington & Company, accountants and engineers, Boston, Mass., have compiled a list covering general accounting, auditing, banking, municipalities, general business, advertising and selling, and handbooks. The name of the publisher, the number of pages, and the date of publication are given in each case.

Personal Mention

Mr. Hecht Chairman

New Orleans Banker Heads Successor Company to New Orleans Railway & Light Under Reorganization

Rudolph S. Hecht has been made chairman of the board of directors and acting president of the New Orleans Public Service, Inc., created recently to control the New Orleans Railway & Light Company under the recent reorganization. Mr. Hecht is a commanding figure in the financial and banking activities of New Orleans. His elevation to the highest position in this service by the directorate is conspicuous proof of recognition of his fidelity to the task of bringing about the reorganization of the New Orleans Railway & Light Company. As chairman of the committee representing the



R. S. HECHT

holders of the 4½ per cent bonds, he exercised rare tact and diplomacy in reconciling conflicting interests when hope to do so had practically been abandoned. For four years he applied himself with tireless energy to attain the end sought.

His versatility in other lines of effort is further attested by the fact that he is at present president of the Hibernia Bank & Trust Company, New Orleans, one of the leading financial institutions of the South; president of the Hibernia Securities Company, New Orleans, New York, Atlanta and Dallas, an institution of which he was the founder, and president of the Board of Commissioners of the Port of New Orleans, a State institution devised for the purpose of placing New Orleans in the front rank as a port of entry and export. This latter organization now owns and manages \$55,000,000 of property on the river-front, represented by docks, warehouses and elevators. It has also built and will soon open for commerce an inner harbor or navigation canal, at an expense up to the present time of nearly \$20,000,000.

Mr. Hecht is also vice-president of

the Union Indemnity Company, New Orleans; vice-president of the Clearing House Association; director of the New Orleans branch of the Federal Reserve Bank of Atlanta, the Mississippi Shipping Company and the Federal International Banking Company, New Orleans, formed under the Edge act, in which organization he took a leading part.

Rudolph S. Hecht was born in Ansbach, Germany, on June 3, 1885, and after his graduation from a local college emigrated to the United States, settling in Chicago in 1903, where he entered the service of the National Bank of the Republic as a clerk at a salary of \$30 a month. From that position he was appointed, two years later, assistant foreign exchange manager of the Commercial National Bank, Chicago. In 1906 Mr. Hecht came to the Hibernia National Bank, New Orleans, where he rose from a minor official position to vice-president and finally to president, to which position he was elected in 1918. He was then thirty-three years of age.

Mr. Hecht is a man of unvarying good humor, of exceptional affability and courtesy, easy to approach, and an attentive listener.

His duties as chairman of the board of the New Orleans company will place in Mr. Hecht's hands the financial management of the affairs of the company, for which his varied experience as a banker well equips him. He will also have general supervision of the other policies of the corporation.

W. A. Webb of Colorado has been selected as chief railway commissioner of South Australia at a salary of £5,000 a year. Mr. Webb was recently on the staff of the United States Railway Administration at Washington.

F. H. Harrington is now claim agent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. The position was formerly held by E. E. Smith.

W. H. Sawyer, president of the East St. Louis & Suburban Railway and of the East St. Louis Railway Company, East St. Louis, Ill., which were recently bought by the North American Company, has resigned from his position as vice-president of the E. W. Clark Management Corporation and from his other connections with the E. W. Clark Company.

Guy R. Radley, of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has accepted the chairmanship of the electric railway section of the National Safety Council for the coming year. He is a man of experience, well known in the Middle West for his ability to organize. Mr. Radley has asked the hearty co-

operation of every member of the railway section in increasing the membership. Mr. Radley is safety engineer of the Milwaukee Company.

G. F. Butler is general freight and passenger agent of the Norfolk & Western Railway, Bluefield, W. Va. B. W. Herman held this position previously.

A. L. Castle is now president of the Honolulu (H. I.) Rapid Transit Company, Ltd., of which L. T. Peck was formerly president. Mr. Castle has been with the company for a long period and before his election to the presidency served as a vice-president. Mr. Peck's retirement was noted in the *Electric Railway Journal* for May 20, 1922.

Obituary

John C. Welty, counsel for the Northern Ohio Traction & Light Company, Akron, Ohio, died recently.

F. M. Hawkins, who has been associated with the Crouse-Hinds Company for more than twenty-five years, died recently.

J. Houston Miller, Waxahachie, Tex., a member of the board of directors of the Texas Electric Railway, is dead at his home in Waxahachie. Mr. Miller was seventy-one years old. He had been prominently connected with the Texas Electric Railway since it was first projected by the late J. F. Strickland.

James F. Hogan, superintendent of construction of the New York State Railways, is dead. He had been in ill health for some time and six weeks ago went to visit his brothers in Binghamton, thinking the change would benefit him. He suffered a complete nervous breakdown, however, and went to the hospital. Mr. Hogan was born in Chango Forks. He lived there through his school days and later moved to Cortland, where he worked on the Delaware, Lackawanna & Western Railroad. He moved to Syracuse about twenty years ago and became roadmaster of the D., L. & W. lines there.

Frank S. Gannon, from 1903 to 1906 vice-president Metropolitan Street Railway, New York, died in New York Nov. 8. Most of Mr. Gannon's active life was spent as a steam railroad operator. Just prior to his connection with the Metropolitan Street Railway he had been third vice-president and general manager of the Southern Railway, and previously he had been successively superintendent of transportation of the Long Island Railroad, general superintendent New York City & Northern, general manager Staten Island Rapid Transit Railroad and general superintendent of the New York division of the Baltimore & Ohio Railroad. Mr. Gannon left the Metropolitan Street Railway in 1906 to become president of the Norfolk & Southern Railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT
 ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Average Supply Thirty Days Census Report on Coal Situation So Reports, With 28,000,000 Tons on Hand Oct. 1

Official figures are available on the coal supply situation. They were issued under date of Nov. 7 by the Bureau of Census under the authority of the Federal Fuel Distributor. Between Sept. 1 and Oct. 1 stocks increased 6,000,000 tons. Since Oct. 1 they have increased as much again, if not more. What is still more important the trend of production is constantly upward and coal is being added to storage.

If it were possible to compile the figures as of the present moment the situation would undoubtedly show that conditions are greatly improved over those of Oct. 1, the latest date for which official data are available. As of that date, reports from 306 electric light plants collected in part through the American Electric Railway Association and the National Electric Light Association indicate that the electric utilities at that time carried an average supply of thirty days. Into this average, however, went many plants with stocks much in excess of thirty days and others whose reserves were dangerously low. With few exceptions, the electric plants have less coal on hand than they had a year ago.

This in itself might not appear to be very reassuring, but sight must not be lost of the constantly increasing production. To the managers of plants still suffering from the acute shortage of coal, there is, perhaps, small comfort in knowing that things have been worse. But that is the fact. The comparative figures show it. Thus on Oct. 1, 1916, the estimated total commercial stock of bituminous coal was 27,000,000 tons. On Oct. 1, 1917, it was 28,100,000 tons. On Oct. 1, 1918, it was 59,000,000 tons. For the corresponding period in 1919 and 1920 the figures do not appear to be available, although the tendency throughout these years was downward at other periods. On Nov. 1, 1921, the next nearest comparable date to Oct. 1 the supply was 48,500,000 tons. Last April the amount available was 63,000,000 tons, but on Sept. 1 it was only 22,000,000 tons, climbing from that figure to 28,000,000 tons on Oct. 1, 1922.

Measured in tons, the stocks on Oct. 1 were about the same as the corresponding day of the years 1916 and 1917. Measured in terms of days supply, the present stocks are larger, because the present rate of consumption is still below normal. Measured in either tons or days supply, the present stocks are

larger than those of June, 1920. If evenly divided among all consumers the stock on Oct. 1 would last twenty-two days. The record stock of last April, just before the strike, was sufficient to last fifty-two days if evenly divided. The low stock of June, 1920, was sufficient for only fifteen days. But then stocks are never evenly divided. In every community there are consumers who store virtually no coal and others who carry stocks far above the average.

Statistics of Car Factories and Repair Shops

The Census Bureau has just made public some statistics for 1919 about factories for the manufacture of cars and railroad repair shops and the number of cars manufactured in them. They show that in 1919 there were

TABLE I—ELECTRIC CARS BUILT IN 1919

Class	Total	Number			All Steel	Value
		All Wood	Steel Under Frame	Steel Body With Wood Interior		
Electric-railroad cars....	2,049	73	938	899	139	\$14,264,946
Passenger.....	1,814	41	840	898	35	12,131,561
Freight and all other..	235	32	98	1	104	2,133,385

TABLE II—STATISTICS OF CARS TURNED OUT BY MANUFACTURERS' SHOPS IN VARIOUS YEARS

	1919	1914	1909	1904
Electric-railroad cars:				
Number.....	1,898	2,542	2,525	4,384
Value.....	\$13,502,653	\$8,789,546	\$6,626,357	\$9,297,166
Passenger—				
Number.....	1,726	2,335	2,345	4,008
Value.....	\$11,495,791	\$8,075,710	\$6,249,415	\$8,809,261
Other varieties—				
Number.....	172	207	180	376
Value.....	\$2,006,862	\$713,836	\$376,942	\$487,905

seven manufacturing establishments building electric cars and 624 electric railway repair shops. The former employed 3,286 and the latter 33,120 persons. The value of the material turned out by the manufacturers was \$18,441,976 and by the repair shops \$75,210,701. The electric cars built and these various establishments are listed in Table I.

Table II shows the cars built in 1919 and previous census years in manufacturers' shops. These figures do not include the cars built in railway shops.

Personnel Changes in Westinghouse Offices Announced

A number of changes in the personnel of the district offices of the Westinghouse Electric & Manufacturing Company have been announced by W. S. Rugg, general sales manager.

In the Pittsburgh office, the power division has been changed to the central station division with Barton Stevenson as manager. Mr. Stevenson will also be in charge of the sale of

supply apparatus throughout the entire Pittsburgh district. The railway division has been changed to the transportation division, with F. G. Hickling as manager. A merchandising division has also been organized of which F. C. Albrecht has been appointed manager. A transportation division has been organized in the Philadelphia office and Thomas Cooper has been appointed manager. A central station division has also been organized with H. L. Moody as manager. Mr. Moody will also be in charge of the sale of supply apparatus in the Philadelphia district, assisted by H. F. Brinckerhoff, who has been appointed assistant manager of the central station division. W. P. Cochran will temporarily have charge of the merchandising division, which has been newly formed. Similar changes have also been made in the Detroit office. A central station division has been established with L. Whiting as manager. Mr. Whiting will also have charge of the sale of supply apparatus. F. D. Koebel has been made acting manager of a newly created merchandising division. A transportation division has been established with R. L. Hermann as manager,

Railway Sales Double

That the railway industry is making substantial recovery in its purchasing this year is well indicated by the fact that the General Electric Company has made gross sales of railway equipment and supplies during the first ten months of 1922, which indicate that the total business for the year will be about double that for 1921.

Metal, Coal and Material Prices

Metals—New York	Nov. 7, 1922
Copper, electrolytic, cents per lb.....	13.80
Copper wire base, cents per lb.....	15.625
Lead, cents per lb.....	7.00
Zinc, cents per lb.....	7.40
Tin, Straits, cents per lb.....	37.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$6.875
Somerset mine run, Boston, net tons....	3.625
Pittsburgh mine run, Pittsburgh, net tons	3.37
Franklin, Ill., screenings, Chicago, net tons	2.625
Central, Ill., screenings, Chicago, net tons	1.87
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	6.50
Weatherproof wire base, N. Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	\$2.00
Linseed oil (5-bbl. lots), N. Y., cents per gal.	\$2.00
White lead, (100-lb. keg), N. Y., cents per lb.	12.125
Turpentine, (bbl. lots), N. Y., per gal.....	\$1.64

Track and Roadway

Toledo & Indiana Railroad, Toledo, Ohio, is laying new rails in East High Street, Bryan.

Chattanooga (Tenn.) Traction Company has begun extending its line from Signal Mountain in the direction of Crossville.

Potomac Public Service Company, Hagerstown, Md., is considering the extension of its tracks into the West End. R. Paul Smith, an official of the company, has made a trip of inspection through the territory.

London (Ont.) Street Railway in a report to the City Council recommends the construction of a new north and south line on Colborne Street; also the extension of Adelaide Street tracks north from Oxford and the construction of a new line up Quebec Street.

Toronto, Ont.—The City Council has passed a resolution recommending that the Toronto Transportation Commission be requested to go ahead with the rehabilitation of tracks between Avenue Road and Spadina Avenue and between Yonge and Church Streets. The estimated cost is \$86,000.

Pacific Electric Railway, Los Angeles, Calif.—This company has filed an application with the Board of Public Utilities of the city of Los Angeles for a franchise for the construction of a second track on Front Street, Los Angeles Harbor, between Fifth and Sixth Streets, and on Sixth Street between Front Street and Pacific Avenue. The total length of the proposed second track is approximately 3,100 lin.ft., and the estimated cost of the proposed improvements is \$120,000.

New York, N. Y.—Nine bids were received by the New York Transit Commission for the construction of the subway portion of the Flushing extension of the Corona line of the Queensborough subway, together with the ramp approach leading into the subway from the drawbridge which will span the Flushing Creek. The highest bidder was T. A. Gillespie & Company, \$2,740,000, and the lowest bidder was the Oakdale Construction Company, Inc., \$1,635,990.

Northern Ohio Traction & Light Company, Akron, Ohio, is putting down approximately one-half mile of double track in Bedford, Ohio. Track extends from Columbus Street to Solom Road. The construction is 95-lb. rail. The work cost \$65,000. The company has just completed the construction of a double-track line extending from the southern limits of Canton to a point midway between Canton and Massillon. The work is of open construction with 80-lb. rail on wood ties. The center pole line is used. The work cost about \$125,000.

Cincinnati (Ohio) Traction Company on Nov. 1 completed one of the most difficult track relaying projects encountered by its engineers in recent years. The work was done on upper

Vine Street and involved the relaying of 2 miles of single-track rails. Fourteen curves were included in the 2-mile stretch. The work was completed in less than three months. Cars were operated over the thoroughfare while the work progressed as there was absolutely no way of rerouting them. Automobile and other vehicle traffic also had to be contended with. According to Walter Draper, vice-president of the company, the work was completed in record-breaking time, considering the conditions under which it was done.

City Railway, Wheeling, W. Va., will take up the car tracks on the East Wheeling loop and on the Market Street line from Eleventh Street to below Sixteenth Street, in accordance with the city demands. The Wheeling Traction Company has agreed to build a new track on Market Street from below Sixteenth Street to Eleventh Street, which will be placed in the center of the street. The company will also co-operate with the city in the paving of this section of Market Street and will be responsible for the paving of the section occupied by the car tracks.

Power Houses, Shops and Buildings

Northern Ohio Traction & Light Company, Akron, Ohio, has begun the construction of a brick freight house in Barberton, Ohio. The new building is to be 25 ft x 70 ft. About 300 ft. of track, from Cornell Street over Houston Street to the building, is also being constructed. Cars will "Y" into the house. The building will house the Electric Package Agency as well as the company's freight department. The building and location represent a \$30,000 investment.

Indiana Service Corporation, Fort Wayne, Ind., has started construction work on the first two units of the shop and carhouse lay-out at Spy Run Avenue and Kamm Street in Fort Wayne. The first unit will be a fireproof two-story building which will contain three car tracks on the ground floor. Pits will be provided for the inspection and making of repairs to city cars. The second floor of this building will contain the offices of the superintendent of the car shops, the city superintendent and the cashier. Rooms will also be provided for the operators of city cars. The building will be 60 ft. by 250 ft. The second unit will be a wash room, 30 by 220 ft. It will be but one story and will be used as a place where city cars will be washed and cleaned. Other units in the general layout will be added next spring, provisions being made for trackage for 200 city cars. A rapid completion of the work on the new carhouses is necessary, according to S. W. Greenland, general manager of the company, because of the inability to care at the old carhouses for the increasing number of city cars owned by the company.

Trade Notes

Johns-Pratt Company, Hartford, Conn., announces the appointment of L. F. Carleton as district sales manager, electrical division, with office in Boatmen's Bank Building, St. Louis.

Dwight P. Robinson & Company, New York, N. Y., has started work on the design and construction of an extension to the plant of the American Rolling Mill Company at Ashland, Ky. The extension will include a jobbing sheet mill, and a galvanizing plant. This is one of several undertakings recently awarded to Dwight P. Robinson & Company.

Major Frederick Pope, first vice-president New York Steam Corporation, and E. B. Powell, consulting engineer Stone & Webster, Inc., sailed for Europe on Oct. 28 on the *Majestic* to make a study of recent developments in European power-plant practice. They expect to visit England, France and Germany, returning to the United States early in December.

Westinghouse Electric & Manufacturing Company has transferred its Krantz works to Mansfield, Ohio, from Brooklyn, N. Y. The Brooklyn works was not large enough to furnish adequate facilities to meet the impending demand for production. The Mansfield plant gives the works a location in the central part of the country with easy access to a large number of railroads and to both the Middle West and Eastern offices of the Westinghouse company.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued Bulletin 47,002. It groups switchboard panels under two general classifications, the vertical type and the bench type. Slate and marble are the two materials mentioned as being universally used for switchboard panels. The title of the Bulletin is "Switchboard Panels and Supportive Framework."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued two attractive publications containing suggestive ideas on the solution of two important problems confronting the electric railway operator, maintenance of equipment and proper application of transportation methods. The first book, "Electric Railway Equipment—Helpful Hints on Its Maintenance," S. P. 1656, contains 112 pages and is the first edition of what will evidently be an encyclopedia of operation and maintenance of equipment. The second book, S. P. 1655, is a twenty-page publication entitled "Electric Railway Transportation." The light-weight double-truck car, the safety car and the trolley bus are the three leading topics discussed, with pictures portraying the actual operation and installation of each type in the United States and Canada accompanying each discussion.

*Does your public
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The PEACOCK Staffless Brake

is visible evidence of safety

Prejudice on the part of both passengers and car crews against the one-man car soon dies out when convincing evidence of the safety and economy of these little cars is offered.

Many companies require operators to make at least one hand brake stop each trip at some designated point. Not only does this make sure that the operator will know what to do in an emergency—it also engenders greater confidence among passengers and operators.

But only with the most reliable and powerful hand brake equipment will such demonstrations prove successful. PEACOCK STAFFLESS BRAKES make good because they have been specifically designed for safety car conditions. They have maximum braking power—several times that of the ordinary type of brakes. They are truly safety brakes for safety cars.



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Canadian Representative: Lyman Tube & Supply Co., Montreal, Can.

"RIMCO" Insulated Screw Driver



The only SAFE Screw Driver for linemen and all high tension work

7 1/2"
8 1/2", 10 1/2"

Tested and passed at 5,000 volts by Electrical Testing Laboratories of N. Y. C. ty.

Semi-soft rubber insulation bonded to metal by Elchemco process. Insulation cannot crack or work loose.



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Transmission Line and Special Crossing Structures, Catenary Bridges

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The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

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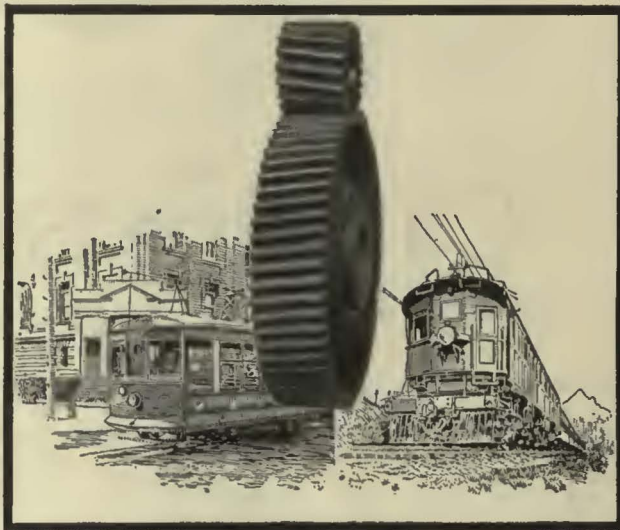
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Standard Helical Gears

7 1/2° Helix Angle



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They practically eliminate noise.

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Wear is minimized to such a point that we predict mileages heretofore unheard of.

If they cost you three times as much as they do, they would still make big savings in upkeep and renewals.

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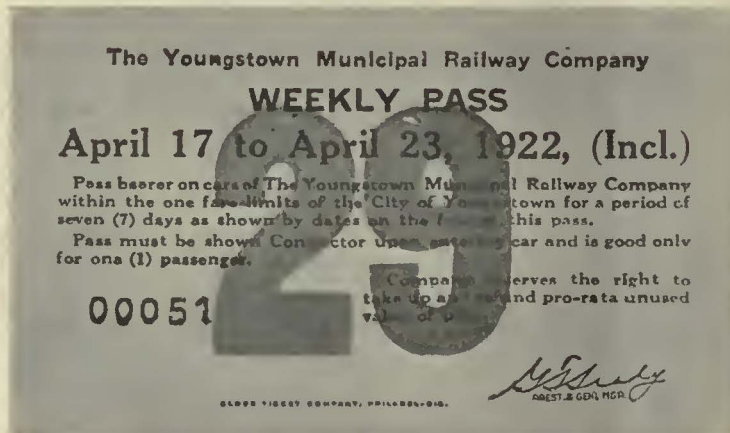
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Service holds patronage—BUT you can't give them service until they ride

And you can only get them to ride by meeting competition.

Some of the largest Electric Railways in the country are meeting with much success as a result of selling Weekly Passes. These passes are sold at a set price, and the holder is permitted to ride on the cars of the Company for a week. It is easy to understand how this appeals to the people.

There is no doubt that the sale of Weekly Passes by your Company would help you to solve the problems of modern competition, and increase your patronage.



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The antique trolley equipment of yesterday is no more modern than the "makeshift" motor TRUCK converted bus.

Passengers won't ride in rough-riding evil-smelling buses any more than they will ride in "Toonerville" trolleys—they expect a clean smooth ride for their money.

MITTEN-TRAYLOR MOTOR BUSES are the most modern and up-to-date passenger carrying automobiles now on the market.

MITTEN-TRAYLOR MOTOR BUSES are designed and built by men long experienced in the electric railway field, plus automotive engineers. They attract passengers.

MITTEN-TRAYLOR BUSES ride smoothly;
Operate economically and speedily;
They are well ventilated;
Well lighted and COMFORTABLE to ride in.

MITTEN-TRAYLOR, in a word, is a REAL PASSENGER carrying automobile—Built to augment your trolley lines, increase your revenue and win for YOU the confidence and approval of the public. *Write for descriptive Bulletin.*

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All-Steel
Seat—
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THE NAME
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*Stands for Highest Standard in
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Write
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Light
Weight
Steel
Seat
Springless
Cushion

**Best Seats for One
Man Safety Cars
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Best Seats for

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**H & K Seats
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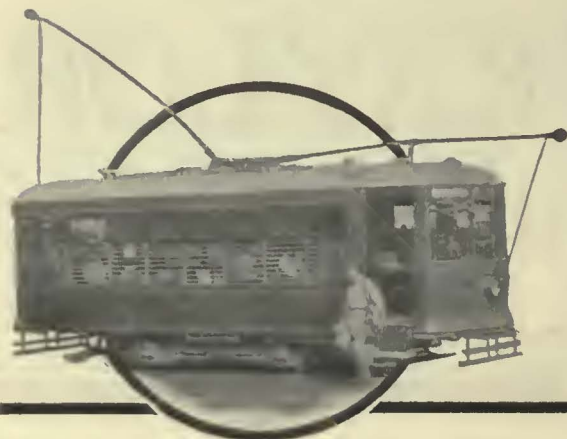
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St. Louis Cars are

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"The Birthplace of the Safety Car"

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Making solderless connections 2-way, showing detail

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The Dossert Solderless is the standardized method of making electrical connections—because the Dossert Tapered Sleeve principle is the accepted method of giving better conductivity at the joint than in the wire itself.

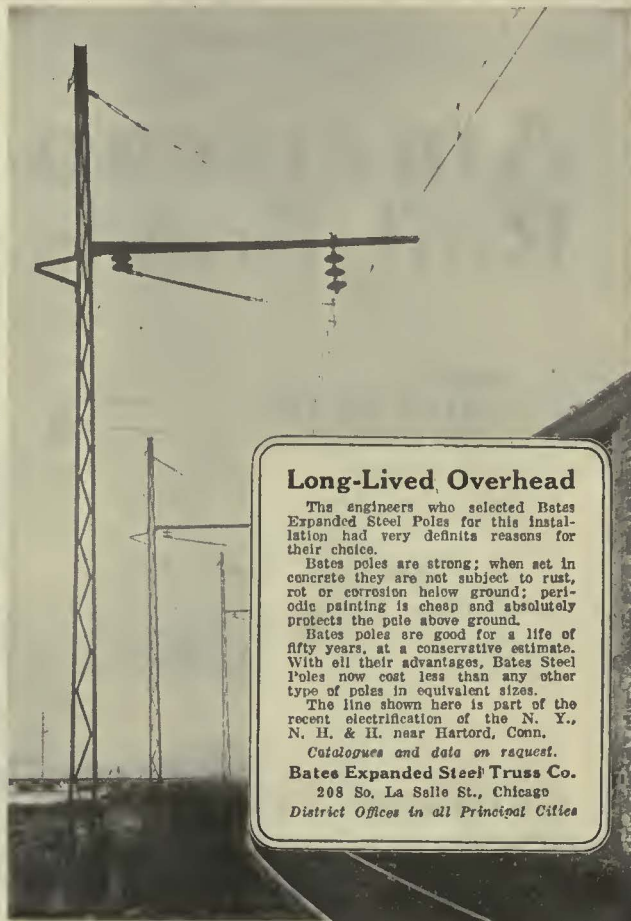
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Long-Lived Overhead

The engineers who selected Bates Expanded Steel Poles for this installation had very definite reasons for their choice.

Bates poles are strong; when set in concrete they are not subject to rust, rot or corrosion below ground; periodic painting is cheap and absolutely protects the pole above ground.

Bates poles are good for a life of fifty years, at a conservative estimate. With all their advantages, Bates Steel Poles now cost less than any other type of poles in equivalent sizes.

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District Offices in all Principal Cities

ELRECO TUBULAR POLES



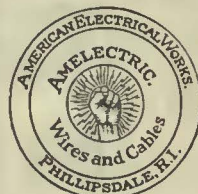
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Peirce Forged Steel Pins with Drawn Separable Thimbles

Your best insurance against insulator breakage

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NASHVILLE TIE COMPANY

Cross Ties: White Oak, Chestnut, and Treated Ties.
Oak Switch Ties.

Prompt shipment from our own stocks.

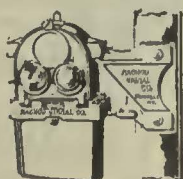
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Single-track block-signal protection
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Proceed signals in street reconstruction work

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Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
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Plant—Texarkana Beaumont Galveston

MONEY SAVERS TO RAILWAYS

Treated railway ties, poles, piling,
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Automatic Signals**
Charles N. Wood Co., Boston



AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches

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FLOOD CITY
Rail Bonds and Trolley Line Specialties
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FOR
CARBON ARC RAIL JOINT WELDING
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CARBON and METALLIC ARC GENERAL WELDING
Rail Welding and Bonding Co., Cleveland, O.



Standard Underground Cable Co.
Manufacturers of
Electric Wires and Cables of all kinds;
also Cable Terminals, Junction Boxes, etc.

Boston Philadelphia Pittsburgh Detroit New York
San Francisco Chicago Washington St. Louis

Ramapo Iron Works
Established 1881

Ajax Forge Company
Establish 1883

RAMAPO AJAX CORPORATION
Successor
HILLBURN, NEW YORK

Chicago New York Superior, Wis. Niagara Falls, N. Y.

Automatic Return Switch Stands for Passing Sidings
Automatic Safety Switch Stands
Manganese Construction—Tee Rail Special Work

THE INDIANAPOLIS SWITCH & FROG CO., SPRINGFIELD, OHIO

Indianapolis Economy Products That Make Dollars "Grow"

Indianapolis Solid Manganese:

Frogs, Crossings, Mates and Tongue-switches. Super-quality material. Par-excellent design. Gives many lives to one, of ordinary construction, and when worn down, CAN BE RE-STORED by INDIANAPOLIS WELDING.

Indianapolis Electric Welder:

Efficient, Rapid, ECONOMICAL, Durable. Price, \$2.00 (per day for three hundred days) thoroughly dependable every day in the year, upkeep about 75 cents per month. LAST A LIFE TIME.

Indianapolis Welding Steel:

Fluxated heat treated Metal Electrodes, insure Uniform Dependable Welds that are from 75 per cent to 100 per cent more efficient, than the "MELT," from the same High Grade basic stock, untreated.

Indianapolis Welding Plates:

Eliminate "Joints" and "Bonds" in Street Track. Higher in Strength and Conductivity than the unbroken Rail. Installed according to instructions, have proven THOROUGHLY DEPENDABLE, during 10 YEARS of "Time and Usage" TEST. Extensively used in 48 STATES and COUNTIES. Recognized as paramount MAINTENANCE ELIMINATORS.

Indianapolis Welding Supplies:

CABLES, HELMETS, LENSES, CARBONS.

Turntables:

Ball-bearing, for ash-pits, storage yards, etc.

Indianapolis "Economy" Products

are Pre-eminently "Money Savers," YES—"Money Makers" for Electric Railways.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

- BOSTON, 49 Federal Street
- PHILADELPHIA, North American Building
- PITTSBURGH, Farmers Deposit Bank Building
- CLEVELAND, Guardian Building
- CHICAGO, Marquette Building
- CINCINNATI, Traction Building
- ATLANTA, Candler Building
- TUCSON, ARIZ., 21 So. Stone Avenue
- FORT WORTH, TEX., Flatiron Building
- HONOLULU, H. T., Castle & Cooke Building



WORKS

Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

- DETROIT, Ford Building
- NEW ORLEANS, 521-5 Baronne Street
- HOUSTON, TEXAS, Southern Pacific Building
- DENVER, 435 Seventeenth Street
- SALT LAKE CITY, 705-6 Kearns Building
- SAN FRANCISCO, Sheldon Building
- LOS ANGELES, 404-6 Central Building
- SEATTLE, L. C. Smith Building
- HAVANA, CUBA, Calle de Aguiar 104
- SAN JUAN, PORTO RICO, Royal Bank Building

High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS

COMPLETE LAYOUTS

IMPROVED ANTI-KICK BIG-HEEL SWITCHES

HARD CENTER AND MANGANESE

CONSTRUCTION

New York Switch & Crossing Co.

Hoboken, N. J.

SPECIAL TRACKWORK

Of the well-known WHARTON Superior Designs and Constructions

Steel Castings
Converter and
Electric

Forgings
Drop Hammer
and Press

Gas Cylinders
Seamless
Steel

Wm. Wharton Jr. & Co. Inc., Easton, Pa.

(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)

ORIGINATORS OF

MANGANESE STEEL TRACKWORK

Corrugated Culverts

"ACME" (Nestable) and IMPERIAL Riveted Corrugated Culverts. Made of anti-corrosive Toncan Metal. Write for prices.



SUPER-SEASONED FIBRE

Peerless Insulation Paper has 25 to 50 per cent higher electrical resistance.

Hornflex Insulation Paper has no grain. Folds without cracking.

NATIONAL FIBRE & INSULATION CO.
Box 424, Wilmington, Delaware

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK

- Boston
- Philadelphia
- Pittsburgh
- Kansas City
- Dallas
- Chicago
- San Francisco
- London, Eng

Car Seat and Snow Sweeper Rattan

For 60 years we have been the largest importers of rattan from the Islands in the Indian Ocean. It is therefore to be expected that when Rattan is thought of our name, "Heywood-Wakefield," instantly comes to mind.

Follow that impulse and write us when in the market for:

High Grade close woven Rattan Car Seat Webbing, canvas lined and unlined, in widths from 12 in. to 48 in.

High Grade Snow Sweeper Rattan in Natural and Cut Lengths.

High Grade Car Seats, cross or longitudinal, covered with Rattan, Plush or Leather.

HEYWOOD-WAKEFIELD COMPANY

Factory: Wakefield, Mass.

SALES OFFICES:

Heywood-Wakefield Co. Heywood-Wakefield Co.
 516 West 34th St., New York 1415 Michigan Ave., Chicago.
 E. F. Boyle, Mondsnoek Bldg., San Francisco, Cal.
 F. N. Grigg, 630 Louisiana Ave., Washington, D. C.
 Railway and Power Engineering Corp., Toronto and Montreal.
 G. F. Cotter Supply Co., Houston, Texas.



Refinish Your Rolling Stock The "SPRACO" Way

Save 50-80 per cent Labor Costs. On handy man with "Spraco" Paint Gun easily outstrips 4 or 5 brush painters. On Car Bodies—Under Rigging—Bridges—Elevated Structures—Steel Frame Buildings—Tubular Poles, etc. In fact every class of painting and finishing work.

Get a "SPRACO" Paint Gun—Compare Results Send Today for "Spraco" Bulletin P-71



SPRAY Engineering Co.

60 High St. Boston, Mass.

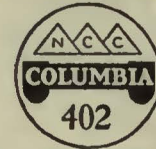


We make a specialty of
ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment.

The Universal Lubricating Co.
 Cleveland, Ohio

RAILWAY MOTOR BRUSHES



Grade 402 has been proved by test the most economical and satisfactory brush for standard slotted commutator railway motors in both city and interurban service. One of a series of standard railway motor brushes.

COLUMBIA BRUSHES

COST NO MORE — LAST LONGER
 NATIONAL CARBON COMPANY, INC.
 CLEVELAND, OHIO SAN FRANCISCO, CAL.

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes

A Single Segment or a Complete Commutator

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

Cameron Electrical Mfg. Co., Ansonia, Connecticut

HACKSAW HIGH SPEED GLADIUM BLADES ECONOMY EFFICIENCY

GLADIUM CO. Inc. 34 Cliff St. New York

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
 Alliance, Ohio

THE Difference in Advertising Is the Difference in Men

The differences in advertising are the differences which exist in men.

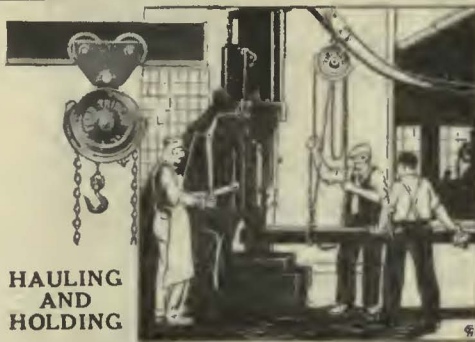
Just as some men are strong and virile and interesting, so is some advertising. And just as some men are ineffectual and weak and boring, so is some other advertising.

"Does it pay to advertise?" It pays those men who are keen enough students of their public to make it pay them. It pays those men who are truthful, sincere, interesting and believable.

It pays the men whose product deserves the payment, whose brains are keen enough to organize for success and judge enough of the human mind to know how to tell their story with sincerity and interest.

Published by the Electric Railway Journal in co-operation with The American Association of Advertising Agencies

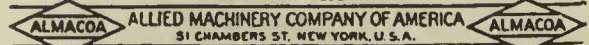
FORD TRIBLOC



THE Tribloc not only lifts and lowers—it hauls and holds. Suspended from roller-bearing steel plate trolleys, mounted on overhead I-beam trackways, it may be made to serve a complete bay, floor, or building. The security of its mechanism lowers the load accurately into place at lathe, forge, or press—and holds it steady there. Write for information on any type or capacity to 40 tons.

FORD CHAIN BLOCK CO.
2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE



PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO

FORD TRIBLOC

2219-D

WILLIAMS' "AGRIPPA" TOOL HOLDERS

"THE HOLDERS THAT HOLD"

for

Turning Boring Planing
Threading Knurling
Cutting-Off and Side Work

J. H. WILLIAMS & CO.

"The Drop-Forging People"

BROOKLYN BUFFALO CHICAGO
143 Richards St. 143 Vulcan St. 1143 W. 120 St.



THE WORLD'S STANDARD

"IRVINGTON"

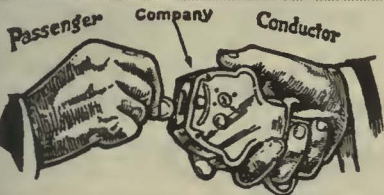
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

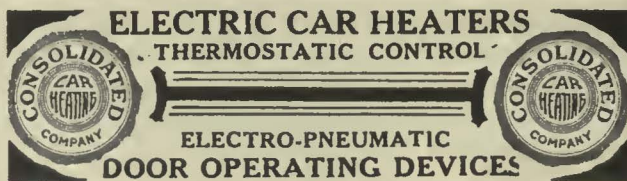
Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives in the Principal Cities



Direct
Automatic
Registration
By the
Passengers
Rooke Automatic
Register Co.
Providence, R. I.



STERLING VARNISH

Manufactured by electrical engineers who will understand your insulating problems and render intelligent service. Noted for uniformity and quality. It will pay you to get in touch with

The Sterling Varnish Co., Pittsburgh, Penna.

Tickets and Cash Fares.

THE CLEVELAND
accommodates both

The Cleveland Fare Box Co.

CLEVELAND OHIO
Canadian Cleveland Fare Box Co., Ltd., Ontario
Preston

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron

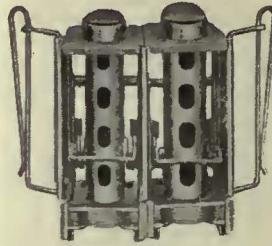
345 Madison Avenue, New York

Pittsburgh Office: 634 Wabash Bldg.

San Francisco Office: 525 Market Street

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

JOHNSON Universal Changer



Adjustable

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.



Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois

MORE-JONES "TIGER-BRONZE" AXLE AND ARMATURE BEARINGS

Not always the cheapest, but ever lowest in ultimate cost

MORE-JONES BRASS & METAL CO.
St. Louis, Missouri.

ELECTRIC HEATER EQUIPMENTS

GOLD CAR HEATING & LIGHTING CO.
NEW YORK CITY
PATENTED

Address All Communications to
BUSH TERMINAL (220 36th St.)
Brooklyn, N. Y.
Literature on Request

THERMOSTAT CONTROL EQUIPMENTS

PS HEATERS

Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

RAILWAY UTILITY COMPANY

Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS for Monitor and Arch Roof Cars, and all classes of buildings; also ELECTRIC THERMOMETER CONTROL of Car Temperatures.

141-151 WEST 22D ST. Chicago, Ill. Write for Catalogue 1328 Broadway New York, N. Y.

A Style for Every Service

Send for Catalog
BONNEY-VEHSLAGE TOOL CO.
Newark, N. J.

PROVIDENCE H-B FENDERS LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

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, 4¢ 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

WANTED a good secretary also superintendent of a hydro-electric interurban railway company. This is said to be the second best iron mining district in the United States. Don't lose time but come at once. Room 1, First National Bank Bldg., Iron River, Mich.

POSITIONS WANTED

AUDITOR or assistant. Eighteen years of experience in electric railway, light and power industry. Middle West preferred. PW-475, Elec. Ry. Journal, 10th Ave. at 36th St., N. Y.

ENGINEER of way and structures, eight years in present position in charge of design, maintenance and construction, also electric welding work with fully up-to-date company operating electric, railway and gas utilities; age 40, married; best references. PW-472, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

MR. MANAGER—This is the age in which practical experience is of vital importance in the Electric Railway Industry. Are you in need of a capable, practical experienced superintendent of transportation who is capable of taking over details and handling same in a manner that would be a credit to your property? Successful in public relations and recognized as an economical operator. At present with a large property but desire a change on account of personal reasons. Very successful in handling labor and have made a study of safety work. A proven record of 18 years on city, suburban and interurban properties with high grade references from leading men in railway field is back of this ad. Would prefer a large city and suburban property that requires careful attention. PW-470, Electric 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 present employer, personal reasons for desiring change. Address, PW-469, Electric Railway Journal, Leader-News Bldg., Cleveland, O.

WORKING barn foreman desires position. Can do any kind of wiring, wind armatures and controller repairs; 12 years' experience. PW-463, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

WANTED TO BUY

32 G. E. 88

RAILWAY MOTORS

State price and condition

W-476, Electric Railway Journal
 10th Ave. at 36th St., New York City.

3000 TONS

60 lb. Relaying Rail

A.S.C.E. Section
 and Angles

At Girard, Pa.

Buffalo Housewrecking
 and Salvage Co.

Buffalo, N. Y.

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 prices.

Send your orders to us and deduct 25 per cent from the current quotations.

What have you for sale?

TRANSIT EQUIPMENT CO.

Cars—Motors

501 Fifth Avenue, New York.

"The House of Dependable
 Service"

NEW and RELAYING RAILS

of all Sections

HYMAN-MICHAELS CO.

Peoples Gas Building, Chicago, Ill.

Branch Offices:

1324 Woolworth Bldg., New York
 2115 Railway Exchange Bldg., St. Louis
 1313 First Nat'l Bank Bldg. Pittsburgh

Write or wire when in the market
 to BUY or SELL

Please Mention this Publication

FOR SALE

STREET CAR HEATERS

50—No. 10 Jewell, in good repair. Exceptional bargain. Immediate delivery.

GRAND RAPIDS RAILWAY COMPANY
 42 Ionia Ave., N. W., Grand Rapids, Mich.

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.

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

THE BEST PROOF

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market place which these ads represent could not exist for any length of time.

Are you using the Searchlight Section?

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 Sup. Co. Ohio Brass Co. Standard Steel Works Co. Westinghouse E. & M. Co.
- Armature Shop Tools Elcc. Service Supplies Co.
- Automatic Return Switch Stands Ramapo Ajax Corp.
- Automatic Safety Switch Stands Ramapo Ajax Corp.
- Axles Bemis Car Truck Co. Standard Steel Works Co. Axles, Car Wheel Bemis Car Truck Co. Brill Co., The J. G. Carnegie Steel Co. St. Louis Car Co. Westinghouse E. & M. Co.
- Axle Straighteners Columbia M. W. & M. I. Co.
- Babbitt Metal Ajax Metal Co. More-Jones Br. & Metal Co.
- Babbling Devices Columbia M. W. & M. I. Co.
- Badges and Buttons Electric Service Sup. Co. Internat'l Register Co., The
- Batteries, Dry National Carbon Co.
- Bearings and Bearing Metals Ajax Metal Co. Bemis Car Truck Co. Columbia M. W. & M. I. Co. General Electric Co. Gilbert & Sons, B. F. A. More-Jones Br. & Metal Co. St. Louis Car Co. Westinghouse E. & M. Co.
- Bearings, Center and Roller Side Stucki Co., A.
- Bearings, Roller Stafford Roller Bearing Car Truck Corp'n
- Bells and Gongs Brill Co., The J. G. Columbia M. W. & M. I. Co. Consolidated Car-Heating Co. Electric Service Sup. Co. St. Louis Car Co.
- Benders, Rail Railway Track-work Co.
- Bollers Babcock & Wilcox Co.
- Bonding Apparatus American Steel & Wire Co. Electric Service Sup. Co. Indianapolis Switch & Frog Co. Ohio Brass Co. Rail Welding & Bonding Co. Railway Track-work Co.
- Bonds, Rail American Steel & Wire Co. Electric Service Sup. Co. General Electric Co. Indianapolis Switch & Frog Co. Ohio Brass Co. Rail Welding & Bonding Co. Westinghouse E. & M. Co.
- Book Publishers McGraw-Hill Book Co., Inc. Brackets and Cross Arms (See also Poles, Ties, Posts, etc.) Batec Exp. Steel & Tr. Co. Electric Ry. Equip. Co. Electric Service Sup. Co. Hubbard & Co. Ohio Brass Co.
- Brake Adjusters National Ry. Applance Co. Westinghouse Tr. Br. Co.
- Brake Shoes Amer. Br. Shoe & Fdry. Co. Barbour-Stockwell Co. Bemis Car Truck Co. Brill Co., The J. G. Columbia M. W. & M. I. Co. St. Louis Car Co.
- Brakes, Brake Systems and Brake Parts Allis-Chalmers Mfg. Co. 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. St. Louis Car Co. Westinghouse Tr. Br. Co.
- Brooms, Track, Steel or Rattan Amer. Rattan & Reed Mfg. Co.
- Brushes, Carbon General Electric Co. Jeandron, W. J. Le Carbon Co.
- National Carbon Co. Westinghouse E. & M. Co.
- Brushes, Graphite National Carbon Co.
- Brushes, Wire Pneumatic Ingersoll-Rand Co.
- Brush Holders Anderson Mfg. Co., A. & J. M. Columbia M. W. & M. I. Co.
- Buses, Motor Brill Co., The J. G. Mitten-Traylor Incorporated Republic Truck Sales Corp.
- Bus Seats Hale & Kilburn Corp.
- Bushings Nat'l Fibre & Insulation Co.
- Bushings, Case Hardened and Mangnese Bemis Car Truck Co. Brill Co., The J. G.
- Cables (See Wires and Cables)
- Cambria, Tapes, Yellow & Black Vornished Irvington Varnish & Ins. Co.
- Carbon Brushes (See Brushes Carbon)
- Car Lighting Fixtures Elec. Service Supplies
- Car Panel Safety Switches Consolidated Car-Heating Co. Westinghouse E. & M. Co.
- Cars, Dump Differential Steel Car Co.
- Cars, Passenger, Freight Express, Etc. Amer. Car Co. Brill Co., The J. G. Kuhlman Car Co., G. C. McGuire Cummings Mfg. Co. National Ry. Applance Co. St. Louis Car Co. Wasco Mfg. Co.
- Cars, Second Hand Electric Equipment Co.
- Cars, Self-Propelled General Electric Co.
- Castings, Brass, Composition or Copper Ajax Metal Co. Anderson Mfg. Co., A. & J. M. Columbia M. W. & M. I. Co. More-Jones Br. & Metal Co. Castings, Gray Iron and Steel Bemis Car Truck Co. Columbia M. W. & M. I. Co. St. Louis Car Co. Standard Steel Works Co.
- Castings, Malleable and Brass Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co. Columbia M. W. & M. I. Co. St. Louis Car Co.
- Catchers and Retrievers, Trolley Electric Service Sup. Co. Ohio Brass Co. Wood Co., Chas. N.
- Catenary Construction Archbold-Brady Co.
- Circuit Breakers General Electric Co. Westinghouse E. & M. Co.
- Clamps and Connectors for Wires and Cables Anderson Mfg. Co., A. & J. M. Dossert & Co. Electric Ry. Equip. Co. Electric Service Sup. Co. General Electric Co. Hubbard & Co. Ohio Brass Co. Westinghouse E. & M. Co.
- Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms) Brill Co., The J. G. Ohio Brass Co. Root Spring Scraper Co.
- Clinsters and Sockets General Electric Co.
- Coal and Ash Handling (See Conveying and Hoisting Machinery)
- Coal Handling and Winding Machines Columbia M. W. & M. I. Co. Electric Service Sup. Co. Coils, Armature and Field Columbia M. W. & M. I. Co. Economy Elec. Devices Co. General Electric Co. Coils, Choke and Kicking General Electric Co. Westinghouse E. & M. Co.
- Coln-Counting Machines Electric Service Sup. Co. Internat'l Register Co., The Johnson Fare Box Co.
- Commutator Slotters Electric Service Sup. Co. General Electric Co. Westinghouse E. & 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 E. & M. Co.
- Compressors, Air Allis-Chalmers Mfg. Co. General Electric Co. Ingersoll-Rand Co. Westinghouse Tr. Br. Co.
- Compressors, Air, Portable Ingersoll-Rand Co.
- Condensers Allis-Chalmers Mfg. Co. General Electric Co. Ingersoll-Rand Co. Westinghouse E. & M. Co.
- Condenser, Papers Irvington Varnish & Ins. Co.
- Connectors, Solderless Dossert & Co. Westinghouse E. & M. Co.
- Connectors, Trailer Car Consolidated Car-Heat'g Co. Electric Service Sup. Co. Ohio Brass Co.
- Controllers or Parts Allis-Chalmers Mfg. Co. Columbia M. W. & M. I. Co. General Electric Co. Westinghouse E. & M. Co.
- Controller Regulators Electric Service Sup. Co.
- Controlling Systems General Electric Co. Westinghouse E. & M. Co.
- Converters, Rotary Allis-Chalmers Mfg. Co. General Electric Co. Westinghouse E. & M. Co.
- Conveying and Hoisting Machinery Columbia M. W. & M. I. Co.
- Cooling Systems Spray Engineering Co.
- Copper Wire Anaconda Copper Min. Co.
- Cord Adjusters Nat'l Fibre & Insulation Co.
- Cord, Bell, Trolley Register, etc. Brill Co., The J. G. Electric Service Sup. Co. Internat'l Register Co., The Roebbing's Sons Co., J. A. Samson Cordage Works
- Cord Connectors & Couplers Electric Service Sup. Co. Samson Cordage Works Wood Co., Chas. N.
- Couplers, Car Brill Co., The J. G. Ohio Brass Co. Westinghouse Tr. Br. Co.
- Cranes Allis-Chalmers Mfg. Co. Cross Arms (See Brackets)
- Crossings Ramapo Ajax Corp. Crossing Foundations International Steel Tie Co.
- Crossing Frog & Switch Ramapo Ajax Corp. Wharton, Jr., & Co., Wm.
- Crossing Manganese Indianapolis Switch & Frog Co.
- Ramapo Ajax Corp. Crossing Signals (See Signals, Crossing)
- Crossings Track (See Track) (Special Work) Crossings, Trolley Ohio Brass Co.
- Crushers, Rock Allis-Chalmers Mfg. Co. Culverts Canton Culvert & Silo Co.
- Curtains and Curtains Fixtures Brill Co., The J. G. Electric Service Sup. Co. Morton Mfg. Co. St. Louis Car Co.
- Dealers' Machinery Electric Equipment Co.
- Derailing Devices (See Track Work)
- Derailing Switches Ramapo Ajax Corp. Bestnatlin Signs Columbia M. W. & M. I. Co. Electric Service Sup. Co. Detective Service Wish Service, P. Edward Dogs, Lath Williams & Co., J. H.
- Door Operating Devices Con. Car-Heating Co. Nat'l Pneumatic Co., Inc. Safety Car Co.
- Doors and Door Fixtures Brill Co., The J. G. General Electric Co. Hale and Kilburn Corp.
- Doors, Folding Vestibule Nat'l Pneumatic Co., Inc.
- Draft Rigging (See Couplers)
- Drills, Rock Ingersoll-Rand Co.
- Drills, Track American Steel & Wire Co. Electric Service Sup. Co. Ingersoll-Rand Co. Ohio Brass Co.
- Dryers, Sand Electric Service Sup. Co. Ohio Brass Co.
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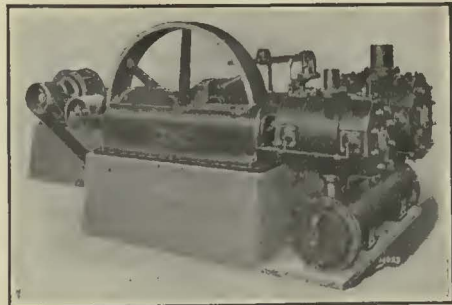
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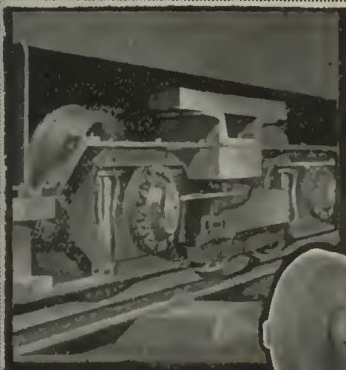
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