

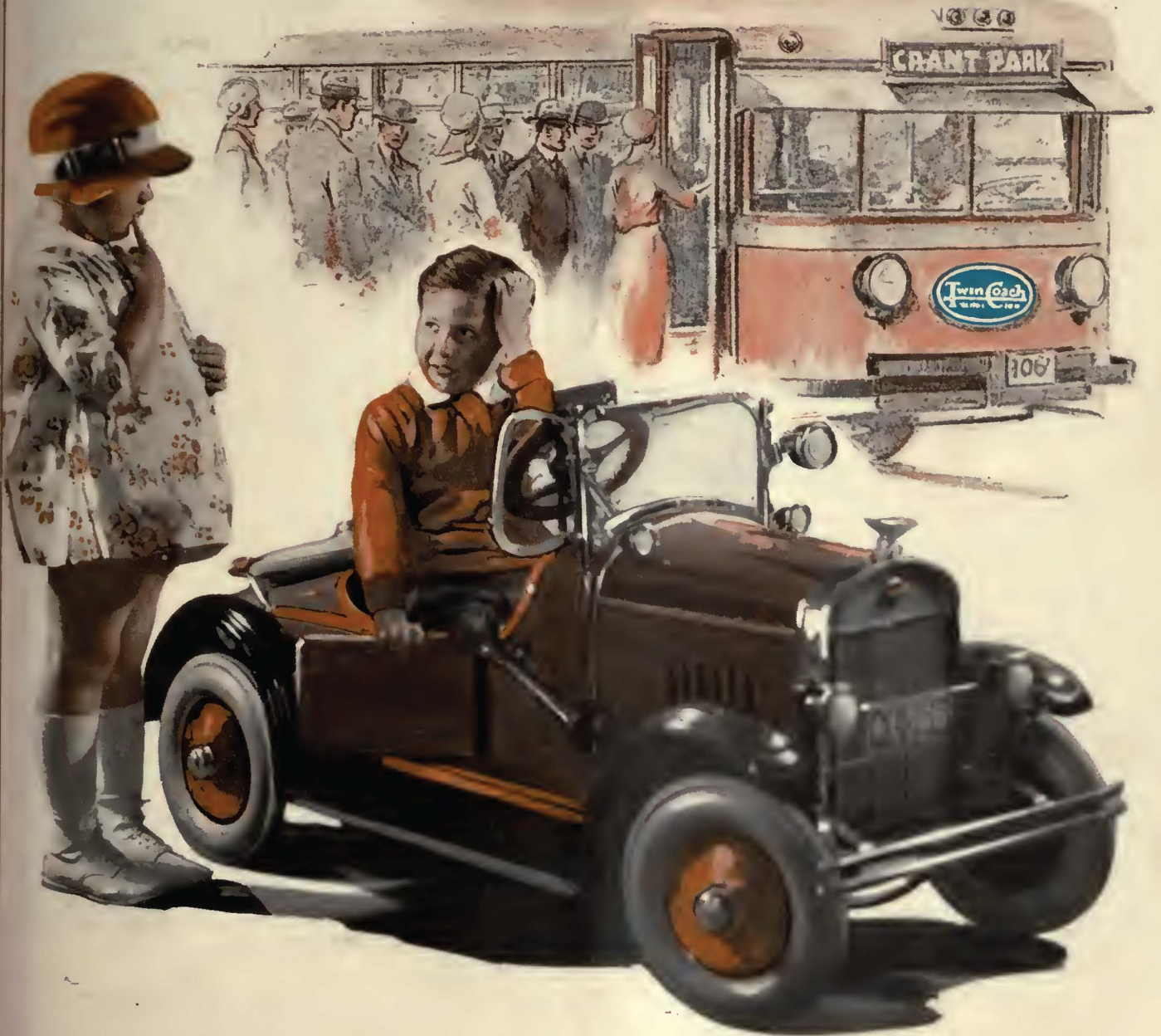
ELECTRIC RAILWAY JOURNAL

ill Publishing Company, Inc.

MARCH 23, 1929

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"He lacked capacity for his heavy run"



Like the grip
of a mighty
hand

The bronze alloy flows beneath and grasps the raised strips of the bronze insert with the grip of a Mighty Hand — moulding itself into —

The "CHAMPION" the New Westinghouse Trolley Ear

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East Pittsburgh Pennsylvania

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the United States and Foreign Countries



Westinghouse

Electric Railway Journal

CHARLES GORDON, *Editor*

Vol. 73, No. 12

Pages 461-498

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March 23, 1929



In This Issue



McGraw-Hill
Publishing Company, Inc.,
Tenth Ave. at 36th St.,
New York, N. Y.
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(Published in San Francisco)
American Machinist—European Edition
(Published in London)

SUBSCRIPTION PRICES: United States and its Possessions, Canada, Mexico and other countries taking domestic postage rates, \$4 a year. All other foreign countries, \$7 a year. Single copy, 20 cents. Published weekly. Entered as second class matter, June 23, 1908, at the Post Office, New York, N. Y., under the act of March 3, 1879. Printed in U. S. A.

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CHANGE OF ADDRESS
Subscribers are requested to send both the old address and the new address when they move to a new address.
ELECTRIC RAILWAY JOURNAL is official correspondent in the United States for Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles.
Member A. B. P. Member A. B. C.
Number of Copies Printed, 6,000



1929

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NEXT WEEK

THE

Annual Maintenance Number

THE FIRST ISSUE OF

ELECTRIC RAILWAY JOURNAL

AS A MONTHLY

BETTER RAIL, BETTER TRANSPORTATION

Straphanger Psychology

“The straphanger in a dirty, crowded, old-fashioned street car is not particularly interested in the fact that the same company operates attractive de luxe bus service on some other route. What he wants is good service on his own route;”

and—

the backbone of good service is good track. No matter what else you do, you can give good service only on good track.

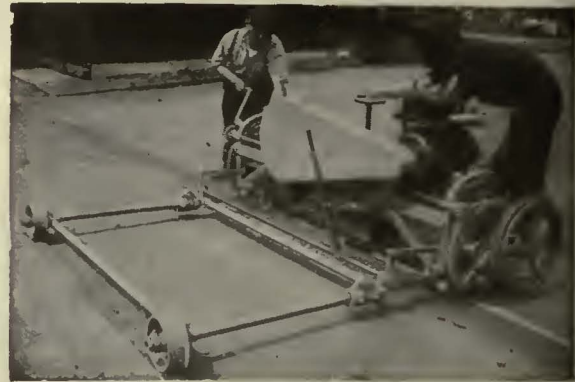
*Bulletins on
these track
improvers?*

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS

Chester F. Gallor, 50 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. La Salle St., Chicago
P. W. Wood Railway Supply Co., New Orleans, La.
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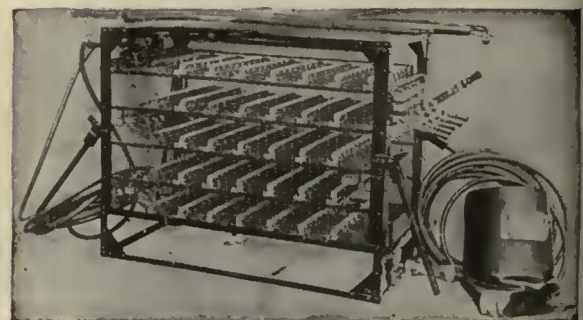
Vulcan Rail Grinder



Eureka Radial Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

BETTER RAIL, BETTER TRANSPORTATION



**Back They Come
for More of the
Same**

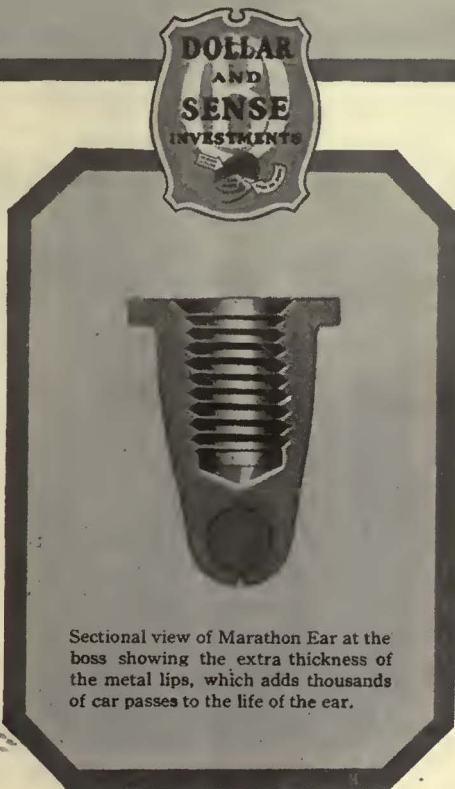
IT is easy to understand how any progressive overhead superintendent will give a product—such as the Marathon Ear—an opportunity to prove its claims in actual service. But there is more to it than experiment and test when the repeat orders of these same superintendents plus orders from new users during 1928 exceeded by 25% the total purchases of Marathon Ears in 1927. *There must be a reason.* There is. The reason is contained in the Marathon Ear advantages continuously pointed out.

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These five points of service definitely indicate the characteristics that hold the friends of Marathon Ears year after year.

Easy Approach because lips are tapered to a knife edge at the tips and left heavy at the center. The wheel comes onto the ear gradually because of this special shaping at the tips.

Smooth Underrun by merging the special tip design and heavier



Sectional view of Marathon Ear at the boss showing the extra thickness of the metal lips, which adds thousands of car passes to the life of the ear.

section of the lips at the center. This provides a smooth passage for the wheel.

Smooth wheel passage and ample metal in the lips *Protect the Trolley Wire* from wear or pounding.

Correct Proportioning has put plenty of bronze in the Marathon Ear just where it is needed most—yet none for excessive weight or overbalancing.

The combination of the four features outlined above with the scientifically controlled characteristics of O-B Bronze, puts the *Extra Life* in this Ear and in addition gives longer life to the trolley wire.

**Replacements and Line
Breaks Reduced**

The reports of a test conducted by a large city property for 21 months show that ear replacements with Marathon Ears in service were reduced to 500 per month as compared to an experience of 1470 per month with other trolley ears. Line breaks were reduced from 73 to 30 the first year. This is not an unusual record for it has since been equalled or bettered in many cities.

**300,000 Car Passes
Per Ear**

This same report showed that Marathon Ears lasted three times as long as others, and that even after over 300,000 car passes had not been worn out. These figures are offered as a basis of comparison with *all* other ears. Match them with your records—then investigate Marathon Ears at once.

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co., Limited
Niagara Falls, Canada
1012L

Ohio Brass Co.

NEW YORK CHICAGO PHILADELPHIA PITTSBURGH ATLANTA CLEVELAND BOSTON SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES



One of the cars to which Simplex
Clasp Brakes have been applied

SIMPLEX MULTIPLE UNIT CLASP BRAKES

Railroads would not purchase passenger cars without "Simplex Clasp Brakes."



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The mechanically correct Brake for a Modern Car.

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means RELIABILITY
in Car Signal Systems



Type FB



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No. 21022 Single Stroke Bell



No. 19587 Vibrating Bell

Faraday Signal Systems are made for every requirement—high or low voltage systems, buzzers, vibrating bells or single stroke bells, resistance panels, flush or surface type push buttons.

They are not only a passenger convenience but a real help to car operators because they signal stops *definitely*.

Faraday Signal Systems make a definite bid because of their RELIABILITY and long service. You can't go wrong in installing them.



No. 19403 Buzzer

ELECTRIC SERVICE SUPPLIES Co.

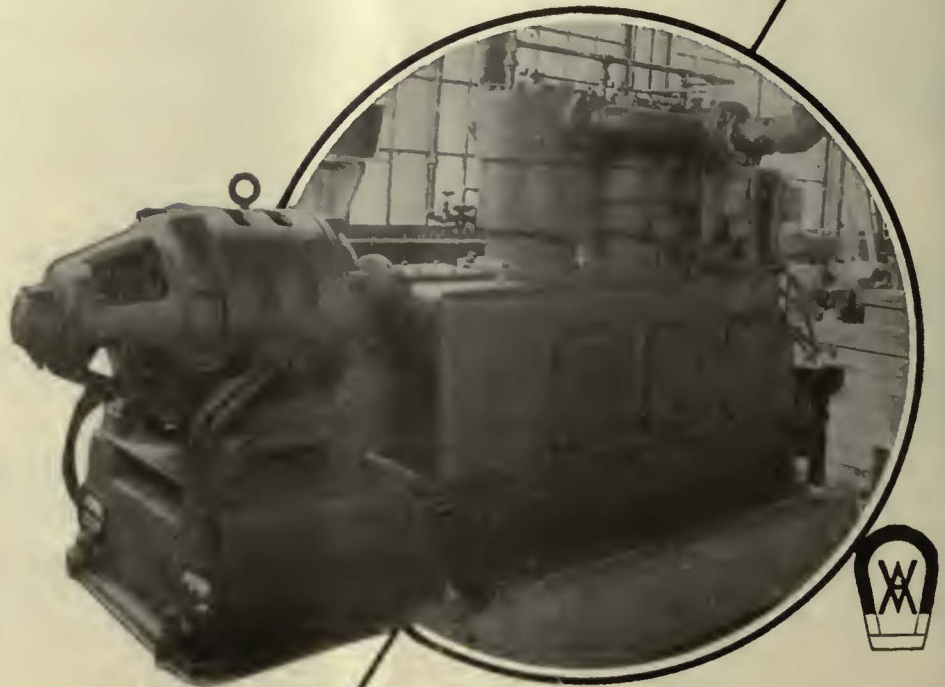
MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

Home office and manufacturing plant located at 17th and Cambria Streets, Philadelphia, Pa.; District offices are located at 111 N 7th Canal Street, Chicago, Ill. and 50 Church Street, New York City.



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WESTINGHOUSE-NATIONAL *Air Compressors*



**POWER
HOUSE**

**CAR
BARN**

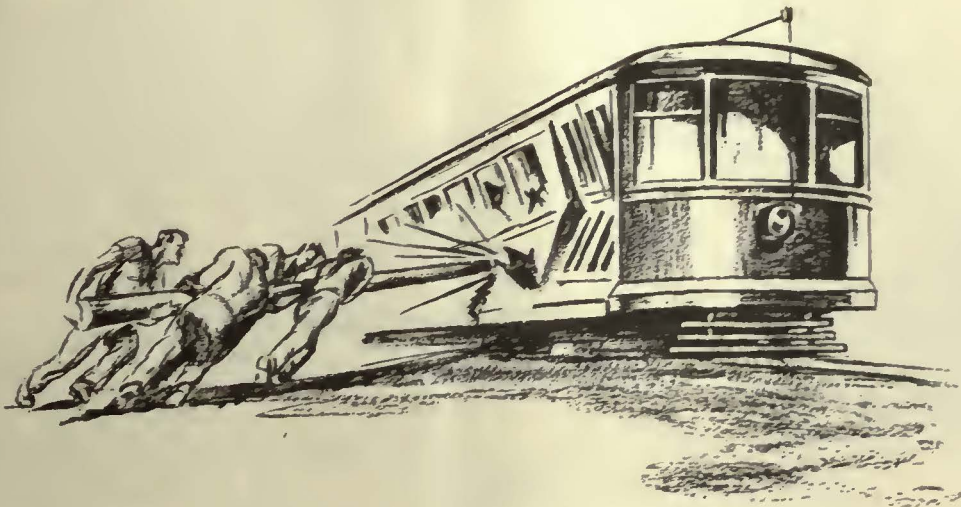
SHOP

Wherever there is a need for compressed air on street railway properties, Westinghouse-National compressors can and are being used. For every requirement—in power house, car barn, shop, or on the right of way—there is a suitable type and size available (ranging from 3 to 700 cu.ft. displacement).

When you think compressed air for any purpose, think Westinghouse-National!

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

"QUALITY MACHINES FOR QUALITY SERVICE"



You wouldn't treat
your new cars this way...

of course not! It's absurd!

BUT is it any more absurd than pounding modern, luxurious, new cars over rails where every joint means a bump?

How can the motorist be lured from his rubber-tired, shock absorber equipped sedan, to ride on the finest trolley car in the world, if the track is bad?

Think it over!

Give the modern cars a chance to show what they really can do.

THERMIT WELD THE RAILS AND ELIMINATE THE JOINTS.



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

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CHICAGO

BOSTON

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TORONTO



THIS MAN IS
COMFORTABLE
AT HOME

THE COMFORTABLE IN YOUR CARS?

When a chair at home is too near the heat or too far from the light, it can easily be *moved* into proper relation. But the seats, lights, windows and heaters on a trolley car are in a *fixed immovable position*.



The H. & K. No. 900D Double Chair has brought street railway seating to the highest point of modern luxury and comfort. It is, however, but one of the many Hale & Kilburn styles developed to fulfill this function in all fields of transportation.

Once uncomfortable upon a car—always uncomfortable. It is necessary, therefore, to bring these factors into right relation at the start and a Hale & Kilburn seating engineer, working with you from the beginning of the design of the car, will assure the maximum degree of final comfort.

We have half a century's experience to aid, not only in providing the most practical *arrangement* of these comforts, but in providing the most practical and comfortable type of *seat* for every type of city and inter-city service.

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GOLD



1929

When railroads first took to the air

AUTOMOBILES were unknown . . . and people tapped their foreheads significantly when bold thinkers prophesied that some day men would fly. New York did take to the air by building the "L", powered by small steam locomotives.

Even at that date cars were warmed with apparatus made by the Gold Car Heating & Lighting Company. Then, as now, Gold equipment was supreme in the field.

Ever since railways of the 70's replaced wood-burning stoves with Gold's first heater, the Gold Company has periodically introduced new and better ideas in car heating. This long and successful experience is crystallized in today's advanced Gold heating equipment.

There is a type of Gold apparatus for every variety of passenger coach, both in the steam and electric railroad fields.

Send for the GOLD catalog. Free upon request.



GOLD CAR HEATING
Bush Terminal Bldg. No. 2



& LIGHTING COMPANY
220 36th St., Brooklyn, N. Y.

In Canada: CANADIAN GOLD CAR HEATING & LIGHTING CO., LIMITED, 728 St. James St., Montreal



Here All Steps Lead to One Goal
... Multiplied Mileage

In the coning operation—last of the “hot” operations—the Gary Wheel, having been forged, rolled and punched, is placed in the loose dies of a press, where sufficient pressure is exerted by the ram [also equipped with loose dies] to give the web the proper curvature, or “cone.” Here minor variations in rotundity are also corrected.

..... From wheel blank to finished product, the process of making Gary Wheels is a series of “steps” leading directly to Multiplied Mileage. The buyer receives the advantage of modern equipment, careful manufacture and painstaking inspection, resulting in a superior type of wheel.

Our wheel engineers are at your service.

Illinois Steel Company

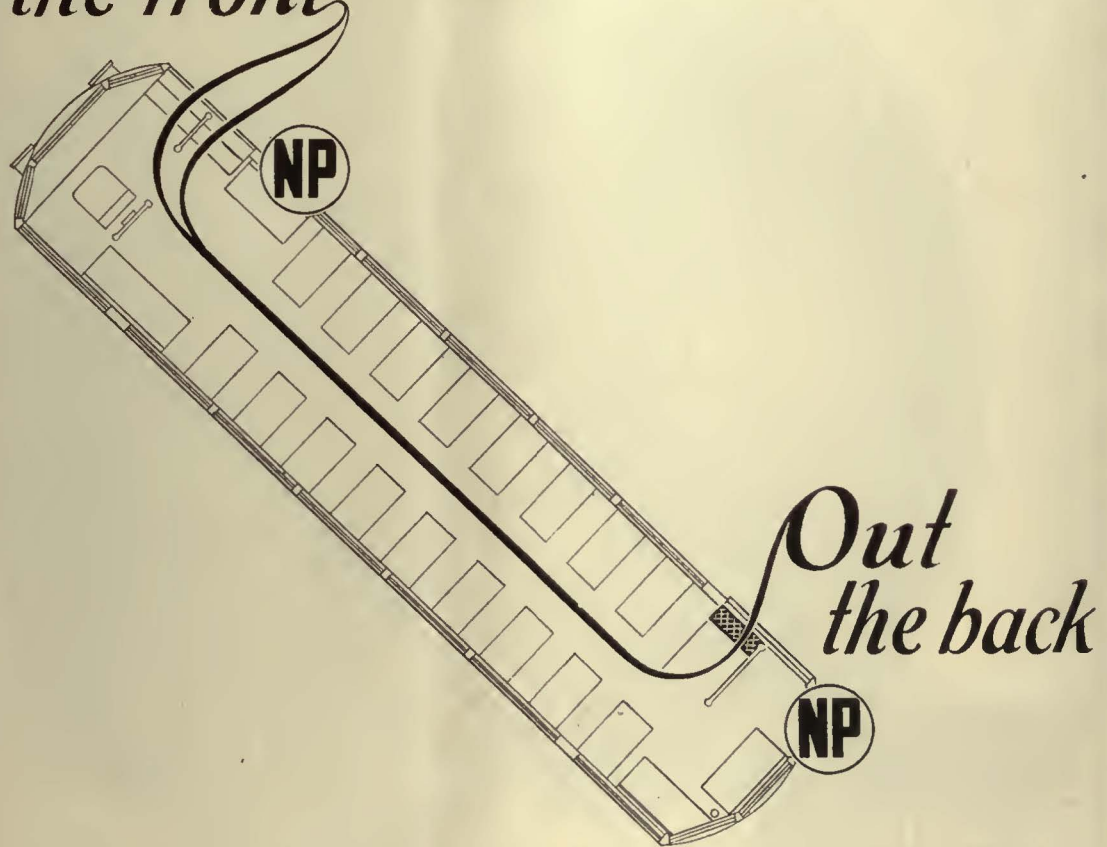
Subsidiary of United States Steel Corporation

General Offices: 208 South La Salle Street
Chicago, Illinois

G A R Y
WROUGHT STEEL WHEELS



In the front



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Circulating load provides the only practical means of handling heavy traffic without blocking and congestion by the boarding and alighting passen-

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"PHONO-ELECTRIC," the peerless contact wire, is exclusively a product of the Bridgeport Brass Company. Developed in 1896 and perfected over the past 30 years, it is known 'round the world.

"Phono-Electric" bronze alloy has over three times the life of hard drawn copper contact wires. It has tensile strength approaching that of steel. All accessories of overhead construction, such as bolts and

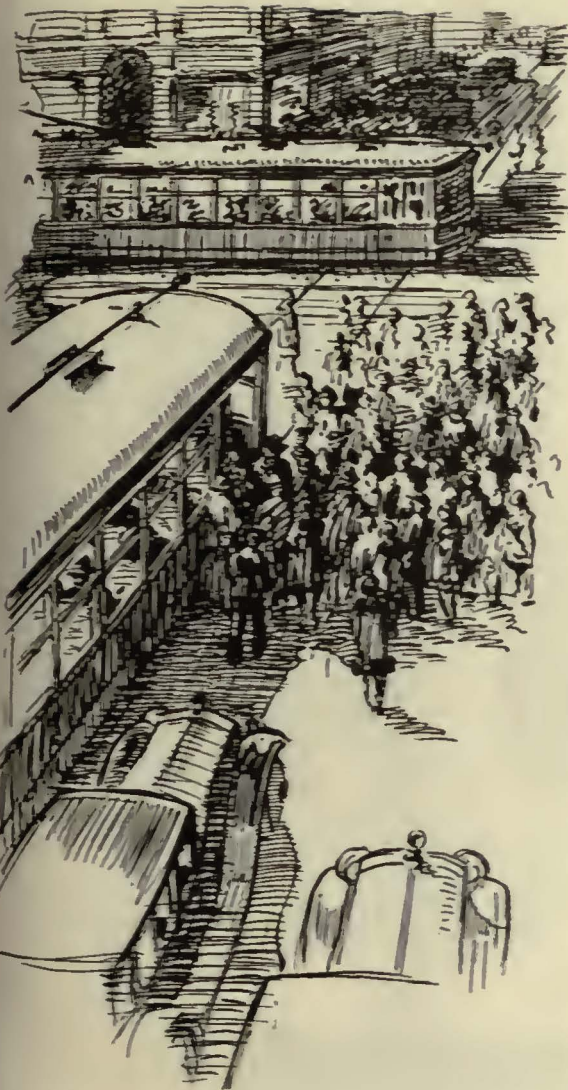
clamps, can be made from this alloy and give the utmost satisfaction.

"Phono-Electric" span wires are now available and provide the same economies over steel spans that "Phono-Electric" trolley wire gives over copper.

"Phono-Electric" is more than an alloy. It is a material produced by highly specialized manufacturing qualities. Send to headquarters for full, authentic facts.

"Phono-Electric" Bronze Alloy TROLLEY & SPAN WIRE

BRIDGEPORT BRASS COMPANY General Offices, East Main St., BRIDGEPORT, CONN.



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How about your wheels?

Flashing traffic lights, whistles, stop signals necessitate frequent braking and short stops. The wheels and axles of modern cars must absorb the punishment and deliver their full mileage.

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*Rolled
Steel
Wheels*

*Armature
Shafts*

*Axles
and
Springs*

**“FOR EVERY
TYPE OF CAR**



**IN EVERY
TYPE OF
SERVICE”**



**STANDARD STEEL
WORKS COMPANY**
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CHICAGO NEW YORK PORTLAND PITTSBURGH
ST. LOUIS HOUSTON RICHMOND SAN FRANCISCO
WORKS: BURNHAM, PA.



Thousands of shuffling feet daily test this light weight car flooring*

THE heaviest passenger traffic in the world—the wear and weight of the crowds that daily travel in the subways of New York and Boston—could be safely supported by Johns-Manville Truss Plate Car Flooring.

Greater Strength — Lighter Weight — Longer Life

Johns-Manville Car Flooring not only meets the severest passenger car requirements, but reduces the weight of steel car flooring about 25%. Figured conservatively, this means a saving of 1000 lbs. on the average car floor weighing about 5000 lbs. The power saved in hauling this unnecessary dead weight will actually pay for the floor in a very few years.



Although lighter in weight than any other car flooring, J-M Car Flooring contains almost twice as much steel and has 4 times the bracing stiffness of any other car floor construction. J-M Car Flooring consists of "Truss Plate," a copper-bearing steel sub-flooring and Masticoke, a wearing surface with an asphalt base.

J-M Car Flooring can be installed at a cost no greater than other types. It is both fireproof and water-proof and has high insulating efficiency.

Every car builder and every railroad official concerned with keeping down his costs on passenger rolling stock should have a copy of our booklet which gives the complete story of J-M Car Flooring. The coupon will bring it to you promptly.



*Patented

"Truss Plate" is made of two sheets of 22 U.S.S. gauge, copper-bearing steel which are braced against each other in parallel planes through the medium of staggered rows of oval cones pressed into the sheet. This construction forms a continuous series of trusses which provide the greatest mechanical strength with the least weight. "Truss Plate" may be applied to any car construction either directly or over the steel floor plate, or, where this plate is eliminated, can

be secured directly to the center, side and transverse sills.

The Masticoke wearing surface of this J-M Car Flooring is of asphalt composition, light in weight, durable, easy to apply and repair. Due to its tough, resilient structure, Masticoke will not crack nor split under impact, nor will vibration or car-weave affect it. Masticoke has a non-skid surface, is sanitary and odorless and is furnished in dark gray and six attractive colors.

Masticoke is being applied over hundreds of old wood floors in traction cars and buses



Johns-Manville
SERVICE TO RAILROADS

JOHNS-MANVILLE CORPORATION
New York, Chicago, Cleveland, San Francisco, Toronto
{Branches in all large cities}

Please send me your free booklet "Reducing the weight of car flooring."

Name.....

Company.....

Address.....

R-115-3



Two dominating considerations point the way to your adoption of these all-steel safety steps:

Passenger Safety against the all-too-frequent "step accidents" which may result in costly damage claims.

Operating Economy resulting from the elimination of all car step maintenance and a lower cost of car cleaning.

Let us send Bulletin 2D28.

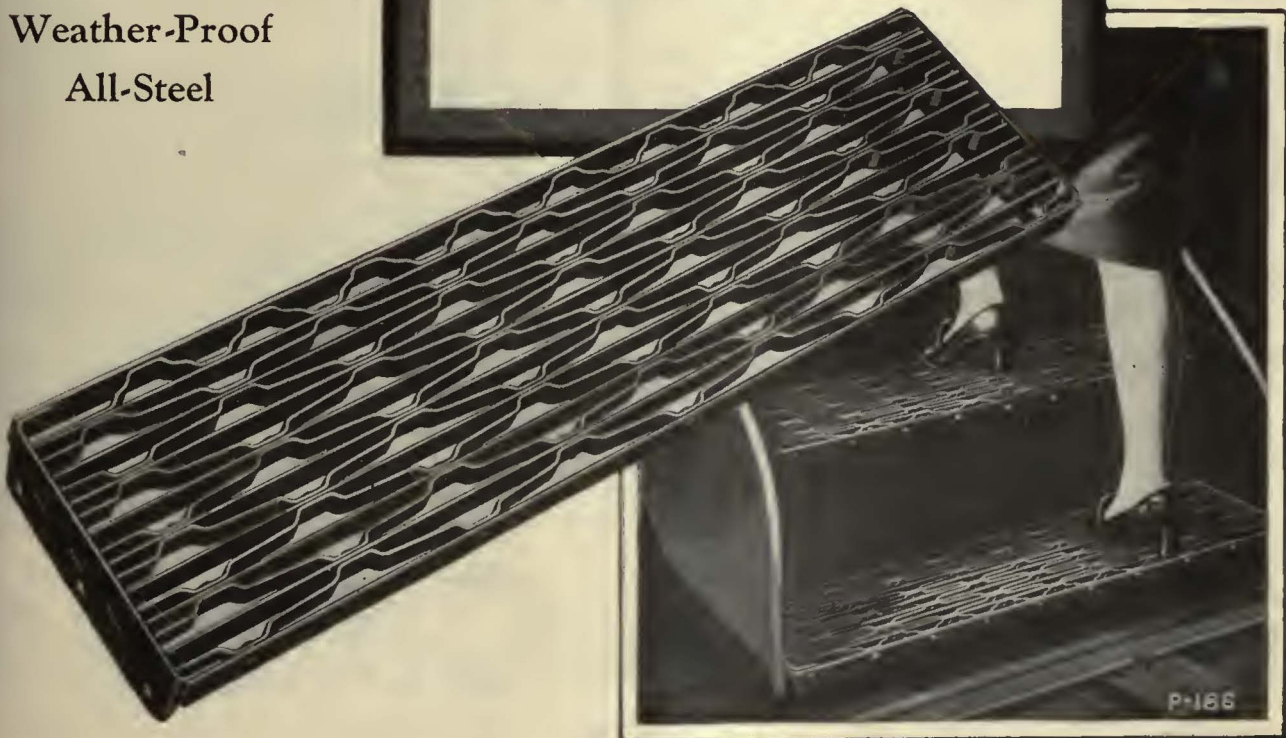
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LONG ISLAND CITY, N.Y. U.S. A.

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See Your Telephone Book for Local Address

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BRING THE BUYERS
TO MARKET**

*Car Card Advertising
Almost Everywhere!*

BARRON G. COLLIER
NEW YORK CITY INC.

“Going Goodrich enabled us to make more profits,”

says L. SIMMONS,

Manager of a Grand Rapids, Mich., Trucking Company



Ten new Whippet bodies ride on a Silvertown equipped truck-trailer owned by the Service Trucking Co. of Grand Rapids, Michigan, between Grand Rapids and the Whippet plant at Toledo, Ohio

The “water-cured,” stretch-matched cord, twin-beaded Silvertown Heavy Duty Cord Tire . . . for Trucks, Buses and Trailers

BODIES for Whippet automobiles are made in Grand Rapids, Michigan. The Service Trucking Co. delivers them in loads of eight, nine and ten to the Toledo, Ohio, assembling plant with a fleet of Silvertown tire-equipped trucks and trailers.

“With the passing of the year 1928,” writes L. Simmons, Manager of the Service Trucking Company, “we find we have many things to look back upon which gave us considerable pleasure and enabled us to make more profit.

“One of the things that has proven very profitable is the use of Goodrich Truck and Bus Tires on the greater part of our fleet of 115 trailer trucks. As you know, it is essential for our drivers to keep their trucks in service without delay. Our trucks and trailers, which on an average carry nine bodies on a 200-mile trip from here to Toledo, must keep traveling so as to permit of efficiency in operating the trucks as well as the fulfillment of our promise to deliver automobile bodies on time.

“Prior to going Goodrich we were using various brands of tires, some of which were good and some not so good. Generally speaking, our drivers found many delays occasioned because of flat tires, some of which were defective and some injured.

“It is a pleasure to be able to tell you that since using Goodrich, we have practically eliminated road delays with the exception of those that come from a tire which has been run so many thousands of miles that it is worn out. We have fewer injuries and literally no hold ups because of defective merchandise. Our drivers are all very pleased and so are we.

“Mileages range from 30,000 to 75,000 per tire.”

When you buy truck tires specify Goodrich Silvertowns.

* * *

The B. F. Goodrich Rubber Company, Akron, Ohio, Established 1870, Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Co., Kitchener, Ont.



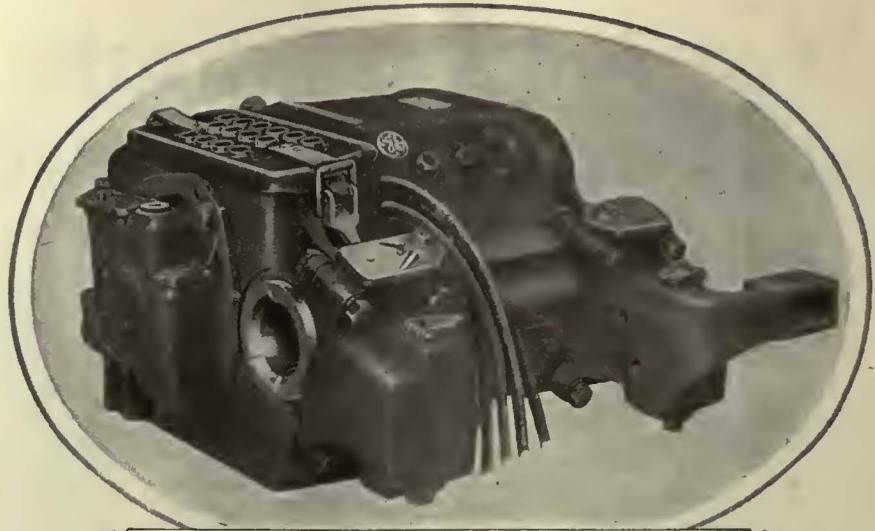
A fleet of five truck-trailers Goodrich equipped loaded with forty-five automobile bodies ready to meet a regular schedule between the body works and the automobile factory



Goodrich



HEAVY DUTY SILVERTOWNS



The GE-265 Railway Motor

81 original orders-3280 motors
 89 repeat orders-4270 motors
Total-7550 motors

Operators' appreciation of the GE-265 motor is shown by the fact that 81 original purchases involving 3280 motors have prompted 89 additional purchases, bringing the total to 7550 motors.

The City of Detroit, for example, has added seven times to its original 200 motors, until it now has 1764 motors. The Georgia Railway and Power Company has added ten times to the original equipments; and the United Electric Railway of Providence, six.

Such appreciation on the part of these large operators is due to the unsurpassed performance of GE-265 motors.



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review

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JAMES H. MCGRAW, Chairman of the Board
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LOUIS F. STOLL,
Publishing Director

Volume 73

New York, Saturday, March 23, 1929

Number 12

Looking to the Future

SPEAKING a short time ago before the public utilities committee of the Philadelphia Chamber of Commerce, and more recently before the Boston Chamber of Commerce, General W. W. Atterbury, president of the Pennsylvania Railroad, expressed a far-sighted view of the country's transportation problems that is worthy of more than passing attention on the part of local transportation men. It is in the fact that General Atterbury seems to recognize, particularly in his Philadelphia address, the close relation that exists between the development of railroad terminals and the local transportation facilities of a large city that his remarks are of greatest interest to readers of the JOURNAL.

As a matter of fact, it becomes increasingly evident that one of the major factors, if not the most important single problem in planning for the present and future of the country's long-distance rail carriers, is that presented by the terminal situation in large cities. In its physical aspects alone, terminal planning presents to the railroads, as well as to large communities themselves, many serious and highly controversial problems. But when viewed from the standpoint of economics, and particularly when considered in combination with the economic problems of local transit, the situation becomes complicated indeed. In his Philadelphia address General Atterbury dealt primarily with a conception of a 50-year transportation program for the Pennsylvania Railroad. But he also advanced the idea of co-ordination of all forms of transit in the city as a means of utilizing most efficiently all facilities now available or to be constructed in the future.

At first this may seem merely a recognition by a steam road man of a principle which the local transportation industry has set up for some time as fundamental. But it is easily possible to attach far broader significance to General Atterbury's remarks than may seem evident on the face of things. It seems worthy of note that this public discussion of the community transportation situation by a man who occupies a place in the public eye and in railroad circles as prominent as does the president of the Pennsylvania Railroad, follows an intensive study of the whole terminal situation in the entire area lying between Philadelphia and New York. Furthermore, it follows closely on the announcement of a \$100,000,000 electrification program in this area resulting from these studies, which is designed to meet the transportation requirements of a New York metropolitan area expected to contain 30,000,000 people by 1950, and to extend from New Brunswick on the west well out on Long Island on the east.

In addition to all of this, about the same time that General Atterbury was speaking in the east, there came the announcement from Cleveland that the Van Sweringens are engaged in developing in that city a combined

terminal and community transportation project which is to include the Cleveland Railway and future rapid transit lines, as well as the trunk-line railroad terminal plan which they originally undertook to work out. When these facts are taken together they indicate an approach to the idea of co-ordination of community transit which transcends in its extent any ordinary conception of recent years.

Most significant of all, therefore, is the evidence here indicated of the way in which present-day railroad planners are looking at the terminal transportation situation. Even on the face of things, the projects in the New York and Cleveland areas are gigantic in proportions and daring in their conception—in keeping with the modern tempo of business and industrial development of the country. But, in addition, they seem to go further than the railroad man has been inclined to go in the past, in recognizing the relation between transportation within a community, the development of the community itself, and consequently the terminal problem of the railroads.

Whether or not this attention to intra-community transportation on the part of the railroads will be accompanied by recognition of certain basic economic principles that have been established after long and in some cases disastrous experience, remains to be seen. Present indications and railroad precedents, however, do not point in that direction. The question that may be expected to loom up with increasing importance in the future, if railroads undertake to play a major part in community transportation, is that of whether rights-of-way for local transit facilities should be or can be financed with private funds. To attempt to do so is a step in the wrong direction, for it is a step away from the principle that local transit rights-of-way of a city constitute merely specialized forms of streets for the movement of its citizens and should be financed by assessment against the property benefited by their construction.

Public Relations—Plus

SEVERAL weeks ago in a large Southern city the Chamber of Commerce was preparing to elect a new board of directors. Among the names under consideration was that of the public relations official of the local railway. The president of the company was already a member of the board and his re-election was a foregone conclusion. This meant two votes for the railway interest in addition to a much coveted honor for the young public relations man.

In the meantime, however, officials of a civic club which had never had any representation on the board sought recognition. An appeal was made to the electric railway president by the secretary of the club. Without a minute's hesitation the railway official, one of its most valuable members, offered his place on the board, but

the publicity man heard of this and promptly said that if there was any "stepping down" he was going to do it. The net result was the election of a member of the civic club to replace the publicity official.

The story does not end here, however. Another claim for representation equally as just then came up. This from one of the largest railroads in the country which had its general offices in the city and employs thousands of workers in its shops. Again the electric railway president offered to resign. The sequel to this was the election to the board of the railroad executive and the elevation of the electric railway president to the post of vice-president of the Chamber. This meant, of course, the loss of voting power by the man chosen to represent the electric railway.

Recognition of this disposition of the electric railway men to efface themselves is best expressed perhaps by the letter written to the publicity man by the secretary of the civic club, who said: "The good will shown by you and other officials of this company is one that makes us all feel proud to live in a community where there are so many broadminded men and men that are willing to sacrifice personal ambitions and honor for the benefit of the community and to the end that they are always willing to do what is right and fair, regardless of their interests." If the man who received this letter were to admit that it warmed the cockles of his heart, that certainly would be nothing against him.

Not a Job for Amateurs

ADVERTISING constitutes one of the electric railway's major means of reaching the public. It is generally agreed that a properly conducted advertising program wins rides and creates public good will. When guided by experienced hands, such publicity plays an important and essential part in the conduct of a public transportation business under present-day competitive conditions.

Recent advertising campaigns by a number of electric railways in this country and Canada, as outlined in last week's issue of *ELECTRIC RAILWAY JOURNAL*, indicate remarkable development in this field. The Portland Electric Power Company some time ago completed an extensive newspaper campaign, selling the company's service, at the same time celebrating the property's twentieth anniversary. Service and safety were featured throughout the entire campaign, these features being linked with the growth of the company during the past twenty years. The Kansas City Public Service Company recently concluded an advertising series with an ad paid for by the employees, featuring a creed expressing the employee's duty to the public.

The Montreal Tramways devised an unusual means of awakening the interest of Montreal's citizens to historic and interesting points in and near Montreal, and has furnished authentic and accurate information that would be appreciated by visitors to the city. The British Columbia Electric Railway has conducted an extensive educational campaign through poster advertising. The New York State Railways has used newspapers extensively to discuss with the public its policies and plans. These and many other companies operating local transportation systems have presented their messages clearly, simply and frankly and have displayed striking ingenuity in winning the attention and the interest of the public.

Of even greater significance, however, is the fact, as

indicated by recent campaigns, that electric railways are fast learning that poorly-executed advertising is not only of little value but may actually become seriously harmful in its effect on the public. Current advertising shows, on the whole, a wholesome absence of the plaintive or complaining type of "poverty" copy which only recently was too often found in electric railway advertising. Typical recent electric railway advertising attracts attention, induces constructive thinking and avoids criticism. These features indicate the work of experts, not amateurs. They emphasize the fact that the inexperienced have no more place in the management of electric railway advertising than they have in the management of an electric railway itself.

Duplicate Tracks Dilute Service

EXAMINATION of the routes of street railway companies in many cities discloses an evil which is far too common, and toward the correction of which relatively little has been done. This is best described as surplus or duplicate trackage near the centers of cities, resulting in many instances from competitive construction during the promotional days of the industry. It is likewise far too common in these cities to find the needs of large sections of outlying territory inadequately served with public transportation, due to the fact that financial resources are drained by the necessity for running unprofitable duplicate service on streets sometimes only a block or two apart.

This situation holds back the progress of an entire property. In the first place it becomes necessary to maintain many miles of unnecessary track and paving. But even more important from the standpoint of the effect upon earnings, this condition is frequently found to result in a dilution of traffic to the point where headways are excessive. The net result is that there are several lines in close proximity, serving the same general residential section and running into the same general business district, on all of which the service is unattractive because of long headways between cars.

During the past several months the importance of frequent headways as a factor in attracting riding has been strikingly demonstrated. One of the most outstanding examples of this is in Chicago, where despite the general trend in the industry toward a more and more unfavorable load factor, the Chicago Surface Lines has been able to build up off-peak riding through greater frequency of service during those hours. The relative importance of speed and headway as factors in winning increased business is difficult of determination, but it is quite probable that under certain conditions the importance of frequency cannot be over-stressed.

A recent experiment by a railway in a medium-sized city throws into sharp relief the situation resulting from unnecessary duplication of lines in the same territory. On this property one of two such lines was changed to one-man operation and the service increased by a large percentage. On the parallel line the former service was retained. As a consequence of the cut in headway on the one-man line, there was a large immediate increase in revenue and in the revenue per car-mile operated. At the same time there was a drop in revenue on the parallel line which had not been changed. Observations made in the district soon disclosed that in many instances passengers were walking several blocks, *crossing* the line which maintained its former headways, and patronizing

the line two blocks away which offered frequent service. In other words, they were willing to walk two extra blocks to the line on which they were sure to get a car with little waiting, rather than to take their chances on waiting for a car to come on the line which was closer to their homes.

Thus it seems more than probable that needless duplication of lines in many cities is causing dilution of service which tends to drive away much-needed revenue. Of course there is usually serious objection from property owners and business people on the affected streets, to the elimination of existing tracks, even though the line is proved to be a needless and unjustified duplication. For some strange reason, property owners and business men assume the right to demand retention of a car line though they have for many years been deaf to its difficulties, and contribute not a penny toward its revenues. The reason is, of course, quite clear. They recognize the property value that is created by the existence of a permanent transportation line in the street. Perhaps a new line of attack is necessary. If the surplus trackage is of such value to them, why not propose that they purchase this track from the railway on the condition that service will be maintained? The possibilities resulting from acceptance of such a proposal provide an interesting field for speculation.

"Horse-Car Days"

CONTRIBUTING to the *American Mercury* seems to have become a habit with Raymond L. Tompkins of the United Railways & Electric Company, Baltimore, Md. This time Mr. Tompkins is in no way captious. His subject is "Horse-Car Days." It does not seem possible that Mr. Tompkins could have drawn much on his own recollection for the facts he sets down. He is too young for that. And the facts are too multifarious for him to have been an observer of any considerable number of them. But again he proves himself to be an able raconteur.

Many men still living were witnesses to some of the events he recounts. In fact, any number of such men could be named. They are practical fellows, and while discarded horse cars may be difficult to find, as Henry Ford learned during his recent search for a museum specimen, there are still a few of them tucked away here and there. And there are some that are not tucked. True, they may not be exactly horse cars, but they are still in service, more's the pity.

It would be reasonable to wager that Tom Minary, octogenarian, who in his day could flick flies off a horse's ears with a whip along with the best of them, has an old horse car stowed away somewhere in Louisville. Unlikely is it that from the recollection of Horace Lowry, son of the late Tom Lowry, has faded the picture of the early struggles in the Flour City. Many who are still alive can recall the dreadful epidemic of epizootic of which Mr. Tompkins writes. And there are many who recall the proceedings of the first street railway convention with its topics so remote from the subjects that are discussed today. The veterinary and the horseshoer have given way to the engineer and the economist, but the problem of making a cent go as far as it will is even more acute today than it was in the horse-car days. Those were the days when a nickel had real purchasing power.

There is no occasion to take issue with Mr. Tomp-

kins. He has done a good job. In fact, the period about which he writes seems but yesterday to many transportation men. And the list of men still in the industry who are able to recall them is a long one. Fondly as they may recollect the happy days of long ago the oldest of the Old Guard must admit that the progress of the local transportation industry in the past 45 years has made reminiscences of the first convention but a memory indeed.

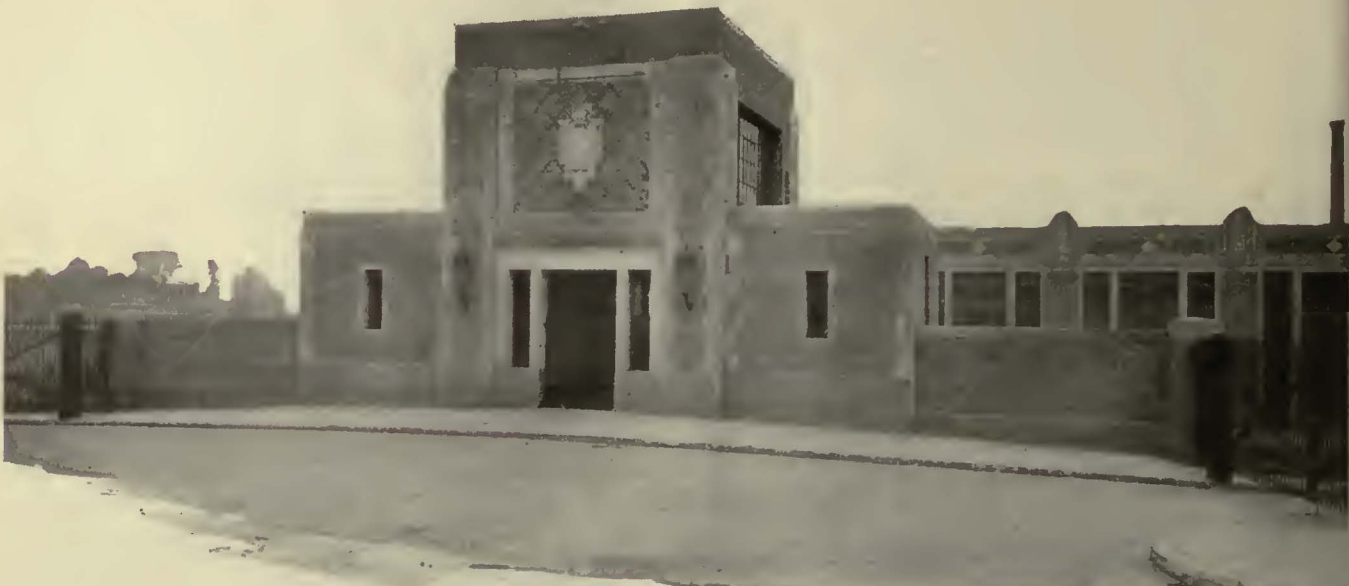
A Sound Demand for Revision of Fares

MILWAUKEE can afford to deal liberally with its railway in the matter of fares. The company has dealt generously with the city. It has anticipated the city transportation requirements. Not only has it kept up the city lines to a high degree of perfection, but it has co-ordinated bus operation with them and has planned suburban transit on a liberal scale designed to anticipate the future growth of Milwaukee as a metropolis. All that the company asks is that the Railroad Commission shall fix boundaries of a single-fare area and adopt rates which would put the city and suburban transportation system on a self-supporting basis. Certainly, this is reasonable.

The Milwaukee company's investment in its railway has increased from \$16,694,409 in 1920 to \$28,263,980 in 1928. Not in any year since 1920 has the company earned an adequate return on its investment in the railway. Where there have been deficits from railway operation, they have been made up from the revenues of the electric department. Economically, this is an anomalous situation. The promise of the company is that if standards of service and rates of fare to be prescribed are so calculated that they will yield an increased return upon the railway and bus service, the company will reduce electric rates by an amount not less than the estimated increase in railway revenue. Present fares are 7 cents with transfer, and eight tokens for 50 cents.

The whole matter is before the commission because of the demand for an extension of the single-fare limits to include former North Milwaukee, now a part of Milwaukee. To meet this demand would eliminate zone fares on that line. The position of the company is that the zone system of fares is most fair and equitable. It regards this as tenable economically.

Like nearly every other American city, Milwaukee has suffered because of the need of keeping available for service equipment to meet the occasional peaks in traffic. This necessitates a large amount of money being tied up in equipment over and above that required to carry the regular load. For instance, in January of this year from 50,000 to 70,000 more casual riders were carried on certain days than in a similar month last year. The position of the company is that under present rates regular riders are discriminated against. The feeling is the occasional rider should pay a fare higher than that of the regular patron, and that the regular riders should pay the minimum rate that is possible. This is sound. It will be interesting to review the basis on which the commission disposes of this matter, since that decision will probably involve not only the regulatory body's idea of fairness to the railway, but also of fairness to the frequent and the occasional user of the transportation service. It is an old question, this one of the demand for extension of fare limits, but apparently each time it arises it must be settled anew.



Views of the
Fern Rock Terminal Yard
and Shops
of the
Broad Street Subway,
Philadelphia

Above—The architectural detail of the entrance building with its limestone trim, polished granite base, doorway fixtures and grille work is typical of the attention paid to the design of all the buildings. At right—Eleven storage tracks are located on the north side of the general repair building, and land is available for fourteen more. This view, taken during construction, shows the white porcelain insulators before the contact rails were laid. Below—The landscaping of the area in front of the main building makes the terminal very distinctive.



Elaborate

Shop and Yard Facilities

Provided for Philadelphia Subway

Fern Rock terminal is conveniently located at north end of Broad Street subway. Architectural treatment of buildings, landscaping of grounds, flexible track arrangement and an array of modern machinery are the outstanding features



Aero Service Corporation, Philadelphia

Aerial view of the Fern Rock terminal yard and shops showing the general layout of the buildings and tracks. The inspection shop is at the left and the main repair building at its right. Note also the portals, the entrance building, the storage building at the rear, the two track loops, the steam railroad connection, the road encircling the main building, the floodlight towers at each corner and the steel and concrete fence which encloses the area

This article is the fourth and last of a series, describing the new Broad Street subway in Philadelphia. The first, published on Feb. 9, showed the relation of the subway to the existing and future transit facilities of the city, and gave operating and construction details. The second article, in the Feb. 23 issue, described the 150 cars bought by the city, and the third, published on March 9, gave details of the power distribution and signal systems.—EDITOR.

shops, was constructed and equipped at great cost and is outstanding in many respects. The architectural treatment of the buildings and the landscaping of the grounds were carefully detailed and the resulting appearance is unusually attractive for a car shop. The terminal is made even more distinctive on account of the flexible track arrangement for the yard and shops, the large number of modern machines and tools, and the provisions made for expansion.

ADVANTAGES OF THE SITE SELECTED

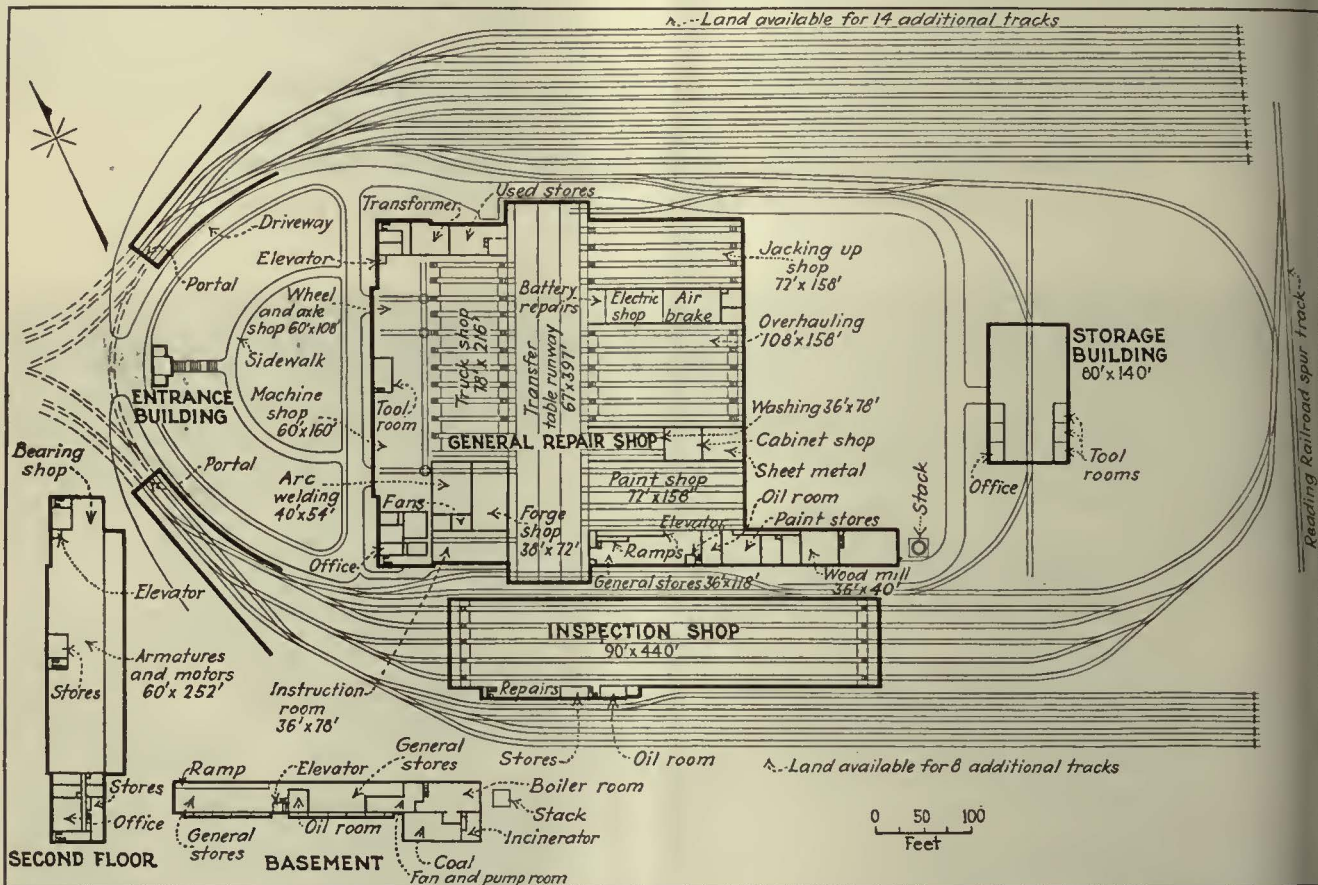
The site selected for the storage yard and shops is bounded by Chew Street, Nedro Avenue, Marvine Street and the Reading Railroad right-of-way, and embraces an area of approximately 32 acres. Its nearness to Broad

CARHOUSING and maintenance facilities for the new Broad Street subway, designed and built by the Department of City Transit of Philadelphia and being operated by the Philadelphia Rapid Transit Company, are provided at the extreme north end of the line. The terminal, known as the Fern Rock yard and

Street, the favorable topography and the adjoining railroad made the site particularly suited for the terminal. With the exception of a few houses on the northern front, the track was totally undeveloped, with no streets opened through it, although the city's street plan provided for five north and south streets and one east and west street, running through the property. It was decided to divert Eleventh Street so as to skirt the western part of the tract, to arrange the yard grade so that another street could be opened beneath the tract when necessary, and to remove the others from the street plan. The plot

to the subway through the two Grange Avenue portals which are located within the yard. By this arrangement ample space was left between the two parts for the shop buildings and other necessary storage area. The general plan of track and buildings is shown in an accompanying illustration.

The initial track arrangement includes eleven storage tracks on the north side of the plot and five on the south side, all stub ended. In addition, there are five tracks which pass through the inspection shop and which are joined at the rear to a track which circles around the



Complete track and building layout of the Fern Rock Terminal, showing the flexible track arrangement and the various departments and shops within the buildings

required a fill on the east end, the spoil from the subway excavation being used for this purpose.

The terminal facilities include a shop for the periodic inspection of all cars operating from this yard; the general repair shop for overhauling and repairing all cars operating on the Broad Street subway, or that may operate on its future extensions, tributaries and connecting lines; an open track storage for cars when not in use; a storage building and yard space for materials used in maintenance of permanent way, buildings, station equipment, etc.; and a steam railroad connection for the receipt and shipment of freight.

STORAGE TRACKS ACCESSIBLE FROM SUBWAY AND SHOPS

Convenient and direct access to all storage tracks and to the inspection and repair shops was sought for and attained in the yard design. The plan selected divides the storage yard into two parts, one on the north side of the plot and one on the south side, each equally accessible

rear of the general repair shop. This track has a spur on the north side which goes to the transfer table runway in the general repair shop, and also a branch to the Reading Railroad spur. Another track, between the general repair shop and inspection shop, has a siding which goes through the south end of the transfer table runway and also joins the circling track at the rear. A second track, which passes through the storage building, joins the north and south storage yards. It is possible to run a train completely around the shop, as a loop track with the portals has been provided.

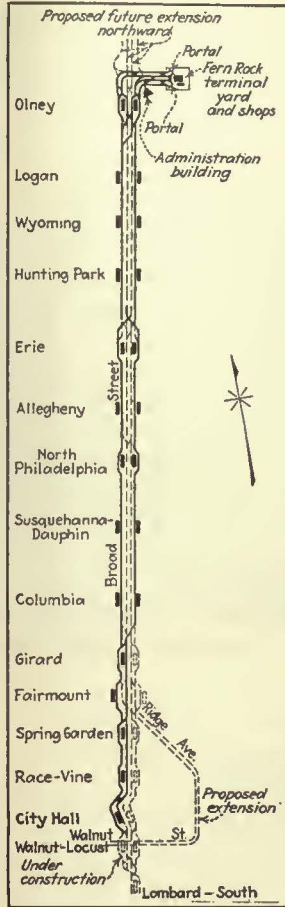
The initial track installation provides storage for approximately 165 cars. The ultimate development of the yard area, which has been kept free of all poles and overhead wires, will permit the storage of about 450 cars. Land is available on the north side of the plot for fourteen additional tracks, and on the south side for eight tracks.

Entrance for automobiles, trucks and other vehicles, made over a driveway, entering from the west end of the

ard, as shown in the diagram of the terminal. The driveway encircles the repair shop, thereby avoiding crossing any tracks except the spurs which enter the repair shop.

BUILDINGS DESIGNED FOR A RESIDENTIAL NEIGHBORHOOD

The yard and shops are in a purely residential district and the buildings were designed and the plot landscaped to add, rather than detract, from the neighborhood. The result can best be judged by studying the architectural treatment of the buildings, and the general effect in the accompanying illustrations. The entrance building, which is typical, shows the close attention to detail that was paid in the design. The pearl gray tapestry brick construction with white limestone trim, the diamond pattern in the panel over the doorway, the specially designed cartouche in this panel, the polished granite base, the iron gates in the doorway, the iron grille work in the narrow windows on each side of the doorway, the imposing gateway fixtures, the general shape of the building with its two wings, the walls projected to the driveway entrances and the iron gates for the driveway, all contribute to the pleasing effect obtained. A harmonizing treatment is given the general repair building and the inspection shop also, as may be seen in the views of these buildings. The pattern was not confined to the fronts of the buildings, but was continued on the sides and rears. The area immediately in front of the general repair shop has driveways and a semi-circular lawn with sidewalks passing around the lawn to the foot of a stairway leading to the entrance building. The remainder of the area is tapered to these sidewalks and also has a lawn. A flagpole in the semi-circular plot, together with shrubbery and trees, carefully located, adds to the general effect. The portals and retaining walls are in white, and harmonize with the sidewalks and stairway. The entire terminal area has been cleared of unnecessary material and graded to give a pleasing appearance. An iron and concrete fence, in keeping with the general architectural plan, surrounds the entire area. The completed yard, with its fence, graded track areas and



The terminal yard is located at the extreme north end of the Broad Street subway. The administration building, north of the Olney Avenue station, is also shown on this map

harmonizing building designs, may be seen in the aerial view.

LONG INSPECTION SHOP

The usual frequency of inspection requires that 5.3 per cent of the total number of cars pass through the inspection shop each 24 hours. Maximum service from the equipment demands that the largest possible number of cars be made available for rush hour periods, and as inspections can usually be made in several hours, they can be made between the morning and evening rush periods. To this end the inspection shop was made long enough to accommodate a full train, and each track connected for entrance or exit at either end. It is not expected that during the first few years of operation the trains will exceed six cars, and the inspection shop was built to accommodate trains of this length, with provision made for further extensions to accommodate eight-car trains.

The building has five inspection tracks, spaced 18 ft. between center lines to provide ample working space between the cars. All tracks are built over pits, with the floor between tracks depressed 1 ft. below the head of the rail. Double-folding doors, motor operated, are installed at both the front and the



Five tracks extend the full length of the inspection shop, which is long enough to accommodate six-car trains. The tracks are spaced on 18-ft. centers, giving adequate room for the workmen

rear of the building, each track having its individual doors. The machinery required in this shop is housed in an offset along the south side, which also provides for oil storage, general storage, work benches, office space and locker rooms for the men assigned to this building.

ARRANGEMENT OF SHOPS IN GENERAL
REPAIR BUILDING

The plan of the general repair shop embodies the use of a car transfer table to move cars into and out of the shop and to move cars and trucks to the various departments during the course of repairing, overhauling and painting. The building is approximately 360 ft. by 380 ft., with an L extension along the south side, 36x 160 ft. The transfer table travels 397 ft. across the entire width of the building and sufficiently beyond each side for the connections to the yard tracks. The wheel and axle, machine, truck, arc-welding and forge shops are located on the west or front side of the transfer table

runway, with the motor, armature and bearing departments on the second floor, over the machine and wheel shops. On the rear or east side of the runway are located the jacking, battery, electric, air-brake, overhaul, cabinet, sheet metal, washing and paint shops.

The shops are so arranged in the building that a car can be completely overhauled with a minimum of handling. Cars entering the shop are moved by the transfer table to the jacking shop, where the bodies are lifted by 20-ton cranes and the trucks removed. The trucks then are taken to the shop on the opposite side of the transfer table runway, where they are dismantled. The motors are hoisted to the second floor by a high overhead crane operating over a well and are repaired on this floor. A separate shop for the armatures and another for the bearings further divide this repair work.

Adjoining the truck shop are the wheel and axle, machine, arc-welding and forge shops, in which the truck repairing and overhauling are completed. When the

Shop Equipment Installed in the Fern Rock Shops of the
Broad Street Subway, Philadelphia

- Truck Shop**
4 cranes—15-ton, single hoist, floor-operated, 33 ft. 5½ in. span..... Box Crane & Hoist Corp.
- Wheel and Axle Shop**
1 wheel press—600-ton..... Chambersburg Engineering Co.
1 car wheel borer—48-in..... Niles-Bement-Pond Co.
1 combination journal and axle lathe.... Niles-Bement-Pond Co.
1 axle grinder—14 in. x 96 in..... Norton Grinding Co.
1 wheel lathe—No. 2..... Niles-Bement-Pond Co.
1 hoist—2-ton..... Box Crane & Hoist Corp.
1 axle straightening press—200-ton..... Chambersburg Engineering Co.
1 two wheel grinder—18 in. x 3 in..... Hisey-Wolf Manufacturing Co.
1 axle testing tank—3 ft. x 3 ft. x 10 ft.. *
1 heater for testing tank—gas fired, 5-hp. B-Line Boiler Co.
- Machine Shop**
1 crane—5-ton, single hoist, floor-operated, 18 ft. 9 in. span..... Box Crane & Hoist Corp.
1 semi-universal turret lathe No. 1..... Acme Machine Tool Co.
1 engine lathe—16 in. x 10 ft..... Monarch Machine Tool Co.
1 engine lathe—20 in. x 16 ft..... Monarch Machine Tool Co.
1 engine lathe—24 in. x 14 ft..... Monarch Machine Tool Co.
1 drill press—15-in..... W. F. & J. Barnes Co.
1 drill press—21-in..... W. F. & J. Barnes Co.
1 radial drill—5-ft..... Carleton Machine Tool Co.
1 universal milling machine—No. 3..... Cincinnati Milling Machine Co.
1 crank shaper—24-in..... Gould & Eberhardt
1 two wheel grinder—14 in. x 2½ in..... Hisey-Wolf Manufacturing Co.
1 bolt threading machine—2-in..... Acme Machinery Co.
1 hack saw—6-in..... Peerless Machine Co.
- Machine Shop Tool Room**
1 tool room lathe—16 in. x 8 ft..... Monarch Machine Tool Co.
1 drill grinder—No. 51..... Oliver Instrument Co.
1 universal tool grinder—No. 2..... Norton Grinding Co.
- Forge and Welding Shops**
3 down-draft forges..... Champion Blower & Forge Co.
1 mechanical sledge..... Chambersburg Engineering Co.
1 binder—Model D, 8-in..... J. R. Kerlin Co.
1 combination punch and shear—No. 20. Heney Pels & Co., Inc.
1 single frame hammer—800 lb..... Chambersburg Engineering Co.
1 coal bin..... *
1 fitting plate..... *
1 stock rack..... *
3 anvils—175-lb..... Paragon
1 air compressor—500 cu.ft., straight line, with 100-hp. synchronous motor..... Ingersoll-Rand Co.
1 electrical welding outfit..... Westinghouse Electric & Mfg. Co.
- Motor Shop**
1 crane—5-ton, single hoist, cage-operated, 37 ft. 7 in. span..... Box Crane & Hoist Corp.
1 crane—5-ton, single hoist, floor-operated, 37 ft. 7 in. span..... Box Crane & Hoist Corp.
1 engine lathe—20 in. x 10 ft..... Monarch Machine Tool Co.
1 drill press—15-in..... W. F. & J. Barnes Co.
1 two wheel grinder—14 in. x 2½ in..... Hisey-Wolf Manufacturing Co.
1 armature storage rack..... *
1 armature extractor..... *
1 lye tank—3 ft. x 3 ft. x 6 ft..... *
1 pinion tank—3 ft. x 3 ft. x 4 ft..... *
2 boilers—gas fired, 5-hp..... B-Line Boiler Co.
1 vertical broaching press—30-ton..... Chambersburg Engineering Co.
1 transfer truck—3-ton..... Easton Car & Construction Co.
- Armature Shop**
1 dust arrester..... Pangborn Corp.
1 cleaning cabinet..... *
1 two wheel grinder—14 in. x 2½ in..... Hisey-Wolf Manufacturing Co.
1 engine lathe—24 in. x 12 ft..... Monarch Machine Tool Co.
1 horizontal press—300-ton..... Chambersburg Engineering Co.
6 armature stands—Peerless type A..... Electric Service Supplies Co.

- 1 commutator slotter—No. 204257..... General Electric Co.
1 universal armature machine—Peerless No. 48623..... Electric Service Supplies Co.
1 mica shear..... Electric Service Supplies Co.
1 bar bender—Segur No. 45636..... Electric Service Supplies Co.
1 kinker vise..... Electric Service Supplies Co.
1 wire skinner..... Electric Service Supplies Co.
1 coil winder—Browning..... Mutual Foundry & Machinery Co.
1 wire reel rack—Browning..... Mutual Foundry & Machinery Co.
1 coil spreader—30-in..... Mutual Foundry & Machinery Co.
2 coil taping machines..... Electric Service Supplies Co.
1 electric bake oven..... Electric Service Supplies Co.
1 dip pond..... *
5 transfer trucks—3-ton..... Easton Car & Construction Co.
- Bearing Shop**
4 babbitt pots—500 lb..... Westinghouse Electric & Mfg. Co.
1 tin pot..... General Electric Co.
1 lye tank—3 ft. x 3 ft. x 4 ft..... *
1 boiler—gas fired, 5-hp..... B-Line Boiler Co.
- Jacking Shop**
4 cranes—20-ton, double hoist, floor-operated, 33 ft. 5½ in. span..... Box Crane & Hoist Corp.
- Battery Repair Shop**
1 water still—gas fired, 2½ gal..... F. J. Stokes Machine Co.
1 cap sink..... *
1 battery charging outfit..... Electric Products Co.
- Air-Brake Shop**
1 boiler—gas fired, 5-hp..... B-Line Boiler Co.
1 lye tank—3 ft. x 3 ft. x 6 ft..... *
1 two wheel grinder—14 in. x 2½ in..... Hisey-Wolf Manufacturing Co.
1 valve finishing machine—Foster..... Special Bolt Corp.
1 valve testing rack..... Westinghouse Traction Brake Co.
1 drill press—15-in..... W. F. & J. Barnes Co.
1 pipe threading machine—2-in..... Bignall & Keeler Machine Works
1 hoist—1-ton, monorail..... Box Crane & Hoist Corp.
- Pattern and Wood Shop**
1 oilstone tool grinder..... Oliver Machinery Co.
2 electric glue pots..... Oliver Machinery Co.
1 carpenter's bench..... Oliver Machinery Co.
1 patternmaker's bench..... Oliver Machinery Co.
1 jointer—16-in..... Oliver Machinery Co.
1 trimming knife—No. 2..... Oliver Machinery Co.
1 patternmaker's lathe—24 in. x 16 ft..... Oliver Machinery Co.
1 band saw—36 in..... Oliver Machinery Co.
1 cut-off saw—16-in., straight line..... Oliver Machinery Co.
1 variety saw—14-in., shaftless..... Oliver Machinery Co.
- Sheet Metal Shop**
1 drill press—15-in..... W. F. & J. Barnes Co.
1 two wheel grinder—14 in. x 2½ in..... Hisey-Wolf Manufacturing Co.
1 gap punch—½-in..... Niagara Machine & Tool Works
1 bending brake—8-ft..... Dreis & Krump Manufacturing Co.
1 forming roll—8-ft..... Niagara Machine & Tool Works
1 squaring shear—8-ft..... Niagara Machine & Tool Works
- General Equipment**
1 transfer table—75-ton..... *Box Crane & Hoist Corp.
1 freight elevator—8,000-lb., storeroom to basement..... Otis Elevator Co.
1 freight elevator—8,000-lb., wheel and axle shop to motor shop..... Otis Elevator Co.
1 elevating hand truck—3,500-lb..... Lewis Shepard Co.
1 storage battery lift truck—4,000-lb..... Baker-Raulang Co.
1 storage battery lift truck—2,000-lb..... Wright Hibbard I. E. T. Co.
1 storage battery crane truck—3,000-lb..... Baker-Raulang Co.
12 skid platforms—33 in. x 48 in..... Stuebing Cowan Co.
2 oil storage cabinets—6-tank, 120 gal. each, No. 64..... S. F. Bowser & Co., Inc.
*Designed by the Department of City Transit, Philadelphia.



Interior of the general repair shop, showing a portion of the machine shop in the foreground and the truck repair section beyond

trucks are fully assembled again they are returned to the jacking-up shop and placed under the car bodies. The cars then progress from this department along the east half of the building, passing from the jacking shop to the overhaul, car-washing and paint shops, in turn. The miscellaneous repair departments on this side, conveniently located to the main departments, are the battery repair shop, the electric shop, the air-brake shop, the cabinet and upholstery shops and the sheet metal shop. When completed the car is again run onto the transfer table and moved to one of the spurs leaving the building.

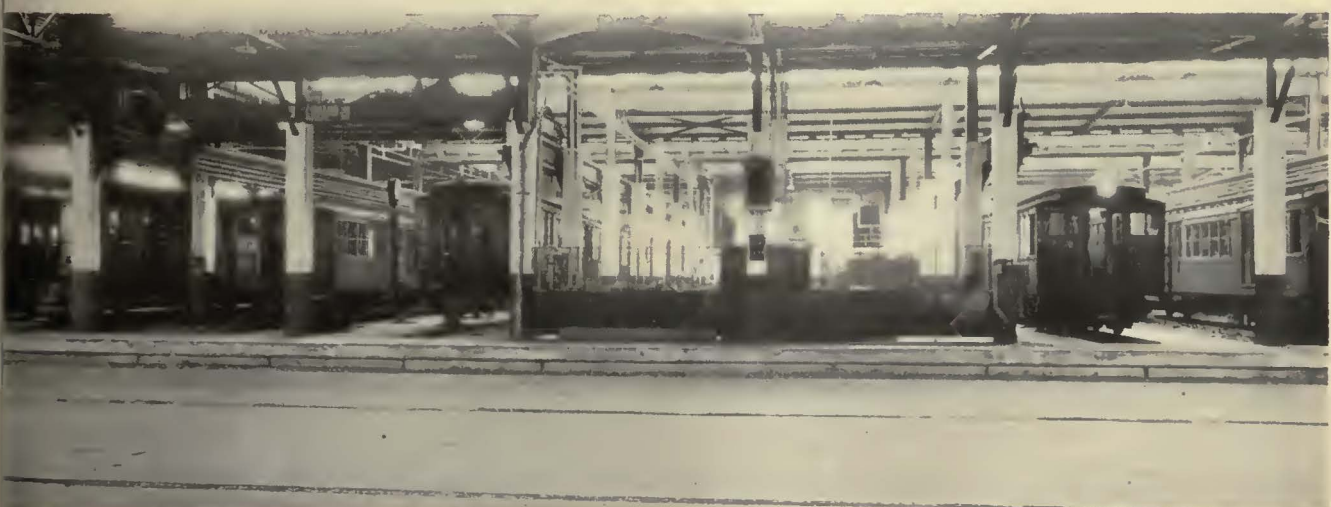
SHOPS COMPLETELY EQUIPPED

Repairing and overhauling are simplified by the array of modern machines and tools in the various departments. A list of the more important ones is given in the table on page 468. The jacking-up shop has four 20-ton, double-hoist, floor-operated cranes, each with a span of 33 ft. 5½ in. The transfer table was specially designed for this building and is 67 ft. in length, operating in a bay with a clear span of 84 ft. The table operates on

four rails and is so designed as to give a depth of pit of 19 in. that does not obstruct the movement of workmen across it. The table is designed for a live load of 150,000 lb., permitting the handling of the largest capacity freight cars in the delivery of car wheels, brake shoes and other heavy supplies.

The truck shop, which is 78x216 ft., has twelve tracks, all but one having pits. Two of these tracks are extended into the wheel and axle shop. They are intersected by a long track, extending the full length of and beyond the truck shop and are joined to it by turntables. The wheel and axle shop is equipped with a 600-ton wheel press, a 48-in. car wheel borer, a combination journal and axle lathe, an axle grinder, a wheel lathe, a 200-ton axle-straightening press and a two-wheel grinder.

The forge and arc-welding shops have a track which extends from the transfer table runway to the machine shop. The track is joined also to the long track paralleling the truck shop by a turntable. The equipment of these two shops includes three down-draft forges, a mechanical sledge, a combination punch and shear, an



East or rear section of the general repair building, with the transfer table runway in the foreground. At the left may be seen the jacking shop in the center the battery repair and electrical shops, and at the right a portion of the overhaul department

800-lb. single-frame hammer, three anvils, an air compressor system and an electrical welding outfit.

In the machine shop are found numerous lathes, drill presses and other machines. The tool room adjoining this shop has a lathe, a drill grinder and a tool grinder. The equipment is just as complete in all the other departments. The motor, armature, bearing, battery, electric, air-brake, cabinet and sheet metal shops all have the necessary machines for repairing the cars efficiently. Throughout the building a number of special machines and other equipment have been installed. Among these are a metal working machine, an armature extractor, a sand blaster, a large wheel lathe, vaporproof lamps and fireproof doors, these lamps and doors being used in the paint shop.

Ample storeroom facilities are provided on the main floor and in the basement of the L extension. The gen-



The administration building has quarters for the trainmen and operating staff of the system

eral storeroom is connected with the main floor and the basement storeroom by ramps. Individual rooms are set aside for oil and paint, and all other materials are systematically stored in numerous bins and racks. This extension also has a wood mill, a heating plant and an incinerator for burning the refuse collected from the subway stations, as well as waste materials from the shop. Several sub-storerooms are located throughout the buildings, to serve the individual departments.

The shops have a number of locker rooms for the employees, all conveniently located, and in the front of the main building is a large instruction room. Ample office space also is provided in this building.

The portion of the shop to the west or front of the transfer table runway will not be expanded, partly because of the building arrangement selected and partly because the greater portion of machinery required for the maintenance of the initial equipment of cars is sufficient to care for a much larger number. However, additional capacity in the jacking shop, overhaul bay, paint room, etc., can be provided when needed by extending the main building to the east. The general repair shop can be expanded to care for more than 600 cars if necessary.

The storage building at the rear of the general repair building is intended for storing maintenance-of-way materials, primarily. It has an office and three tool rooms, and is equipped with an overhead traveling crane. The building measures 80x140 ft., and has ample room for storing the rails, special work and other materials.

Power for the Fern Rock terminal is supplied at 13,200

volts from the Loudon Street substation. A 13,200-volt bus structure, located in a transformer room in the general repair shop, contains electrically-operated switching equipment for the lighting and power transformers. The lighting transformer is a 200-kva., three-phase, 13,200/550-volt unit, and feeds a lighting transfer switch on the main switchboard. Individual switches control the lighting for the various sections of the shop buildings, the entrance building, and the tower floodlights in the yard.

The lighting feeders through the shop buildings and yard are three-phase, 550-volt, and at various points single-phase, 550/250/125-volt transformers are connected to this line. The secondaries of these transformers are connected to lighting cabinets that control the lighting circuits. The intensity of the general lighting of the shop buildings is approximately 4 foot-candles.

Three single-phase, 200-kva., 13,200/550-volt transformers supply the shop power. The secondaries are connected directly to the main switchboard which contains the switches and breakers for the shop and crane feeders. Two panels of this board are for 600-volt, direct-current feeders for the transfer table, and for overhead trolleys used for moving the cars in the shop buildings.

The power feeders from the main switchboard feed several large machines and cutout panels located at various places in the shop buildings for feeding the smaller machines. Each machine has the necessary compensators, controls and safety switches to safeguard the operators.

A direct-current switchboard is located in the inspection shop for the control of the overhead trolleys in that

building. The total connected lighting load for the yard and shops is approximately 180 kva., and the total connected power load approximately 450 kva.

At each of the four corners of the yard is located an 80-ft. tower on which floodlights are mounted. In addition, five floodlights are mounted on the roof of the entrance building to illuminate the front of the building at night. With these four towers and the lights on the entrance building, the entire terminal is brilliantly illuminated at night, with a minimum of shadows. Thirteen 1,000-watt and fifteen 500-watt lamps are used for the floodlighting. The 550-volt feeders to the towers are connected through magnetic switches on the main switchboard, and these magnetic switches are controlled from the entrance building, making it possible to light any one of the towers from this building.

The five story administration building at the corner of Broad and Grange Streets is built on the roof of the subway, with 2½ stories below the ground level. It has a polished granite and limestone base, pearl gray semi-glaze brick walls, limestone trim and terra cotta ornamentation and cornice. The upper floors house the administrative and operating staffs of the city-built subway-elevated system. Provision has been made for the trainmen. The receiver's department for handling the receipts is in the basement, while the lower floors are used for locker rooms and small shops. For the convenience of trainmen there is an underground passage 600 ft. long on the roof of the subway connecting with the Olney Avenue station.



Exterior of Nemahbin rectifier substation, showing at left the sheet-iron housing for load-shifting resistors

Maintenance Problems with Mercury-Arc Rectifiers

Three rectifier substations of the Milwaukee Electric Railway & Light Company are among the first fully-automatic installations for railway service in this country

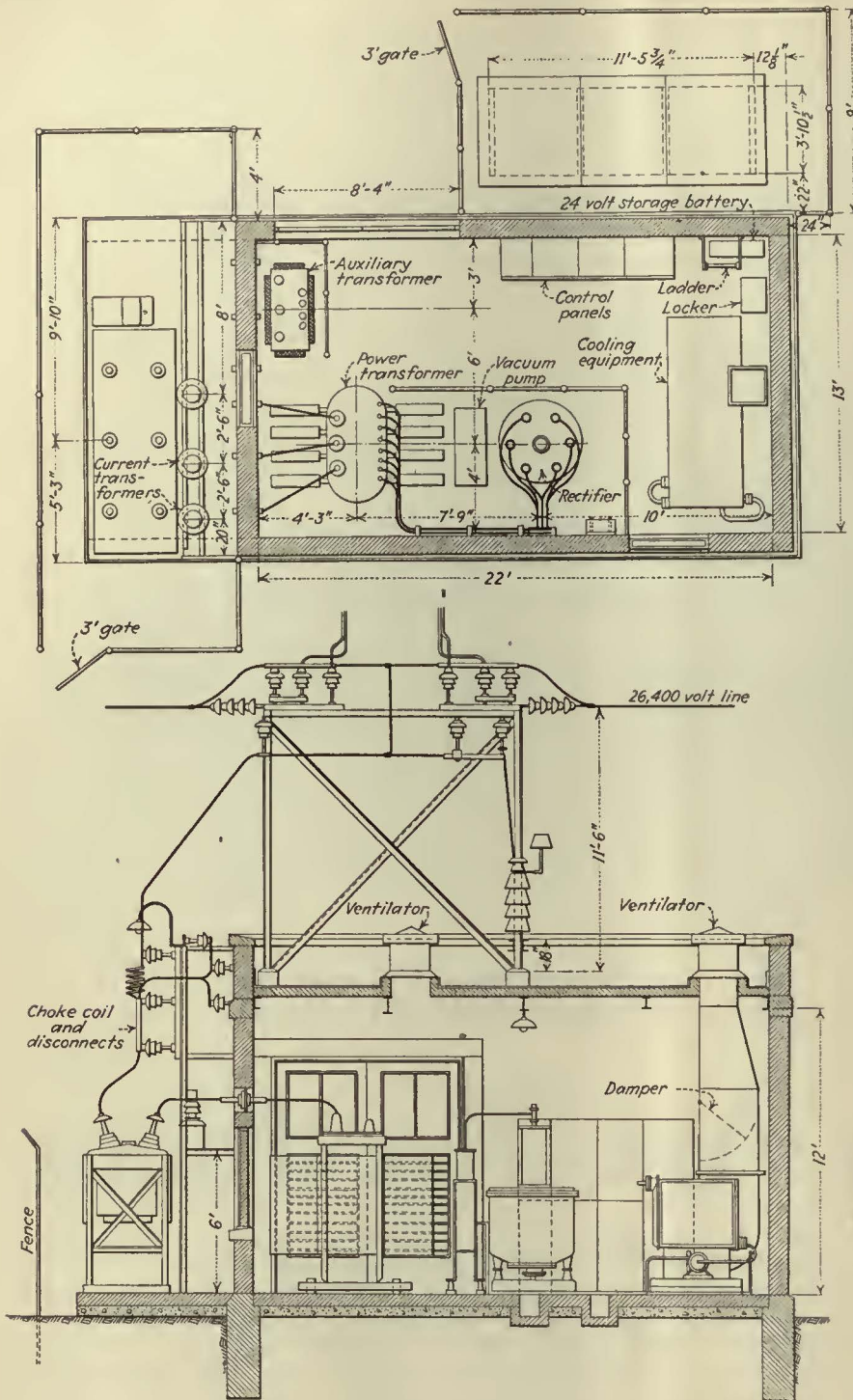
By *O. M. Ward*

Superintendent of Operation The Milwaukee Electric Railway & Light Company
Milwaukee, Wis.

FOR APPROXIMATELY two years three fully-automatic 550-kw., 600-volt mercury-arc rectifier substations, located at Nemahbin, Oconomowoc and Pipersville, have been in service on the Milwaukee-Watertown interurban line of The Milwaukee Electric Railway & Light Company, a route which serves an important farming district to the northwest of Milwaukee. The substations in which they are installed are about .5 miles apart, and are all connected through 600-volt trolley feeders of the interurban line, which also

are fed by manually-operated rotary-converter stations. The company also has a number of rotary-converter substations on other interurban lines which carry approximately the same peaks and deliver about the same annual output.

The original rectifier installations did not include load-limiting or load-shifting resistors. Difficulties experienced in these substations under sustained peak loads made the addition of such equipment necessary; its installation was completed late in 1927 and has materially



Ground plan and elevation through typical automatic substation on the Milwaukee-Watertown line, showing rectifier and auxiliary equipment

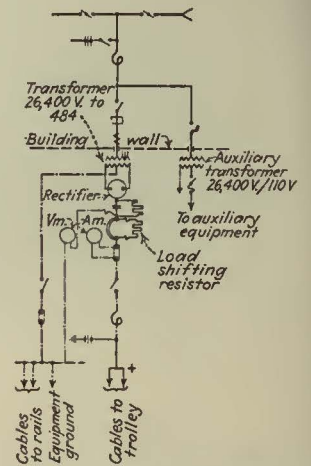
improved the operation. Without the load-limiting resistors the higher current demands put the stations off the line, resulting in very poor trolley voltage in the vicinity, with a corresponding reduction in possible train speeds. With the load-limiting resistors inserted in the feeder circuit, a station is never disconnected from the line and a fairly good trolley voltage can be maintained during high-demand periods.

Three-car trains starting near a substation may impose a demand of 3,000 to 3,500 amp. The load-shifting resistor used is a one-step type, that is, all of the resistance is cut in or cut out at once. The resistor shunting breaker opens when the demand reaches 1,800 amp. and

closes when the load decreases to approximately 1,000 amp. The resistors, located outside the substation buildings, are protected from the weather by sheet steel coverings, open at the bottom. The equipment is accessible for inspection and repairs; trouble in the resistors cannot be transferred to other station equipment, and the heat dissipated by them does not affect the temperatures of the transformer and rectifier.

WATER CIRCULATING SYSTEM USED

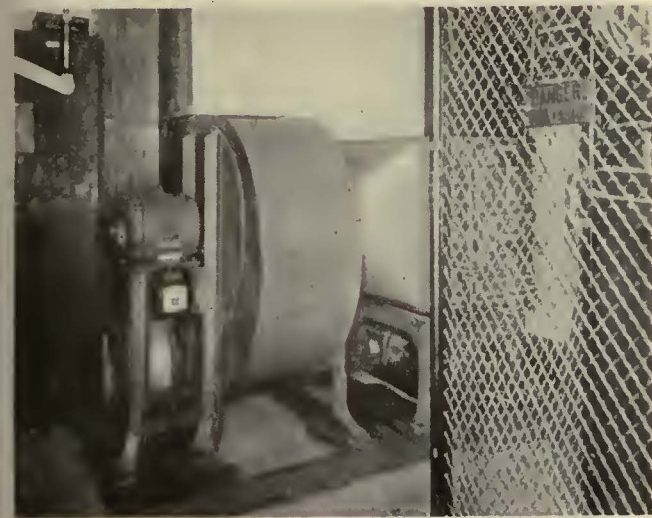
The rectifier stations have self-contained cooling systems, because no regular water supply is available. Water is circulated by a motor-driven



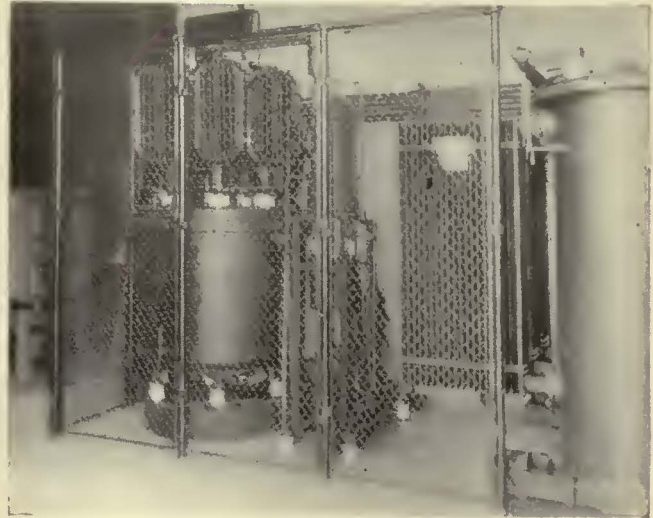
One-line diagram of electrical connections for 550 kw. mercury-arc rectifier units

pump through the water jacket surrounding the tube tank and through a radiator of the automotive type. The cooling system is at one end of the station. A motor-driven fan forces air drawn into the room at the opposite end past the step-down transformer and rectifier, through the radiator, and finally discharges it outside the building. A non-freeze solution of water and high-grade alcohol is used in the cooling system during the winter, the air-circulating fan being taken out of service. Fan, radiator, and pump are grounded, necessitating

the use of distilled water with a non-conducting, non-freeze solution, such as alcohol, to prevent electrolytic action. Insulation of the radiator and pump has been under consideration, but it was decided that it would introduce a hazard. The equipment was arranged with the idea of keeping building size at a minimum, and there is not sufficient space to guard properly an ungrounded fan and radiator. Some difficulty has been encountered from corrosion in the water pipes and water jacket. It has been partially overcome by use of condensed water with an alkaline tendency. Caustic soda is added to distilled water to give a concentration of about five parts of sodium hydrate per million. A pH indicator (hydrogen



Cooling fan, radiator and water pump are immediately adjacent to the rectifier unit in Nemahbin substation



Interior of Pipersville rectifier substation. At the extreme left is a part of the self-contained water cooling system

ion concentration—being a measure of acidity or alkalinity) is used to measure the quality of the water. With the above solution a pH 9 is secured.

The water system is open to the atmosphere, admitting sufficient oxygen to cause some corrosion. Experiments are being made, using water of greater alkalinity. The water is tested and treated occasionally, but the work has not been followed up long enough yet to reach conclusions as to its effectiveness. Naturally, there is a limit to the alkalinity which can be used without materially increasing the conductivity of the water. It may be necessary to install an oxygen extraction breather on the water system opening to the atmosphere. Present experience indicates that the water jacket must be painted once a year because of the corrosion. Inasmuch as to paint the water jacket the tube tank must be raised out of the outer shell, considerable time is needed. In the future a redesign of equipment arrangement may make it possible to do work of this character without moving the rectifier off its insulators.

To prevent iron rust clogging the water pipes, a trap

has been installed in the cooling system. This trap consists of a pipe tee connected in the water pipe. The tee is larger than the pipe line. To the third opening in the tee is connected a capped pipe that points downward. The velocity of the water in the tee is reduced and the suspended solids will settle into the trap. With a valve in the trap the dead-end pipe may be cleaned without disturbing the water in the cooling system.

PERFORMANCE BETTER IN SECOND YEAR

The record of the rectifier stations for the second year of service shows great improvement over the first year. Most of the rectifier service delays were caused by auxiliary equipment failures. These are not so serious as trouble in the rectifier, as when it becomes necessary to open the tube tank to the atmosphere, the rectifier must be out of service for quite a long time until the vacuum can be brought back to normal during the baking-out process. A distinct improvement in the rectifier operation would be made if the ignition rod spring could be done away with. This spring, as well as the contacts on the top of the ignition rod, has caused considerable trouble. To work on either necessitates the breaking of the vacuum in the tube tank.

In the rectifier installation the absence of movable parts and the quietness of operation appear to have advantages. However, the auxiliary equipment for the rectifier should be improved. If some simple method for determining the height of the mercury in the tube tank could be devised and used, this also would help materially in keeping the rectifier in continuous service.



Pipersville, Oconomowoc and Nemahbin rectifier stations are located on the Milwaukee-Watertown interurban line, while Chamberlain, Wind Lake and Waterford rotary-converter substations supply power to the East Troy and Burlington lines

500,000 Leaflets Distributed Describing "L's" Advantages

RECENTLY the Chicago Rapid Transit Company, operating the elevated lines in the city of Chicago, made a special effort to acquaint the people living in territory adjacent to the lines with the advantages of the service and the use that can be made of it in traveling to points of interest in the city. Nearly 500,000 leaflets describing points of interest reached by the "L" were distributed in the territory a half mile on either side of the lines.

Rail Traffic 90 Per Cent, Bus 10 Per Cent in European Cities

FIGURES recently compiled, showing the relative volumes of traffic on various local transportation facilities in a number of the larger cities of Europe, indicate that the electric railways continue to carry the bulk of the load, although the bus has become increasingly popular in recent years. Except for the cities of London and Paris, where special conditions prevail, the electric railways are carrying about 90 per cent of the total traffic and the buses about 10 per cent.

In London there are about 5,226 buses operated and 2,000 street cars, and in Paris 1,371 buses and 3,183 street cars. London buses carry 40 per cent of the total number of passengers, while the street cars carried 30 per cent and the subways and the local steam railroads together about 30 per cent. For Paris the figures are respectively 40 per cent, 42 per cent and 38 per cent.

NUMBER OF BUSES AND STREET CARS IN EUROPEAN CITIES

City	Population	Number of Buses	Number of Bus Routes	Bus Route, Mileage	Street Cars	
					Motor Cars	Trailers
London...	7,500,000	5,226	512	1,691	2,000	...
Paris.....	2,800,000	1,371	...	...	2,291	892
Berlin....	4,000,000	431	33	192.1	2,085	1,793
Hamburg..	1,460,000	58	13	75.6	848	867
Amsterdam	730,000	95	9	30.0	394	336
Cologne...	720,000	34 and 29 trailers	11	230.3	528	702
Rotterdam	580,000	40	7	24.9	341	146
Frankfort.	540,000	41	7	23.9	376	463
Hanover...	540,000	10	2	4.6	276	332
The Hague	490,000	30	5	14.0	275	248
Bremen...	400,000	21	4	33.3	222	244

When street car service began in London, about the time when traffic became congested the municipal government passed a law prohibiting the entrance of the cars into the downtown section, covering an area of 12.24 square miles. Only buses are permitted to operate in this part of the city. It was thought that by prohibiting the street car from entering this district the traffic congestion would be minimized, but this object has not been realized. Traffic congestion in the old downtown section of London has now reached such proportions that the condition is almost intolerable.

In Paris the area of the business section where street cars are not admitted is much smaller. The average length of a bus route here is also considerably shorter. The traffic by bus in Paris is, because of this, considerably less than in London. However, here too the effect has been the same as in London. The downtown section of Paris, where the street cars do not operate, presents the same congested appearance, and energetic efforts must be made to keep traffic moving.

Buses with three axles are prohibited from operating in the densely crowded downtown area of Paris, where it is considered that it would be impossible for them to operate safely. In this particular district the subway is looked for to bring relief. This form of transportation is being extended rapidly.

The present pressing problem of traffic congestion in London and Paris is due primarily to the tremendous increase in the number of private automobiles. The intensive use of buses in these cities also contributes somewhat to the congestion. It is now believed that the bus, due to its mingling with other vehicles and its frequent stops, retards traffic more than street cars do, particularly if the latter are used with street loading platforms such as are found in many American cities.

DISTRIBUTION OF TRAFFIC IN EUROPEAN CITIES

City	Population	Street Car	Number of Passengers			Percentage	
			Suburban Railroad	Subways	Bus	Rail	Bus
Berlin.....	4,000,000	77,100,000	35,000,000	21,100,000	19,300,000	87.5	12.5
Cologne...	720,000	14,700,000	1,950,000	.....	500,000	97.0	3.0
Leipzig....	680,000	21,700,000	400,000	.....	180,000	99.2	.8
Dresden...	620,000	19,600,000	130,000	.....	880,000	95.7	4.3
Breslau...	600,000	10,200,000	.....	.....	570,000	94.7	5.3
Frankford on Main	540,000	13,600,000	135,000	.....	1,200,000	92.0	8.0
Dusseldorf	440,000	11,300,000	580,000	.....	170,000	98.6	1.4
Amsterdam	730,000	122,739,337	.....	.....	10,656,181	92.0	8.0
Rotterdam	580,000	70,000,000	.....	.....	10,000,000	87.5	12.5
The Hague	490,000	63,422,011	.....	.....	3,404,400	95.0	5.0

In Germany bus traffic plays only a minor part as compared with the street cars. In Berlin 12.5 per cent of the total traffic is carried by bus and 87.5 per cent by rail. Elsewhere in Germany the proportion of bus traffic is even smaller.

According to *De Ingenieur*, the journal of the Royal Institute of Engineers in the Netherlands, it has been found that in Rotterdam, the main port of the Netherlands, 10,000,000 passengers are carried yearly by privately owned buses while the street cars take care of approximately 70,000,000; thus 87½ per cent travel by street car while 12½ per cent prefer, or must use, the bus. It has been estimated that in the near future, when certain extensions have been made to the rail systems, 93,000,000 passengers in that city will be carried by street cars and 9,000,000 by buses.

In Amsterdam 122,739,337 passengers were carried by street cars during the year of 1927 and 10,656,181 by buses, or 92 per cent and 8 per cent respectively. For The Hague these figures for 1927 were respectively 63,422,011 and 3,404,400, or 95 per cent were carried by street cars and 5 per cent by motor buses.

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OUT NEXT WEEK

Higher Speeds Effective

in New Bedford

By Harold E. Potter

Assistant Superintendent of Transportation Union Street Railway
New Bedford, Mass.

By adjusting the schedules on several lines the Union Street Railway has made its service more attractive and at the same time materially reduced its operating costs

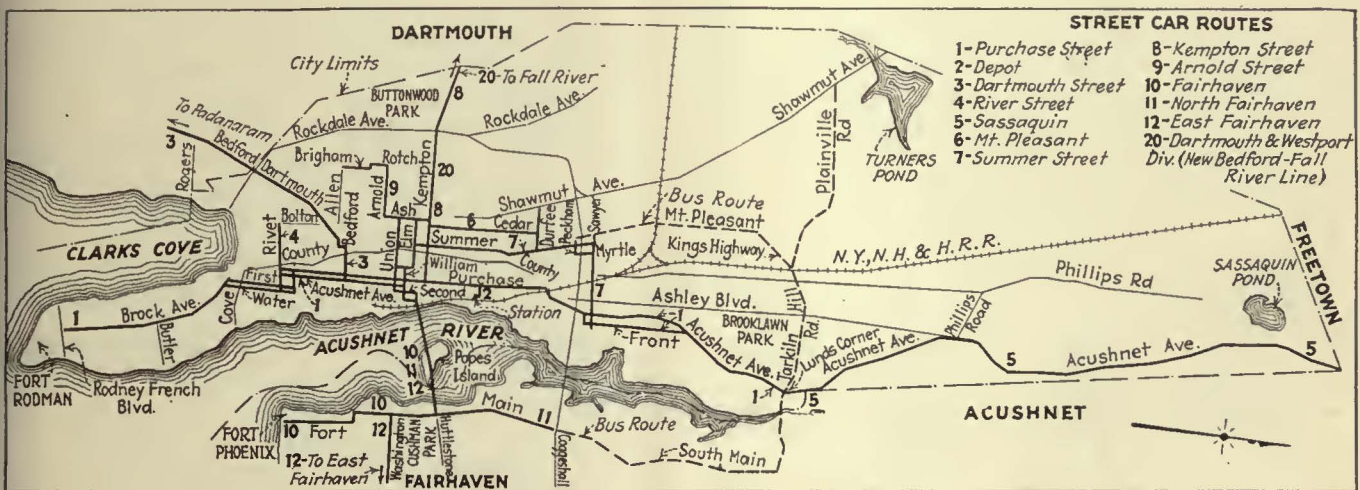


Fig. 1—Street car and bus lines of the Union Street Railway, New Bedford, Mass.

FOR a number of years the Union Street Railway, New Bedford, Mass., has maintained a traffic department which devotes the greater part of its time to analyzing riding requirements and making time-tables to meet the needs of the public. Not only has this given service where, when and as required, but it has been the means of saving the company from expending thousands of dollars in performing unnecessary service.

Recently the efforts of this department have been concentrated on the problem of increasing the schedule speeds on certain lines of the system. These increased schedule speeds have resulted in quicker transportation to the patrons, and in a number of cases operating costs have been decreased appreciably. Before placing any new schedule in operation, the traffic department makes a thorough study of the riding, first, to provide a satisfactory, speedy service to the patrons, and second, if possible, to provide more economical operation. The company realizes that while the patrons appreciate a speedier service this service is not always satisfactory unless the cars are almost certain to arrive and depart on schedule time. For this reason the company, in many instances, has followed the policy of using the slack time as layover time instead of eliminating car-hours in a way that might result in operating on an erratic headway. On the Kempton

Street line, for example, ten-minute layovers are allowed in rush-hours, insuring regular service.

When the company recently changed several of its lines from two-man to one-man operation, in no instance was this higher schedule speed reduced. The operators were trained to lose no time in handling their cars and to maintain the regular schedules.

All time-tables have been so constructed that they may be adjusted readily to changes in traffic requirements without disrupting the regular basic schedules. Headway may be changed from fifteen to ten or to twenty minutes without making out entirely new time-tables. This type of schedule has been of great assistance to the supervisory force in increasing or decreasing the service as riding requirements vary. All supplementary time-tables are made out so they interlock easily with the regular weekday schedules. The trainmen are provided with pocket folders that include all the regular schedules of the system, to assist them in operating intelligently.

Before putting any important time-table change into effect the company always advertises the change for a week in all local newspapers. Thousands of cards or time-tables also are distributed to the patrons by the trainmen. An additional supply of these time-tables is always kept available for patrons. Twenty-four-hour

COMPARISON OF OLD AND NEW SCHEDULES

Route No.	Line	Schedule Speed in Miles per Hour		Round Trip Running Time in Minutes		Headway in Minutes		Number of Regular Cars Operated		Per Cent Increase in Schedule Speed	Per Cent Saving in Cars Operated	When Schedule is Operated
		Old	New	Old	New	Old	New	Old	New			
1	Purchase Street.....	8.58	10.30	90	75	5	7½	17	10	20.0	41.2	Sundays and holidays.
4	Rivet Street.....	6.98	8.73	30	20	15	20	2	1	25.1	50.0	Sundays and holidays.
5	Sassaquin.....	10.96	14.25	90	40	45	45	3	1	30.0	66.6	Every day.
7	Summer Street.....	6.80	7.65	45	40	15	20	3	2	12.5	33.3	Sundays and after 7 p.m. every day, except Saturdays.
10	Fairhaven.....	7.04	7.92	45	40	15	20	3	2	12.5	33.3	
12	East Fairhaven.....	10.49	12.59	90	75	30	30	3	3	20.0	.....	Every day.
20	D. & W. Division (New Bedford-Fall River)	13.72	16.47	120	100	30	30	4	4	20.0	.....	Every day.
4-11	Rivet Street and North Fairhaven.....	8.22	8.22	60	60	15	20	4	3	.....	25.0	After 7 p.m. every day, except Saturdays.
6-8	Mt. Pleasant and Kempton Street.....	7.39	7.39	60	60	15	20	4	3	.....	25.0	

switchboard service also is maintained. Patrons may telephone the company at any time during the day or night for information concerning schedules. A large chart, placed under the glass near the switchboard operator, supplies this information.

EACH LINE CAREFULLY ANALYZED

In the case of the Purchase Street line the riding was carefully analyzed and charted, and the number of seats furnished compared with the number occupied. The study revealed that riding on Sunday mornings was light, and the possibility of increasing this schedule speed suggested itself, since traffic congestion at that time is practically nil. A 7½-minute headway was proposed to replace the five-minute headway and a chart, reproduced as Fig. 2, prepared to show what the effect would be. As a result the new schedule was put into effect. A 20 per cent

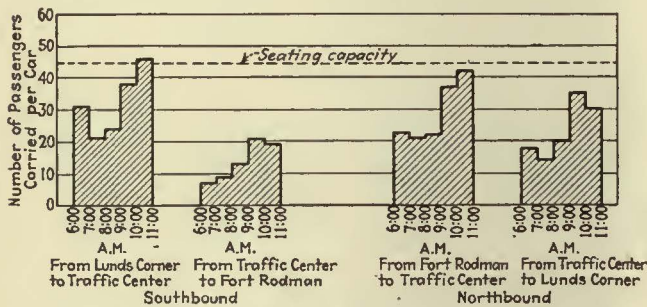


Fig. 2—Chart showing the average number of passengers that would be carried with the proposed 7½-minute headway on the Purchase Street line on Sunday mornings

increase in schedule speed, an increase from five to 7½ minutes in headway, and a decrease in cars from seventeen to ten were some of the outstanding results of the change. The time-table was so constructed for this schedule that it can readily be linked to the regular weekday schedule at noon time. After the schedule had been in effect for a time the riding was again analyzed and adjustments made in accordance with the riding requirements. Fig. 3 shows the results of one of the checks made.

On the Rivet Street line, following a similar analysis, the Sunday morning schedule speed was increased from 6.98 m.p.h. to 8.73 m.p.h., a 25 per cent increase. The headway was increased from fifteen to twenty minutes and only one car was needed for this schedule instead of two. The usual weekday schedule is maintained after noon until 7 p.m. when, except on Saturdays, the schedule again calls for 8.73 m.p.h. In addition, by joining this line with the North Fairhaven line, and having a car make one trip on Rivet Street and then one trip to North Fairhaven, it was found that the headway could be changed from fifteen to twenty minutes and the number of cars from four to three. Routings through the center

of the city were not changed so that patrons board the cars at the usual places. As the schedule speed of the Rivet Street line is rather low and that of the North Fairhaven line somewhat high, this schedule has proved to be an excellent combination.

TWO OTHER LINES COMBINED

After 7 p.m., except on Saturdays, the Mount Pleasant line is joined with the Kempton Street line, producing similar results. Special operator's trip sheets have been prepared so that the car operators can separate the revenue when two lines are joined together. When twenty-minute headway is in effect, the leaving times are arranged to correspond as closely as possible to those of fifteen-minute headway. For instance, on fifteen-minute headway the cars on this line leave the center of the city at 4, 19, 34 and 49 minutes past the hour, while on the twenty-minute time they leave at 5, 25 and 45 minutes past the hour. An analysis of the results of the twenty-minute headway showed no appreciable decrease in riding, which leads to the possible conclusion that the evening rider is a necessity rider.

By increasing the schedule speed of the Summer Street line from 6.80 m.p.h. to 7.65 m.p.h. on Sunday mornings and after 7 p.m. on weekdays, except Saturdays, the speed has been increased 12.5 per cent, the headway increased from fifteen to twenty minutes, and the number of cars reduced 33½ per cent. A notable result was an increase of 26 to 35 per cent in the number of seats occupied.

The same results were accomplished on the Fairhaven line by increasing the schedule speed from 7.04 m.p.h. to 7.92 m.p.h. on Sundays and after 7 p.m. on weekdays.

To insure a positive ten-minute leaving time of cars operated on the Kempton Street line, an additional car

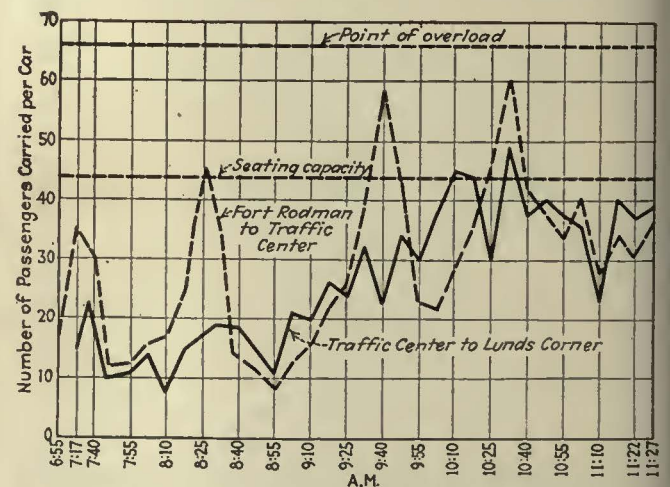


Fig. 3—Check of Sunday morning northbound traffic on the Purchase Street line with the 7½-minute headway in effect

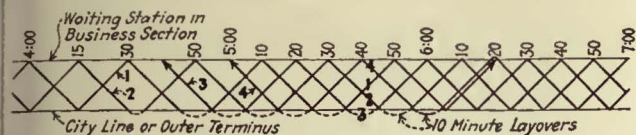


Fig. 4—Graphic time-table for the Kempton Street line during the evening rush period, showing how the ten-minute headway is guaranteed by adding a car and allowing ten-minute layovers at the city limit

has been provided during the evening rush hours, but the schedule speeds have remained unchanged. The extra time caused by operating this additional car is used at the end of the line in the form of layover time. Of course the crews do not always get this ten-minute layover time, because of traffic congestion or other delays, but this method insures a positive ten-minute headway to the public. This regular headway has eliminated overcrowding, and instead of running a single trip extra at night, which cost the company a two-hour wage guarantee to operate, this car is now operated the full two hours as shown in the accompanying graphic time-table, Fig. 4, at no additional cost to the company.

The Sassaquin line operates through a thinly populated territory at the northern end of the city to a midway point called Lunds Corner, which is 3 miles from the center of the city. Formerly, all Sassaquin cars when arriving at Lunds Corner continued to the center of the city. By so doing they operated over 3 miles of track over which the regular five-minute Purchase Street headway was being maintained. A careful survey and analysis was made of this line which showed that nearly 50 per cent of its patrons either started or terminated their rides at Lunds Corner. It also was determined that the five-minute headway on Purchase Street could easily accommodate the Sassaquin patrons riding between Lunds Corner and the center of the city. It was decided, therefore, to terminate the Sassaquin cars at Lunds Corner and to run a shuttle service between that point and the city limits.

By terminating the Sassaquin cars at Lunds Corner it was possible for the company to reduce the Sassaquin line service from three two-man cars to one one-man car, and at the same time to maintain the 45-minute headway. Only one-third of the former car-hours are operated now. The speed has been increased from 10.96 m.p.h. to 14.25 m.p.h., and the car-miles have been reduced 84,870 miles per year, a saving of approximately 42.8 per cent. The elimination of duplicate mileage alone saves approximately 127,305 kw.-hr. per year, amounting to \$1,273.05.

One of the regular cars was converted, out of the savings, into a de luxe type, with heavy leather air cushion seats. The converted car, put into operation because patrons were obliged to transfer at Lunds Corner, has caused much favorable comment. A waiting station is located at the transfer point so the patrons are not greatly inconvenienced by the change. Also time-tables are issued so the passengers know when to expect a car. The entire change has saved the company several thousands of dollars and has provided a service equally as satisfactory as the former.

On the East Fairhaven line a high schedule speed could not be maintained positively because of a bus connection at the Mattapoisett terminus. However, it was increased from 10.49 m.p.h. to 12.59 m.p.h., or 20 per cent, and the running time was decreased from 45 to 35 minutes. The saving of nearly ten minutes is used as layover time at the ends of the line. In the city, a centrally located spur

track is used for this layover purpose. Schedules in wooden frames have been posted on white poles located along the line to inform the patrons of the time cars are due.

INTERURBAN SPEED INCREASED 20 PER CENT

The schedule speed of the Dartmouth and Westport Division interurbans, running between New Bedford and Fall River, has been increased from 13.72 m.p.h. to 16.47 m.p.h., or 20 per cent. The running time for the round trip of 28 miles has been decreased from 120 to 100 minutes, and the slack time of twenty minutes is used as layover time in New Bedford. Because the riding of this line varies from hour to hour, and the traffic congestion in the two cities causes some delays, it was thought advisable not to try to eliminate cars operating at a higher schedule speed. The company felt that it would rather guarantee its patrons a positive leaving time, even though it was necessary to pay the trainmen when laying over. All patrons of this division are informed when the cars pass various points along the line by pocket cards. These cards are circulated by the trainmen and copies are always available. While no saving has been accomplished on this line, the quickened service has been thoroughly appreciated by the public.

While the main object of all these changes has been to increase the schedule speed of the cars on the various lines of the system, it has in many instances produced a surprising saving in car-hours, car-miles and operating costs. A summary of the changes made with the results obtained, in increased schedule speeds and cars saved, is given in an accompanying table. Although cars were reduced on several lines and headways lengthened the service has been made more attractive because of the higher speeds.

London Improves Cars to Increase Earnings

EARLY in 1925 the London United Tramways, London, England, commenced re-equipping its cars in an attempt to give a faster, more luxurious service and at the same time increase its earnings. As a test, four cars were re-equipped and placed in operation on the Shepherd's Bush-Uxbridge route. These cars proved so popular that the company rebuilt 40 cars for this service.

The two 35-hp. motors on the cars were replaced by two 50-hp. motors, resulting in an increased schedule speed from 8.5 m.p.h. to 10.5 m.p.h. or an improvement of 23.5 per cent. This speed was obtained in service calling for a possible eight stops and a usual four stops per mile. The lower decks of the cars were fitted with cross-seats in moquette (plush) and rubber flooring. The rubber flooring proved successful from the standpoint of noise reduction, but it is so difficult to keep it dry in wet weather that hardwood is likely to be used in other modernizing work.

The cost of re-equipping these cars was approximately \$2,425 per car. This included new motors, line switch and cross-seats. The investment is bringing good returns inasmuch as the earnings have increased appreciably in addition to the operating gains.

In view of such results the management is planning to rebuild another 50 cars in the same way except that the car dimensions will not permit the use of cross-seats. On the allied Metropolitan Electric Tramways, 40 cars used on the Golder's Green-Finchley suburban route have

been re-motored, and another 60 cars have been re-motored and equipped with new cross-seats. The South Metropolitan Electric Tramways, another allied company, has fitted sixteen cars with moquette cross-seats. One hundred cars of these companies have also been fitted with short tooth gears as a successful means of noise reduction.

In general, the management's observations are that these improvements in comfort, speed and noise reduction are having a marked effect in bringing traffic back to the railways. Today the tram is beginning to set the pace for road traffic with a schedule speed of more than 10 m.p.h., including stops. It is claimed that it will undoubtedly be able to do still better when the legal maximum running speed is raised from the present 20-m.p.h. limit.

Illinois Association Meeting Well Attended

Co-ordination of rail and bus services, one-man car operation, mercury-arc rectifiers, and developments in new street cars share interest of delegates at two-day session

COMPETITION of the private automobile is the most significant factor affecting the success of electric railway operation today, declared J. W. Welsh, general secretary American Electric Railway Association, in addressing the opening session of the joint convention of the Illinois utility associations in Springfield on March 14. It is remarkable, however, that since 1923 the total rides on public transportation vehicles have remained practically constant at approximately 16,000,000,000 per year while the automobile registration has doubled.

Hon. Louis L. Emmerson, Governor of Illinois, addressing the convention Friday, pronounced it his belief that the powers vested in the Illinois Commerce Commission under present laws are sufficient to insure intelligent regulation. "I regard this commission," he said, "as a court which, when made up of men of the highest integrity, should function without executive suggestion or interference." Public ownership of utilities, the Governor declared, is coming rapidly; but in a way never anticipated by the early utility promoters. "It is called customer ownership and employee ownership. As the average citizen becomes more familiar with investments in securities of corporations, and as utilities see more clearly the value of customer ownership, the day will approach when most of the stockholders of your companies will be the people who use your service. When that day comes you will have found not only a new and important source of capital, but, in addition, an understanding, helpful and friendly public."

The riding tastes of the public have so changed that those in the transportation business have adopted the motor bus in increasing numbers, stated E. A. Roehry, general manager St. Louis Electric Terminal Railway, in his paper, "Co-ordination of Rail and Bus Service." "The results of experimentation with the self-propelled motor bus have been satisfactory to a considerable degree. In fact," continued Mr. Roehry, "it is no longer a question as to the advisability of co-ordinating bus service with rail operation, but rather the extent to which the motor bus should be used that is disturbing the present-

day operator." After enumerating certain advantages to be derived from bus operation, Mr. Roehry hastened to add: "The bus does not offer a panacea for all transportation ills, it has not qualified in any brilliant manner as a traffic stimulator, it is not always profitable, but it does offer the advantage of developing new territory and serving where street cars could not be used.

"It is now accepted by municipal and transportation authorities," he added, "that the agency charged with mass transportation in any community should have control of all methods with a co-ordinated system of street car and bus transportation so planned and operated as to fit local conditions peculiar to each community."

During the past few years the use of mercury-arc rectifiers as conversion equipment on electric railway has increased very rapidly, and from present indications will probably displace the rotating machines to a great extent, according to A. W. Baumgarten, division engineer Chicago & Joliet Electric Railway. On his property a 500-kw., full automatic, closed cooling system rectifier has been in almost continuous operation since that time, displacing two 250-kw., manually-operated motor-generators. The installation, according to Mr. Baumgarten, has resulted in a saving of 13 per cent in energy, the elimination of two men and the cost of maintenance and operation of 25 miles of transmission line. The estimated total saving is \$9,576. Plans are now in progress for the substitution of a 1,000-kw., full automatic mercury-arc rectifier for three motor-generators now in use on the system.

Late trends in street cars and equipment were discussed by W. C. Wheeler, engineer of equipment Chicago Surface Lines. Commenting on the tendency toward refinement of car design and the study of equipment possibilities indicated by the many developments carried on by railways and equipment manufacturers, Mr. Wheeler summarized the outstanding accomplishments to date. Better looking and better performing cars, which will in turn mean faster schedules and more comfortable riding, are being produced, he stated.

In his paper on one-man car operation G. W. Welsh, vice-president and general manager East St. Louis Railway, said that at the present time, there are on his property 39 one-man cars operating over six routes during the rush hours. Twelve two-man tripper cars also are used during the rush hours, making the service 100 per cent one-man in the non-rush hours and 75 per cent one-man at peak periods. According to Mr. Welsh, the installation of one-man service has reduced total platform wages from 27.7 per cent to 21 per cent of the gross in spite of the decline in revenue and an increase in wages.

H. O. Crews, supervisor of public relations Chicago Surface Lines, sketched briefly the use by his company of motion pictures to carry to parents and children a more informative picture of the operating difficulties and safety problems which confront the street railway operator of today, and concluded with a showing of the company's latest film release, "Safe Highways."

Officers elected for the ensuing year are Charles F. Jones, Chicago, South Shore & South Bend Railroad, Michigan City, Ind., president; G. A. Richardson, Chicago Surface Lines, first vice-president; R. B. MacDonald, Tri-City Railway of Illinois, Rock Island, second vice-president; and George W. Schwaner, Springfield, secretary-treasurer. The executive committee will be composed of the officers and A. P. Titus, J. F. Ego and J. R. Blackhall.

Efficiency of Sand Drying Tested

Data obtained by Chicago Surface Lines on the operation
of a sand-drying plant of 38,000 tons
per year capacity



Sand-drying plant of the Chicago Surface lines. The wet sand storage is also shown in the background

EXTENSIVE experiments have been made by the Chicago Surface Lines to determine the efficiency of its present method of sand drying as a basis for deciding between coal and gas as fuel in its sand drying plant. The present plant is of the large coal-fired type. The hourly output of dried sand averages from 10 to 18 tons. During the past year 38,000 tons of sand were dried and a reserve supply of 34,000 tons was stored for future use. The drier consists of a revolving drum 48 in. in diameter and 14 ft. 9 in. long. At one end of this drum is a combustion chamber which has a 34x36-in. grate and is 39 in. high from the grate to the arch. The walls are constructed of 9 in. of high grade firebrick and 4 in. of common brick. In the rear of this furnace is a 30-in. diameter opening through which the products of combustion pass directly into the charging end of the drying drum. After passing through the drum they enter a stack about 40 ft. high located at the discharge end of the drum.

Air for combustion, as well as auxiliary air necessary to carry on the drying operation, is supplied by means of a 30-in. No. 6 Buffalo centrifugal cupola blower driven from the line shaft, which also drives the drum and numerous conveyors. A portion of the air supplied by this blower is delivered to the combustion chamber just under the arch, the remainder being delivered under the grate.

In operating the drier the fire is kindled each morning in the furnace by means of scrap wood and after a few minutes coal is added. After about 30 minutes of firing the furnace and drum have reached the required operating temperature. The conveyor system is then started, taking the wet sand from the supply hopper into the drum for drying. The drum is lined with fins so that when it rotates the sand is carried up its side and dropped. The heated air which is forced through the drum evapo-

rates the moisture so that when the sand reaches the end of the drum it is dry.

The sand to be dried is stored in large piles in the yard and is taken from storage to the feed hopper by means of an electric bucket shovel. One hopperful is about the amount turned out by one shift. A normal day's operation is one shift, but there are periods when two and sometimes three shifts have had to be used to meet the demand. A normal day starts about 7:30 a.m. and ends at 4:30 p.m., but only about 7½ hours out of the nine are productive. The 1½ hours non-productive period includes a half hour for firing in the morning, a half hour lunch period and a half hour for cleaning and re-kindling the fire after the noon period shutdown.

In making the efficiency test the weight of the wet sand charged into the hopper was determined by weighing it in a freight car. The total coal fired was weighed on a small platform scale. Samples were taken of each batch of coal weighed, the final cumulated sample being crushed and quartered at the end of the test. This quartered sample was then analyzed and tested.

Samples were also taken periodically of the wet and dried sand, these being analyzed for their moisture content. Half-hourly readings were taken of the temperatures of combustion leaving the drier. The carbon dioxide content of the flue gases also was taken every half hour.

The total weight of wet sand charged during the test was 127,400 lb., and the total weight of the coal fired was 1,939 lb. The moisture content by weight of the wet sand was 4.01 per cent and the moisture content by weight of the dried sand was 0.38 per cent. An 8.8 per cent carbon dioxide in the flue gases indicated that the drier operates with 139 per cent excess air.

In determining the heat output, the following computations were made. From the accompanying tables it will be seen that the sand consumed $127,400 \times 0.0599 \times$



The wet sand is conveyed to the rotating drum, the stack end of which is equipped with a window giving the operator a clear vision of its interior



The dried sand is conveyed to the top of the sand storage bin where it is screened after leaving the belt. It then passes into the storage bins below

$(234 - 32.4) \times 0.19$ or 4,680,000 B.t.u. The moisture remaining in the sand accounted for $470 \times (234 - 32.4)$ or 94,700 B.t.u. The moisture evaporated consumed $4,630 \times 1,150$ or 5,330,000 B.t.u. The sum of these figures gives 10,104,700 B.t.u. as a total heat output.

The total heat input equals $1,939 \times 12,571$ or 24,400,000 B.t.u. The efficiency of the present coal-fired system, therefore, equals the total heat output divided by the total heat input or 41.4 per cent.

To compete with coal in the matter of cost of operation



An electric crane equipped with a 1-yd. bucket loads wet sand into the 100-yd. capacity hopper



In the interior of the rotating drum the sand is carried upward by the fins and poured through the heated air which is blown through the drum by a forced draft from the firebox

It has been estimated that 30,000 cu.ft. of gas must do the work of a ton of coal. This figure allows for all of the cost incidental to coal. The foregoing figures show that by increasing the efficiency to 50 per cent, due to the elimination of the firebox and a reduction in the heating up periods, 39,000 cu.ft. of gas is required per ton of coal fired.

Under the present drying conditions it seems that gas cannot be substituted for coal at a similar cost. However, it now becomes problematical as to whether this operation cannot be carried on at lower temperatures, thus reducing the heat loss in the sand, the radiation losses from the drum, and the flue gas losses, thereby

reducing the total heat requirements. By working at lower temperatures with large volumes of air, this problem becomes one of drying rather than evaporation by heat, thus presenting numerous possibilities.

Hydraulic Tower Trucks for Twin City Rapid Transit

TWO emergency trucks with several novel features of construction and control of tower equipment have recently been added to the fleet of the Twin City Rapid Transit Company. The chassis is a 2-ton Model T-40 G.M.C. equipped with pneumatic tires. Upon this is mounted a Wood hydraulic hoist with a 4x9-ft. platform attached directly to the top of the hoist piston. The entire support for the platform is a 5-in. piston, raised and lowered by oil pumped into a cylinder by a power take-off on the transmission. A shift lever controls the raising, and another lever operating a bypass valve lowers the hoist. The platform can be raised to full height in 21 seconds and completely lowered in about the same time.

The total weight of the truck, hoist and body, without any tools, material, etc., is 8,360 lb. Loaded for service, it weighs about 9,500 lb. Advantages claimed for them over older type line trucks of the company include: (1) Absence of all but a single support for the platform. This gives additional body space sufficient to accommodate six more men. As many as thirteen men can be carried, comfortably sheltered, inside the truck body—three in the driver's cab and ten on two longitudinal seats in the truck rear. (2) More tool storage space inside the truck body. (3) Shortening of wheelbase, thereby facilitating emergency parking along the street curb adjacent to the job.

TEST PROCEDURE DATA FOR FEB. 23, 1928					
Time	Temperature Sand, °F.		Temperature Gases, °F. Leaving Dryer	Per Cent CO ₂ in Flue Gases	Remarks
	In	Out			
9:20	..	...	...	...	Fire started
9:50	34	...	...	...	Drying started
10:00	34	220	275	6	
10:30	32	215	325	9	
1:00	32	260	310	9.5	
1:30	32	280	340	8.4	
2:00	..	...	...	...	Shut down for lunch, cleaning fires, hauling ashes.
2:30	..	...	...	...
1:00	32	200	265	9.4	Drying started
1:30	32	225	290	9.8	
2:00	32	220	340	12.0	
2:30	32	225	260	8.0	
3:00	32	260	290	7.0	
3:15	..	...	...	...	Finished drying
Average	32.4	234	299	8.8	

COAL ANALYSIS		
	Wet Basis	Dry Basis
Moisture.....	5.10	..
Volatile matter.....	16.94	17.85
Fixed carbon.....	69.52	73.25
Ash.....	8.44	8.90
Total.....	100.00	100.00
B.t.u. per pound of coal.....	12571	13247

SUMMARY OF TEST DATA	
Duration of test.....	5 hours 55 minutes
Time of actual drying.....	4 hours 25 minutes
Total weight wet sand through dryer.....	127,400 lb.
Total coal consumed.....	1,939 lb.
Moisture content wet sand by weight.....	4.01 per cent
Moisture content dried sand by weight.....	0.38 per cent
Weight of water in wet sand.....	5,100 lb.
Weight of water in dried sand.....	470 lb.
Total water evaporated.....	4,630 lb.
Average temperature sand to dryer.....	32.4 deg. F.
Average temperature sand leaving dryer.....	234 deg. F.
Average temperature gases leaving dryer.....	299 deg. F.
Average CO ₂ in flue gases.....	8.8 per cent
Sand dried per production hour (wet sand).....	28,900 lb.
Sand dried per ton of coal (wet sand).....	131,500 lb.
Specific heat of sand.....	0.19



The platform of this Twin City Rapid Transit tower truck is raised and lowered hydraulically by a power take-off on the transmission

Car Advertising Carried to an Extreme

COMMERCIAL advertising by car cards, as practiced in this country, is a legitimate method of increasing railway receipts. Nearly always the advertisements are in good taste. Generally they are confined to a row of cards above the windows, with the occasional use of bulkhead advertising.

In Europe car and bus advertising is carried to an extreme, the announcements often being on both the inside and outside of the cars and buses. The accompanying illustrations show the interiors of a standard bus and a standard surface car in Paris. In the former it will be seen that there are two lines of car cards above the windows. The ceiling is also made to serve as display space by the advertisement of an automobile tire, painted around each electric lighting fixture. Then there are two rows of advertisements on the side panels of the bus between the seats, as well as a double row on the backs of the seats. On the seats at the extreme front of the bus which have no backs, an advertisement is carried on the woodwork just above the upholstery, as well as on the woodwork above the front windows. Finally, there are advertisements on the windows themselves. Sometimes these are of paper pasted on to the glass. Sometimes they are actually etched in the glass. Only the bulkhead space is reserved for company announcements.

The interior of the car, illustrated in the second view, shows a very similar condition except that there are no advertisements surrounding the ceiling lights. However, like the bus, there are two rows of advertising racks over the windows, though in this case one row does not seem to be filled with cards. The seats are arranged back to back, so that a whole back seat is not available for advertising purposes, but one appears on the frame of

the seat back. There are also the announcements on the windows.

In some parts of Europe it is a practice to paint advertisements on the outside panels of a car, on the trucks on the step risers and wherever else there seems to be vacant space.

The Readers' Forum

Asphaltum Not Advantageous for Car Floors

THE TRUNDLE ENGINEERING COMPANY

CLEVELAND, OHIO, March 11, 1929.

To the Editor:

We were much interested in the article on page 68 of the Oct. 13, 1928, issue of *ELECTRIC RAILWAY JOURNAL*, telling of the use of asphaltum for car floor. We have, during the past several years, done considerable research work and conducted many tests and experiments on various types of car flooring material.

Our conclusions are as follows:

1. Asphaltum, even when mixed with light-weight filler ingredients, such as coke breeze, is still 20 per cent to 30 per cent heavier per given thickness than the type of flooring now commonly used by the railroads.

2. We find that the type of composition flooring, now generally in use, has been laid $\frac{3}{8}$ in. thick on several thousand vehicles during the past twelve years, which are still in service.

3. Our investigations indicate that it is extremely desirable to use a car flooring material that is fireproof and one that will not melt or give off noxious fumes in case of fire.

R. C. BRETT,
Research Engineer.



Cars and buses in Europe, as a rule, carry advertising to an excess. It seems to be placed everywhere that the eyes of the passengers are apt to rest

PRACTICAL IDEAS

for the

Maintenance Man

Spray Paint Room of Utah Light & Traction Company

AN EXTREMELY simple and satisfactory solution of the problem of ventilating the spray painting room has been worked out for the Utah Light & Traction Company by W. Belcher, Salt Lake City ventilation engineer. Since July, 1925, when the railway adopted spray painting, there has been need for a method of getting rid of the fumes. This has finally accomplished by installing apparatus similar to that used in underground mines.

The new ventilation system is based upon the principle of blowing, rather than exhausting. A sweeping action of positive air currents, the railway found, was the only thoroughly adequate manner of removing the dense fog of paint fumes which settled close to the floor. By this method, including provisions for heating the air currents in the winter time, a definite change can be made in the paint room every three to five minutes.

The equipment used is the Bayley Blower Company's new "Chinook" unit heater-ventilator set No. 305. This unit is furnished in the shape of a vertical cabinet, 5 ft. 6 in. long by 1 ft. 10 in. wide, having an over-all height of 6 ft. 4 in. Air is taken in at the bottom of the casing, and ascending through the casing passes through the "Chinook" heating elements, and thence to two centrifugal fans situated in the top of the casing which discharge the air to the paint room. The driving motor is situated at one end of the casing on a bracket and is direct-connected to the fans through a flexible coupling. The fans are driven at a speed of 1,750 r.p.m. by a 5-hp., 220-volt, three-phase, 60-cycle standard constant-speed induction motor. The capacity, based on standard air at 70 deg. F. and 29.92 in. barometer, is 9,000 cu. ft. per minute.

Each fan serves a short length of 20-in. diameter galvanized iron duct leading to the inner corners of the paint room. The unit itself, for convenience and to give greater space inside, is set up just outside one end of the paint room but inside the adjacent shop space, where clean air, partially heated, is available. The heating ele-

ment in this unit is rated to heat the above capacity from an initial temperature of 60 deg. F. to approximately 100 deg. F., with hot water entering the heating coils at a temperature of 170 deg. F.

The spray room is a long, narrow compartment having a railway track in the center. A roll-type door forms the entry. Over-all length along the track is 58 ft., the width being 15 ft. 6 in. The height varies from 20 to 35 ft. The cubical content is estimated at 35,000 cu. ft. On the basis of a blower capacity of 9,000 cu. ft. per minute, theoretically there is a

change of air every 2½ minutes. Making allowance for diffusion and leakage through window frame cracks and partitions, there is an actual air change about every 3½ minutes. Paint fumes are removed almost immediately.

To get the sweeping action necessary and to control air velocity, the fresh air is introduced in two streams at one end of the long and narrow shop. Each inlet is a 20-in. diameter galvanized iron vent pipe brought in at the height of 10 ft. from the floor line at each corner of the shop. A positive air current is thus forced along each side wall and diffuses itself through the spray room, having maximum velocity at the center where the car is painted. Formation of pockets for the accumulation of fumes is also prevented.

Paint fumes and bad air find an outlet through the entry door by rolling it upward from 2 to 5 ft. The amount of door opening controls the



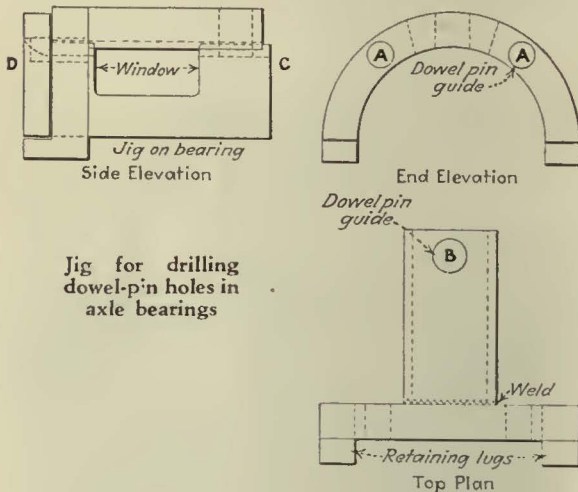
Blower used to force air through the paint room

air velocities across the shop and the sweeping action across the floor. The venting of fumes from the floor line insures a complete removal of the heavy Duco paint spray fumes, since there is no other egress from the spray room for the 9,000 cu.ft. of air per minute being forced through the shop by the fans. In cold weather, the door can be regulated to suit weather conditions.

Jig Assures Accurate Drilling of Dowel Pin Holes*

BY CHARLES HERMS
General Foreman
San Diego Electric Railway,
San Diego, Cal.

HOLES for dowel pins in axle bearings must be drilled accurately and with small clearance over the size of the dowel pin. Where holes are located by center punching, or with a template, it has been found that considerable variation resulted, due to the drills crawling or to small inaccuracies in location. As a result,



Jig for drilling dowel-p'n holes in axle bearings

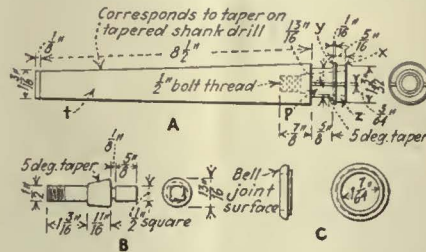
when the dowel pins were installed in a bearing the workmen usually cut away part of the dowel pin to fit the bearing. Wear was then rapid, and in some instances, the bearing flange was broken.

This difficulty has been overcome in the shops of the San Diego Electric Railway by using a jig of the form shown in the accompanying sketch. The time for drilling is decreased as the workman merely drills through the guide holes in the jig shown at A and B. The jig will slide from C to D in installation and the retaining lugs engage the bottom of the bearing flanges and hold securely

to the bearing, which can be mounted on a drill press table in the usual manner.

Expanding Chuck Reclaims Key Washers

EXCESSIVE wear of key washers in the ME-30 rotary valves and the impossibility of obtaining immediate shipment of this material



Chuck used to reclaim key washers of rotary valves

from the manufacturers compelled the Staten Island Rapid Transit Railway, Staten Island, N. Y., to reclaim them in the shop. Before this could be done a suitable chuck had to be designed and developed.

The chuck shown in the accompanying illustration was designed and constructed by Machinist James A. Collins. It consists of two hardened steel parts, A and B. Part A is made from stock with a diameter of 1 1/4 in. The right end is turned to a diameter of 1 3/8 in. for a length of 1 1/8 in. A collar 1/16 in. wide with a diameter of 1 1/8 in. is turned adjacent. The next 5/8 in. of the rod is turned to 1 1/16 in. diameter. For the next 8 1/8 in. the rod is

given a taper corresponding to the taper on a drill shank. This taper starts from a diameter of 1 3/16 in. A 1/8-in. projection completes the turning process. The entire P and Z sections, and part of section T, are machined internally for a distance of 1 3/8 in. on a 5-deg. taper. The diameter of the hole at the start of the taper is 5/8 in. This taper continues into a hole tapped for a 1/2-in. bolt thread. Four slots 3/4 in. wide are cut through sections P and Z, 90 deg. apart.

Part B is made from a piece of 1-in. stock. A length of 1 3/8 in. of this rod is turned and threaded with a 1/2-in. thread. The other end is provided with a 1/2-in. square head, 5/8 in. long, and a fillet 5/8 in. wide. Between

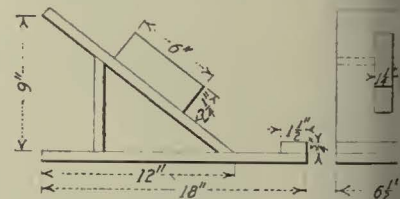
the fillet and the 1/2-in. end the is given a 5-deg. taper for a distance of 1 1/8 in. This taper starts from diameter of 1 3/8 in.

The chuck is used in the following manner: Part A is placed in the lathe spindle and the key washer C installed on the surface X tight against the collar Y. Plug B is then placed the tapered portion of P and Z; screwed up until the slotted section of Z expand and grip the key washer firmly in position. The seat is then ready for machining.

The chuck is self-centering; very positive in its action.

Jig For Drilling Field Terminals

DRILLING out by hand broken and burned off field terminal screws was found to require considerable time in the shop of New York & Queens County Railway, Woodside, N. Y. In order to shorten this time a jig was designed and constructed so that the drill could be performed in a drill press. This is used in connection with drilling of GE-210 field coil terminals. It is made of oak. The block is 1 1/8 in. thick, 6 1/2 in. wide and 18 in. long. The angle of the incline is such as will place the terminal to be drilled in the right position on the drill press spindle. In this case the incline starts at 6 in. from the end of the base and extends upward until the perpendicular is 9 in. from the end of the base. A 1 1/8-in. vertical reinforcing strip is inserted between



This jig has simplified the drilling process and has decreased the time for drilling thereby increasing the daily output

the base and the incline. A block 6 in. long by 1 1/4 in. thick by 2 1/4 in. high is fastened to the center of the incline. The size of this block corresponds to the pole-piece hole in the center of the field coil. A block 3/4 in. high and 1 1/2 in. wide is fastened across the end of the base 6 in. from the end of the incline to support the end of the field coil. The field coil terminals to be drilled is placed on the incline over the block with the bottom surface resting against the 3/4-in. block.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Helpful Equipment from the

Manufacturers

Protective Panel for 600-Volt Motors

By E. A. BEARDMORE

Industrial Engineering Department,
General Electric Company,
Schenectady, N. Y.

PEAK-LOAD conditions of electric railway systems often result in a considerable decrease in the normal operating voltage. On 600-volt lines this sometimes is reduced as low as 450 volts. When a line breaker on a car or main blows out the inductive kick causes a sudden increase in voltage. In some instances oscillograph tests on third rails have shown inductive kicks of twice normal voltage.

Motors operating from trolley voltage, such as are used for pumps and fan motors, are subjected to inductive kicks and so require some protection in order to prevent flashovers. A special protective panel has been designed for use with standard starting devices in this service by the General Electric Company. On this panel are mounted a voltage relay, time delay relay, a protective resistor, and the necessary contactors to cut out the protective resistor in one or more steps as the individual application may require. When the voltage is reduced to a predetermined value the voltage relay drops out and opens the contactors, which normally short circuit the protective resistor, thus inserting it in series with the motor to be protected. When the inductive kick occurs the voltage relay tends to close, but the time delay relay prevents it from closing before expiration of a predetermined time. When time delay relay operates, it allows contactors to close, cutting out the protective resistor and restoring normal conditions.

Improvements in Side and Center Bearings

SEVERAL improvements in roller side bearings and ball-bearing center plates have been announced by the White Manufacturing Company, Elkhart, Ind. These include the use of chromium plating to prevent rust and corrosion in side bearings, use of heavy felt washers in both center and side bearings to ex-



In this side bearing the rollers are large and the parts are chromium plated



Improved type of ball bearing center plate

clude dirt and water and to retain grease, and an increase in the thickness of castings and the size of rollers. The hardness of the chromium-plated surface eliminates much wear. The internal rollers are held in place by pressed, fitted, and turned steel side plates. All parts are pack-hardened and heat-treated, after which they are chromium-plated. Around each side of the rollers is a heavy felt washer

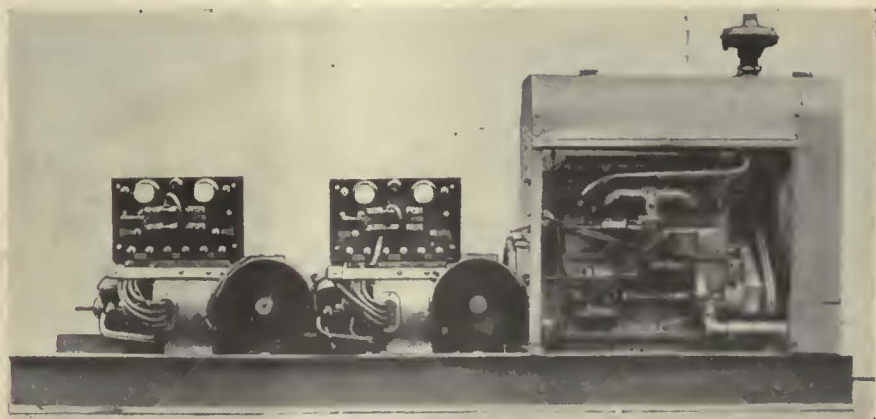
held in grooves which are cast in the malleable-iron housing. These washers are large and heavy enough to give long life and prevent entrance of dirt.

The new center plate castings have increased thickness to withstand bending strains and the thickness under the ball races is increased to withstand ball pressure. The upper plate casting is extended to form a collar down over the lower plate. Under this collar and fastened to the lower plate is a heavy felt washer.

The balls for the center-plate bearings are $2\frac{1}{8}$ in. diameter, made of drop-forged, heat-treated high-carbon chrome-molybdenum alloy steel. Each ball is extremely hard and can carry the full load of the car without showing deflection or possibility of fracture. The bearing has lower friction coefficient than a bronze plate bearing, and is superior to plain friction center plates.

Two-Man Welding Outfit

A TWO-MAN welding machine motored by a single Continental 40-hp. engine is announced by the Electric Arc Cutting & Welding Company, Newark, N. J. Each of the two generators is capable of supplying 300 amp. for metallic arc welding, and the two machines can be connected in multiple to produce full capacity for carbon arc welding. The improvement from existing equipment lies primarily in the use of separate generators, which thus can be run simply to save gas.



Two generator welding outfits driven by a single engine

News of the Industry

More Moves in Chicago "L" Fare Case

A new valuation of approximately \$139,000,000 on the properties of the Chicago Rapid Transit Company will be ready about April 1 for submission as evidence in support of the company's suit to make its 10-cent fare permanent.

The elevated lines are seeking a permanent injunction to restrain the Illinois Commerce Commission from enforcing its order of June 28, 1928, which denied the application of the company to replace its three-for-a-quarter ticket rate with a flat 10-cent fare. The higher rate was put in effect on July 17, however, under a temporary injunction issued by the federal court.

The new valuation to be presented by Rapid Transit engineers will represent an increase of about \$47,000,000 over the valuation of \$92,000,000 presented by the company in the original hearings before the commerce commission in February, 1928.

Although deciding in favor of the city, which had opposed the fare increase, the commission held in its order that the company's return under the old rate was "manifestly inadequate."

Simultaneously with the announcement of a new valuation by the company's attorney, Congressman Frank R. Reid, special assistant corporation counsel, who represents the city in the present hearings, which began Sept. 18, stated that he would ask the City Council immediately for an appropriation to hire engineers and accountants to make an independent valuation of the elevated lines. The City Council has twice failed to vote an appropriation for this purpose.

In the hearings before the commission the city contended that the valuation of the Chicago Rapid Transit Lines should be only about \$60,000,000.

Arbitrators to Interpret New Orleans Contract

Dismissal of the injunction suit paves the way for peaceful arbitration of the dispute between members of the union and the New Orleans Public Service, Inc., over labor contracts. Union officials have announced they have selected Francis Williams, chairman Public Service Commission, as their member of the board of three arbiters. The Public Service previously announced Gustave Lemle as its selection. Messrs. Lemle and Williams are to select the third member, and if they can not agree, the chief justice of the Louisiana Supreme Court is to make the selection.

In terminating the injunction suit intended to restrain the men from putting into effect their threat to strike,

Edward Rightor, attorney for the railway union officials, explained to the court that the act complained of—issuance of the suspension of work order—had been recalled and nullified, and that both sides had agreed to arbitrate their differences.

Judge Cage issued the temporary restraining order when the union officials seemed on the eve of calling a strike. He cited the union leaders to show cause why the injunction prayed for should not be issued.

The New Orleans *States* said:

Both the corporation and its employees have shown consideration for the public agreeing to arbitrate their differences rather than let a suspension of transportation come about. The trouble between them is not a question of hours or wages. It is only one of interpretation of the contract as regards the rights of the two sides and there is no reason why this cannot be determined, if not to the entire satisfaction of both, at least with less damage to the corporation and its varied forces than a strike would entail.

Mr. Storrs Accepts Baltimore Appointment

Managing director of the American Electric Railway Association to start at once intensive study of problems of United Railways & Electric Company—asks forbearance

LUCIUS S. STORRS, managing director American Electric Railway Association, will become executive chairman of the board of directors of the United Railways & Electric Company, Baltimore, a position which was tendered him several weeks ago by the directors of the company. He will assume his new duties on April 1, in the meantime dividing his time between Baltimore and New York. Mr. Storrs will move his family to Baltimore and will withdraw from all other activities.

The new executive head of the Baltimore company plans to spend the next few months in an intensive study of the situation as it exists in the city. In the meantime he has requested that he be relieved from answering any questions which, although natural, should be answered only after he has had an opportunity fully to study them.

Early this year the directors of the United decided to invite Mr. Storrs to become the executive chairman of the board. He had the offer under consideration until March 19, when he made known his decision.

Mr. Storrs' statement, in full, is as follows:

Several weeks ago, the directors of United Railways & Electric Company asked me to become associated with the proposed executive chairman of the board.

It was not an easy matter for me to decide, for I have found an intense interest in my present duties which involve study of all of the electric railway systems of the country, their policies, management efforts to improve service, the determination through experience of what was practical and what was theoretical.

The directors and officers of the railway at Baltimore and a number of Baltimore public officials have impressed upon me the recent growth, development and increase of population in this territory, and the desirability of working out for Baltimore a future transportation system that will keep pace not only with development, but will look years ahead and help to promote that development.

I have decided, therefore, to accept the office and will take hold on April 1. At that time I expect to move my family to Baltimore and withdraw from all other activities, so as to be able to give undivided time and attention to the transportation problems of that city.

I was greatly impressed also by the favorable condition offered by Baltimore as a city in which to live and work. Friends connected with railroads and new industries, who have come to Baltimore to live, have all expressed their gratification and contentment with the living conditions here, the high character and friendly attitude of the people.

The city, with its climatic and economic advantages, presents the greatest possibilities for continued industrial expansion. My own experience in other cities

The First Issue of *Electric Railway Journal News*

Will Be Published
April 6, 1929

News of the Industry for
Busy Executives

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RAILWAY JOURNAL MONTHLY is
published.

shown that healthy industrial progress needs a sound and progressive transportation system. We must not only meet present conditions, but project our minds into the future.

The transportation problem is equally that of the railways and the city. Under regulated ownership, the problem becomes one of even greater import to the city and public. The company must present its problem fairly and on the basis of its knowledge and experience. The decision as to what is wise rests with public officials and the public. We must try to prevent them from making mistakes, try our hardest—for, after all, the people generally cannot study every problem. They look for honest guidance and advice from those whose duty it is to study the problem and who have made this their life work.

I shall faithfully endeavor to aid in the solution of these problems and in the development and expansion of the transportation system, and I believe that all those equally interested in the growth of the city will be willing to lend their aid and guidance free of the bias and prejudice that too often creep in among people who really have a common interest and the same purpose in view.

With this spirit of co-operation we can develop a creditable system of transportation that will be an effective agency in healthy living conditions, which are dependent upon quick and efficient transportation, and an efficient agency in the future expansion of Baltimore.

Finally, I am going to ask my new friends to give me a few months in which to study intensively the situation as a whole and in detail, and not to ask me just now questions which may seem natural, but should be answered only after full study and thought.

In the meantime my door is wide open, especially to those who are critical of the company, as I want their advice as well as that of the fine staff of men now connected with the company.

Piedmont & Northern Resumes Fight on Extension

The Piedmont & Northern Railway has taken the first step toward carrying its fight to the United States Supreme Court for the right to connect its North Carolina and South Carolina divisions. Notice has been filed in the United States District Court at Greenville, S. C., of appeal from a decision of Judge Morris A. Soper, upholding refusal of the Interstate Commerce Commission to grant the road permission to build a line connecting the two divisions between Spartanburg, S. C., and Gastonia, N. C. The Piedmont & Northern, an electric line, also sought permission to extend its lines to Winston-Salem, N. C. Besides the United States of America, the notice of appeal lists the Seaboard Air Line, Atlantic Coast Line, Louisville & Nashville, Carolina, Clinchfield & Ohio of Southern Carolina, and Clinchfield & Northern of Kentucky, as opposing the link.

The Piedmont & Northern, a Duke enterprise, has been seeking permission for some time to build the Spartanburg to Gastonia link. The Interstate Commerce Commission refused permission on the ground that the proposed route would parallel the Southern Railway between Charlotte and Spartanburg,

Need for Steam Railroads to Plan Ahead

Pennsylvania Railroad to save millions in capital investment by buying energy for train operation in Eastern zones. General Atterbury declares power industry a specialized business

GENERAL W. W. ATTERBURY, president Pennsylvania Railroad, at a luncheon of the Boston Chamber of Commerce, on March 14, discussed at length the present status and the outlook of the railroads. After referring to his own company's \$100,000,000 electrification program east of Harrisburg, General Atterbury said, in part:

I believe this electrification, looking a generation or so into the future development of the Eastern part of the country, is more than an ordinary expansion of railroad facilities. It is typical of the projects which business men of this country should be encouraging the railroads to undertake.

My conception of the railroad industry is fundamentally a simple one; namely, that the railroads must plan at least a decade ahead of general industrial progress to provide adequate facilities. You cannot shut down on a railroad and then tool it up for new production overnight. Business and population growth, economic changes that may affect whole industries, improvements in railroading itself, must all be anticipated; then sufficient net earnings must be available to provide the required expansion of facilities.

It must not be thought that extension of electrified railroad lines implies that the days of steam transportation are ended. On the contrary, steam power is basic to railroad operation. Special conditions of a densely populated, rapidly growing district, however, make electrical operation desirable in some instances. In other words, the new era in railroading will not supplant the old, but will supplement it.

Because of the greater volume of traffic and the greater economy of electrification as compared with steam operation in dense traffic, this electrification ultimately will pay for the very high cost of its installation.

ADVANTAGES OF ELECTRIFYING DENSE TRAFFIC

This electrification will cost about \$100,000,000, which is an enormous sum of money for a corporation to spend on improving its ability to serve. It is obvious that it cannot be spent at once, but must be spread over a period of seven or eight years. It is equally obvious that it should not be spent at all unless it is necessary. The directors of the Pennsylvania Railroad did not start this work until exhaustive studies had been made of the whole industrial and transportation situation in the East, including the terminal developments of Philadelphia and Newark. It was foreseen that by 1950 the metropolitan area around New York would probably extend to New Brunswick on the west and well out on Long Island on the east, and contain 30,000,000 people, besides development in other cities.

In this special traffic situation electrification became an essential development. First of all, it will result in the ability to handle much greater traffic in a shorter period of time. By the method of operation proposed we expect eventually to reduce the number of freight trains 50 per cent for a given car movement and increase the speed. This of itself provides 100 per cent increase in capacity in so far as

freight movement is concerned. For passenger trains we expect to eliminate all double-heading and most of the second sections, and also to avoid the possibility of rough handling due to limited starting capacity.

ECONOMIES OF PURCHASED POWER

An interesting and significant comment upon purchased power and its value was then made by General Atterbury in response to a previous inquiry as to why the Pennsylvania had decided to take so important a step as contracting for the electrical supply for its train service in this vital area. Putting aside his prepared notes for a moment, he said:

I have been asked why we are to buy our electricity for this development. One of the best assets a railroad can have is cheap electricity available along its lines. The day of the individual industry's manufacturing its own power has passed. We worked out a jointly-owned power plant scheme with the United Gas Improvement Company and the Philadelphia Electric Company, but decided not to go into it. Why should we enter the power business? We have no warrant to go into that business, which is an industry in itself. By the time we are ready to use it we shall be buying power cheaper than we can make it ourselves, thereby saving a capital investment of from \$20,000,000 to \$30,000,000 over a great number of years.

It is a serious matter for me to recommend to our directors the issuance of say \$100,000,000 in new capital stock. When we get that money we become trustees for it and have a solemn duty to earn and pay a reasonable return on it. We take a real risk in estimating the volume of traffic that will be available with which to earn that return, and it is vital for use to feel sure that the public, through its legislative and regulatory authorities, will permit us to earn enough to pay a fair return to our stockholders.

The next decade will see measures taken with the view of insuring every industry a fair share in the country's prosperity. It is highly important to everyone that the railroads, which have contributed so much to make prosperity possible, shall be permitted to share in it so as to continue in the vanguard of business and industrial progress.

Suggestions to Picnickers on South Shore Route

The Chicago, South Shore & South Bend Railroad recently issued an attractive new folder giving hints on desirable picnic spots along its lines. It is well illustrated with halftones and reproducers of pen and ink drawings of such popular resorts as Hudson Lake, Washington Park, Michigan City, and Grand Beach, Mich. The principal appeal is made to chairmen of company picnic committees, with a view to interesting large special parties. The convenience of the South Shore Line's fast direct service and six express stops in Chicago is emphasized.

Transportation Sold from Door to Door in Roanoke

The Roanoke Railway Electric Company, Roanoke, Va., has started a system under which six employees have begun a canvass of the entire city to sell the public the idea of riding street cars and buses and also dispose of weekly passes and tokens.

Four young women and two young men were assigned certain districts in which to make a house-to-house canvass. All sections of the city will be covered by the young women, save the north east, which along with the business district, will be serviced by the young men.

Through the plan, it is hoped to bring to the housewives' attention the saving to be realized by riding the street cars and buses and furnish them tokens and weekly passes at their door, thus eliminating any confusion in making change on the buses and cars and the subsequent delays.

The canvassers will also find out how many in each home use street cars and buses, and if there is none using these services, they will seek to learn the reason.

Starting on March 20, the canvassers handled passes for the current week, the sale to continue each week through the following Tuesday night. Tokens will be sold at any time.

New Fares in Vancouver

After negotiations between W. G. Murrin, president, and other officials of the British Columbia Electric Railway, and the Vancouver City Council, in connection with the renewal of franchise, the following street car fares have been agreed upon: 7 cents cash; four tickets for 25 cents; 17 tickets for \$1 between the hours of 9 a.m. and 4:30 p.m. week days and all day Sundays. The city's percentage will be cut to \$120,000 a year.

These conditions will be in effect for the next three years. Under the previous agreement the fares had been: 6 cents cash; six tickets for 35 cents in city area; ten tickets for 70 cents in suburban area; childrens' tickets ten for 25 cents.

Some interesting figures covering the electric railway situation in Canada were presented by the company in stating its case. In the year ended June 20, 1928, the net profits of the Vancouver city and suburban system were \$233,217 on a total investment of \$10,118,835, or a return of only 2.31 per cent.

In addition the company claimed that the expense of operation is increasing, and advances the following reasons: The increasing use of automobiles; increasing peak-hour traffic and decreasing non-peak-hour traffic; increasing average length of ride, owing to the spreading out of the city; higher wages to employees and traffic congestion.

The British Columbia Electric also explained that, while the population of Vancouver has increased 31 per cent

since 1921, street car riding has increased only 16 per cent. The company finds it necessary to operate 46 more cars in the peak hours than it did in the corresponding hours of 1922. It has to employ 114 additional conductors and motormen, and has to pay \$260,000 additional each year to cover increased wages. The traffic on long distance lines has increased but traffic on short distance lines has decreased.

The company concluded its case by stating that the problem is not only to allow an adequate fare, but to decide how to co-operate with the company so that it may continue to supply adequate transportation to the people of Vancouver. Transportation cannot be provided indefinitely by the company at a loss.

Slight Damage to Alabama Railways

Recent Alabama floods damaged electric railways but little, as the heaviest floods were in southeastern Alabama where there are no electric railways. In the eastern and western sections of Birmingham a number of streets was inundated, stopping street car service for several hours. Some slight damage was done to tracks and fills. In Montgomery street cars were tied up on some streets for several hours due to high waters, and a slight financial loss was suffered. In the flood district of southeastern Alabama many state highways were flooded for several days and were badly damaged by racing waters. This has greatly retarded the bus service in the vicinity of Troy, Andalusia, Elba, Brewton and other places.

Tightening Traffic Restrictions in Nashville

Several important changes in the laws governing the movement of traffic in Nashville, Tenn., affecting the central part of the city were recommended at a recent meeting of the traffic committee of the City Council. Probably the most important change proposed by the committee is that during what is known as the rush hour between 5 and 6 p.m., no automobile will be allowed to turn into Church Street from Fourth to Seventh Avenues, inclusive. According to members of the committee, this is supposed to eliminate the parade of cars that congest traffic on Church Street at that time in the afternoon, and will allow street cars to move freely.

Other revisions of the Nashville traffic code suggested by the committee were that parking be allowed on the south side of Union Street for one hour; no parking on either side of First Avenue from public square to Mulloy Street; no parking on the east side of Third Avenue from the public square south to the railroad. It also was recommended that the present speed law of the city be increased to 30 m.p.h., to conform with the state law.

Former Commissioner Suggests New Deal in Philadelphia

J. Henry Scattergood, former member of the Public Service Commission of Pennsylvania, believes reasons exist for a review of fares on the line of the Philadelphia Rapid Transit Company. Expenditures, its large reserves for "maintenance and depreciation" and its policy of paying losses of some years ago out of present fares. He feels that a movement of this kind should be carried on by the municipality. It would be too big for any private individual or group to undertake. He said:

With that in mind I told the utilities committee of the Philadelphia Chamber of Commerce that Philadelphia needs a city administration with backbone to stand up for the public interest against the traction interest, and I will add now that the people, with that thought definitely in mind, should strive to get such an administration.

I believe it is desirable that justice shall be done to the Philadelphia Rapid Transit Company, as well as to the city. In this underliers-purchase plan I believe also that justice should be accorded both the city and the underliers. That is a reason I strongly favor passage of the Woodward bill and of the new measures designed to place in the hands of the Public Service Commission the power to review and, if necessary, to revise the rentals and leases between the P.R.T. and the underlying companies.

Token Purchase in Sioux City to Benefit Regular Patrons

An agreement has been made between the Sioux City Service Company, Sioux City, Ia., and the City Council whereby the regular railway patron may obtain rides for 7.6 cents through purchase of \$1 worth of tokens at a time. The cash fare has been raised to 10 cents, under the franchise provisions, but three tokens are sold for 25 cents and the steady patron has opportunity to ride for practically the same tariff as has prevailed in recent months. E. L. Kirk, vice-president and general manager, said that continuance of the sliding tariff depended upon customer response to the offer, but that the plan would be tested thoroughly.

Vacancies on the District Utility Commission

One of the important local questions confronting President Hoover is the filling of vacancies existing and soon to exist on the Public Utilities Commission for the District of Columbia. Colonel Brand's appointment lapsed by reason of the Senate's failure to take up his confirmation. The term of Mr. Childress expires on June 30. As the *Washington Evening Star* sees it the District needs a full commission, sitting full time, to devote thought and study to the various utility questions, having in mind, it would appear, the agitation for the consolidation of the local street railway and also the imminence of the plea for changes in fares.

New Deal in Tacoma

Plan outlined under which company in Pacific Coast city will be returned to local control

ACCORDING to information received by M. G. Tennant, Mayor of Tacoma, Wash., an agreement has been reached between bondholders of both the Tacoma Railway & Power Company and the Puget Sound Electric Company with Stone & Webster, Inc., by which the Tacoma Railway & Power Company will be rehabilitated and placed under the virtually complete management of Richard T. Sullivan, present local manager.

Mayor Tennant received this information in a letter from Attorney Scott Z. Henderson, receiver for the Puget Sound Electric Company, which is the holding company for the Tacoma Railway & Power Company. Mr. Sullivan declares there will be no request for new franchises at this time, there will be no revaluations for rate-making purposes, and there is no intention either to ask a change in fares.

It will be about April 1, Mr. Sullivan states, before all the legal steps in the change of control and management can be consummated. Mr. Sullivan admits that the announcement of the change of management has been hastened over first intentions by the fact that the City Council has up for consideration the proposed agreement between the Tacoma Railway & Power Company and the city for the settlement of paving, bridge construction, track changes and other matters involved in pending public improvements and in franchise requirements.

Last December the Mayor addressed a caustic letter to Mr. Henderson calling attention to the fact that the Tacoma Railway & Power Company had not been put into a receivership as had been promised at a meeting in New York last spring between bondholders and him and threatening action to bring the matter to a head.

It was during a visit by Mr. Sullivan to the East in January that bondholders agreed to invest further substantial sums for rehabilitation of the Tacoma system. Because the plans for the reorganizations still depend, in a measure, upon the receivership of the Puget Sound Electric, details of rehabilitation, changes of personnel, revision of the system and other phases could not be made public at this time. Mr. Sullivan will move towards the substitution of bus service on the Pacific Traction line to the Lake district, on the Midland and Spanaway lines and perhaps others.

Stone & Webster, as holder through its subsidiary, the Puget Sound Power & Light Company, of \$4,895,000 second-mortgage bonds of the Puget Sound Electric, might be said still to have some interest in the local properties, under the reorganization plan, but Manager Sullivan asserts that since the second-mortgage bonds are practically worthless, the concern of Stone &

Webster in the matter is nominal. The Puget Sound Power & Light Company owns all the stock of the Puget Sound Electric, just as the latter owns all the stock of the Tacoma Railway & Power Company and the Pacific Traction Company.

The Puget Sound Electric under receivership has discontinued the Tacoma-Seattle interurban line, but certain properties of the Puget Sound Electric used by the Tacoma system have been reserved. These include all the yards, the Portland Avenue, the one-man and some larger cars, now under rental by the Tacoma Railway & Power Company from the Puget Sound Electric Company.

In the meantime, the City Council and Mayor Tennant, who have been discussing the problem of how leniently to deal with the railway in the matter of paving between tracks, relaying tracks, and conforming to new grades, all subjects in which the company is involved, are divided in their opinions. One group is inclined to take an uncompromising attitude, while the other appears to be disposed to allow the company several years time in which to do all the work demanded of it.

Hertz Interest in St. Louis Bus Sold

The International Utilities Company, operating public utility properties in this country and Canada, has purchased from John Hertz, Chicago, Ill., for approximately \$1,750,000 an interest in the People's Motorbus Company, included in the system of the St. Louis Motor Coach Company, part of whose stock in turn is held by The Omnibus Corporation, controlling lines in New York and Chicago.

Richard W. Meade, president People's Motorbus Company, declined to comment, as his company was not a direct party to the transaction.

In 1924 interests behind the reorganization of the United Railways, St. Louis, endeavored to purchase the People's Motorbus Company, but satisfactory terms of sale could not be arranged.

Lancaster Objects

PATRONS of trolley cars operated by the Conestoga Traction Company will no longer be entertained or annoyed by the merry humming or tuneful warbling of motormen.

The whole happy world for carmen collapsed on March 10, when company officials posted notices warning employees to cease further attempts at grand opera and jazz.

Railway officials said that tired office workers had complained that the whistling and humming motormen annoy them when they are homeward bound. — Philadelphia Ledger.

Virtual Agreement Reached on Chicago Traction Settlement

Representatives of the Chicago Surface Lines, the Chicago Rapid Transit Company and the City Council subcommittee on local transit matters have tentatively agreed on enabling legislation for consolidation of all local transportation systems in the Chicago metropolitan area.

Five legislative bills drawn by the citizens' traction settlement committee, after more than two years of futile discussions between the city and the companies, were approved in general form at a joint meeting on March 19. Facts disclosed on March 21 that company lawyers have dropped the demand that home rule be made contingent on granting of a terminable permit to which the city had objected. This was the last obstacle to the agreement on enabling bills and City Council will be asked to approve them.

The major provisions of the enabling measures are as follows:

1. Authorizing the city to grant a terminable permit and name conditions upon which it is issued, such as how it may be terminated, the rate of return to be allowed the grantee, and the number of miles of extensions and amount of new equipment to be added each year.

2. Amending the cities and villages act, restricting the term of traction franchises to twenty years, by allowing the city to grant franchises for a fixed term of years, the number to be decided by the City Council.

3. Amending the general corporation act to allow the organization of a corporation to acquire street and elevated railways, buses and other forms of local transit facilities in Chicago within a 30-mile radius of the city limits.

4. Authorizing the city to build subways and to finance them by levying special assessments against owners of property especially benefited, through use of the \$50,000,000 traction fund now in the city treasury, and by means of special bonds payable out of subway earnings, or by all three methods.

5. Restoration of home rule to the city through a commission of three members who would be appointed by the Mayor, subject to approval by the City Council. The commission, having jurisdiction over all local transportation lines in the 30-mile metropolitan district, would exercise all the powers now vested in the Illinois Commerce Commission.

Upon obtaining the approval of Judge Wilkerson, under whose supervision the Chicago Railways is now being operated, the bills will be submitted to the City Council for indorsement and then presented to the General Assembly for enactment. This step would be followed by the drafting of an ordinance creating the franchise, which would be submitted to a referendum of the voters.

The settlement plan has been approved, in general, by Samuel Insull, chairman Chicago Rapid Transit Company; Henry A. Blair, receiver for the Chicago Railways; Leonard A. Busby, president Chicago City Railway; and John Hertz, chairman Chicago Motor Coach Company.

No-Accident Vacations for Gary Men

Eighty trainmen of the Gary Railways, Gary, Ind., or approximately 73 per cent of the total number employed, have operated their cars through the year 1928 without being charged with a single accident. Each honor man will receive as a reward a five-day no-accident vacation in addition to his regular annual service vacation.

Although street traffic in 1928 was probably heavier than in previous years, the number of public accidents in which Gary Railways cars and motor coaches were involved showed an actual decrease of 33.4 per cent over 1927. Each month in 1928 showed a decrease in the number of accidents over the corresponding month in 1927. Collisions between cars were reduced 53 per cent in 1928. The number of miles operated by a car without accident was 1,700 miles greater than in 1927.

Monthly safety meetings held by the company are well attended by the trainmen. At them officials talk on the subject of safety, and the operators make suggestions for the correction of unsafe practices and conditions.

Trainmen on the Gary-Hobart interurban division were the stars of the Gary Railways system last year. They had a perfect record.

All Twin City Lines Included in Fare Decision

With a new rate of fare in effect in Stillwater and Bayport on the Minneapolis & St. Paul Suburban Railway, all lines of the Twin City Rapid Transit Company are affected by the recent decision of the Minnesota Railroad and Warehouse Commission giving the advanced rate of 10 cents or six tokens for 45 cents in the Twin Cities. The neutral zone between Stillwater and Bayport is out of existence and the uniform new fare is in operation. Formerly a 6-cent fare was charged in Stillwater to a neutral point, then 4 cents in Bayport.

The Suburban company petitioned the commission on Nov. 15, 1928, for an increase, but it was not effective until after the new Twin City rates had been made. The change in the Minneapolis rate affects the Lake Minnetonka line at the Minneapolis end within the city limits.

Extension of Time for Electrification

The New York Senate has passed the Thayer bill, amending section 53-A of the public service commission law, stating that the time within which a railroad is to comply with the commission's order to electrify within certain city limits shall not be extended beyond seven years after Jan. 1, 1926. Previously the extension of time had been limited to five years.

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 5—Metropolitan Section, American Electric Railway Association, 33 W. 39th Street, New York, N. Y.

April 12—Maryland Utilities Association, Annual Meeting, Hotel Emerson, Baltimore, Md.

May 1-3—Indiana Public Utilities Association, Indiana Gas Association and Indiana Electric Light Association, annual joint convention, Hotel Gary, Gary, Ind.

May 13-15—National Highway Traffic Association, annual meeting, Stevens Hotel, Chicago, Ill.

May 15—Association of Electric Railway Equipment Men, Middle Atlantic States, semi-annual meeting, Wilmington, Del.

June 3-6—National Association of Purchasing Agents, Annual Convention, Hotel Statler, Buffalo, N. Y.

June 5-7—Canadian Electric Railway Association, annual convention, Montreal, Quebec.

June 21-22—New York Electric Railway Association, Bluff Point, N. Y.

June 27-28—Central Electric Railway Association, Michigan City, Ind.

July 24-26—Electric Railway Association of Equipment Men, Southern Properties, Lexington, Ky.

Aug. 15-16—Wisconsin Utilities Association, Transportation Section, Hotel Northland, Green Bay, Wis.

Sept. 28-Oct. 4—American Electric Railway Association, 48th annual convention and exhibit, Atlantic City Auditorium, Atlantic City, N. J.

Controversy Over Counsel Fees in New York

Charles Evans Hughes was paid a fee of \$75,000 for his appearance before the Supreme Court in reargument of the 5-cent fare case of the Interborough Rapid Transit Company. A statement of expense, together with others, totaling \$817,000, has been filed with the New York Transit Commission by the Interborough as "operating expenses." The Interborough contends that expense of its litigation should be charged to operation. The Transit Commission, however, has served notice that fare litigation costs will not be allowed as operating charges. Other legal fees contained in the Interborough's statement of litigation expenses are: William L. Ransom, special counsel, \$120,000; G. W. Wickersham, special pleader at the original Supreme Court hearing, \$25,000; Harry L. Butler, counsel for the Manhattan Railway, owner of elevated lines, \$55,000.

Maintenance Problems Occupy C.E.R.M.M.A.

The Central Electric Railway Master Mechanics' Association, meeting in Youngstown, Ohio, on Feb. 14, busied itself with proposed alterations in its recently published standards on uniform charges and interchange equipment maintenance, a consideration of carbon brush performance and a discussion of a prepared list of questions relating to specific maintenance practices.

"The ideal carbon brush," said J. V. Dobson, chief engineer Stackpole Carbon Company, in his paper on the proper application of carbon brushes, "must have strength, be able to withstand severe vibrations incident to road shocks, be hard, capable of resisting abrasion and dusting away. Contact drop between brush and commutator should be high, electrical resistance low and brush friction low."

In discussing the question of brushes sticking in their holders, Mr. Dobson scouted the idea that carbon actually swelled under service conditions. "It is difficult," he said, "to conceive how a carbon brush that has been subjected during manufacture to a graphitizing temperature of 3,000 deg. C., a temperature above the melting point of practically all metals, can contain anything but carbon, graphite, and a very small percentage of ash residue from iron, copper or silica. At this graphitizing temperature the brush material takes its final shape as has been verified from many tests."

"This refers, of course," continued Mr. Dobson, "only to brushes usually used in railway work, which are electro-graphitic and therefore baked at a very high temperature. It does not consider the so-called "doped" brushes filled with a lubricating material such as paraffin that is not baked out afterward."

Mr. Dobson pointed out that the railway motor has the advantage over strictly industrial types of doing a considerable amount of running under no-load conditions as in coasting and braking periods. This, when no power is being applied to the commutator, is very effective in cleaning and polishing it, correcting to a large extent the damage of the heavy accelerating current which may have immediately preceded. He concluded by saying that this, in a measure, was the reason why the railway motor can safely withstand greater duty both under current density and at high commutator speeds.

Following luncheon at the Poland Country Club as guests of the Pennsylvania-Ohio Power & Light Company, the association elected officers for the ensuing year. A. J. Challeen, superintendent of shops and equipment Detroit United Railway, was elected president; E. J. Jonas, superintendent of equipment Cincinnati Street Railway, was elected vice-president; L. E. Earlywine was re-elected secretary; Charles Sigler, T. H. Nicholl, J. W. Osborn, and J. B. Corderman were elected to the executive committee. The spring meeting will be held in Lima.

Recent Bus Developments

Equitable Grant Still Being Discussed in New York

Comptroller Berry, of New York City, reported to the Board of Estimate on March 18 that Edmund L. Mooney, counsel for the Equitable Coach Company, holder of the bus franchise for Manhattan, Brooklyn and Queens, had informed him on March 16 that it would be unable to proceed with the inquiry "at the present time" because all of its energies were engaged in getting a certificate of necessity and convenience. The application to the Transit Commission to reopen the hearings was made several hours after the Board of Estimate session ended. Mayor Walker suggested "that the comptroller be requested to communicate again with Mr. Mooney and find out what he means by that language—whether he means they will be ready to appear before the comptroller in a day, a week or a year."

The bus company is still a suppliant before the Transit Commission in its endeavor to perfect its rights and was notified to appear before that body on March 21 when hearings on granting a certificate of necessity and convenience were resumed. The session continued during the day and was then adjourned until March 27. The company must obtain this certificate by April 1 before it can have the right to operate buses.

Illinois Senate Passes 3-Cent Gas Tax

The 3-cent gasoline tax, sponsored by Governor Louis L. Emerson in the Illinois General Assembly, passed the State Senate recently by a vote of 35 to 14. In the upper house the chief objection to the measure came from Chicago and Cook County delegations, who claimed that the state's most populous city and country would be deprived of their proper share of the revenue to be derived from the bill. As passed by the Senate, the bill contained Governor Emerson's recommendations that 2 cents of the tax should go to the state and 1 cent be returned to the county from which it was derived. The Chicagoans asked for an equal split. Amendments urged by Cook County members are expected to be discussed in the House of Representatives shortly.

Amsterdam Certificate Reasonable

The Public Service Commission affirmed on March 19 its action of Oct. 18 last in granting a certificate for the operation of a bus line by Charles Vollmer over certain streets in Amsterdam, N. Y., following a rehearing had on the petition of the Fonda, Johnstown & Gloversville Railroad. This railway al-

leged that Mr. Vollmer was violating conditions in his certificate prohibiting carrying local passengers in Main Street and that his bus operations were affecting the income of the trolley line.

In its ruling the commission held that from the evidence at the rehearing, it was not demonstrated that the action of the commission in granting a certificate to Vollmer was in any respect unjust or unwarranted. The commission further held that the railroad, on the rehearing, was unable to show that there had been any considerable violation of the restriction against carrying local passengers and from the evidence of witnesses called by the bus operator, it appeared that Mr. Vollmer had been making every reasonable and proper effort to enforce the provisions of his certificate.

City Versus State in Chicago

A rehearing of the case involving the right of the city of Chicago to require a license and otherwise regulate buses operating over its streets was asked recently in a petition filed by the Chicago Motor Coach Company in the Illinois Supreme Court at Springfield. In a decision handed down on Feb. 18, the court ruled that cities have full jurisdiction over the use of their streets by buses even though the company first obtained permission to operate from the Illinois Commerce Commission. The decision established the validity of ordinances of the city of Chicago which require such a franchise.

The coach company operates in Chicago under authority of the Illinois Commerce Commission and by permission of the local park boards. It asserts in its brief that "no prior decisions require the conclusion which this court has reached."

Preliminary Steps Toward St. Joseph Installation

The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is awaiting permission of the Missouri Public Service Commission and the City Council to institute motor coach service on the Messanie Street line for a trial. If service by bus proves successful it is intended to substitute buses for the railway cars. The change would mean an expenditure of approximately \$150,000 for new equipment, according to C. A. Semrad, general manager. The motor coach service on the Grand Avenue line has proved satisfactory and it is believed that the change on the Messanie Street line will prove popular. Because of the larger number of passengers and the greater length of the Messanie line it is planned to use larger coaches than those used on Grand Avenue.

Service Routes in Jamestown Combined

In an effort to secure more economical operation the Jamestown Motor Bus Transportation Company, subsidiary of the Jamestown Street Railway, Jamestown, N. Y., has combined its North and South Side bus routes. Another important change has been the elimination of the p.a.y.l. system in favor of the p.a.y.e. system on all lines with the exception of the one operating between Jamestown and Greenhurst, conforming to the practice of the Jamestown Street Railway.

Mitten Tours Expand

Further to supplement its through motor coach service from Washington to New York via Baltimore, Wilmington and Philadelphia, Mitten Tours, intercity motor coach lines, owned by the Pennsylvania Railroad and the Philadelphia Rapid Transit Company, began hourly operation of motor coaches between Baltimore and Washington on March 15. Service from Baltimore will be every hour on the hour from 8 a.m. to 8 p.m., then 10 p.m. and 12 midnight from the Union Bus Terminal, Liberty and Redwood Streets. Service from the International Tours terminal, Washington, will be hourly from 8 a.m. to 8 p.m., then 9:30 p.m. and 12 midnight. The noon coach, however, from Washington will leave at 12:15 p.m. Running time between Baltimore and Washington is one hour and 35 minutes. Between Baltimore and Washington the one-way fare is \$1.25 and round trip \$2.25.

Three coaches from Washington, the 9 a.m., the 12:15 p.m. and the 9:30 p.m., will carry through passengers to New York, via Philadelphia. The schedule in Washington has been co-ordinated with the leaving and arrival times of the Richmond, Fredericksburg & Potomac Transportation Company, rendering motor coach service to Richmond and Fredericksburg, Va., and with the Greyhound-Florida lines for Jacksonville and Miami, Fla.

On Jan. 31 the Pennsylvania, following its plan of rail and motor coach co-ordination, purchased a substantial interest in the People's Rapid Transit Company, Inc., (known as Mitten Tours) and operated by the Philadelphia Rapid Transit Company. The Philadelphia transit organization still maintains an interest and it will continue to operate the service under the supervision of Mitten Management, Inc.

Substitution on Eighth Avenue, New York, Urged

Eighteen civic associations asked the committees of the whole of the Board of Estimate of New York on March 18 to scrap the cars and tracks of the Eighth and Ninth Avenues Railway and to substitute a system of buses. The petition asking that such action be taken was signed by representatives of the

civic associations at a luncheon on Feb. 27. The removal of the surface car lines is asked on the ground that they obstruct traffic and hinder the development of the districts through which they pass. According to the civic groups, the railway has expressed willingness to exchange its 99-year franchise for a short-term bus franchise.

Extension of Service by Pacific Electric

A certificate of public convenience and necessity has been granted by the Railroad Commission to the Pacific Electric Railway to operate motor coach service for the transportation of passengers between Wingfoot in Los Angeles, and the Ford Plant in Long Beach. This is subject to the provision that no local service be performed between Orange Avenue and Olive Street in the city of Compton, and between the intersection of Anaheim Street and Badger Avenue in the city of Long Beach, and the Ford Plant.

Meter System in Worcester by May

Possibility that the competition with which the Worcester Consolidated Street Railway, Worcester, Mass., has had to contend both on its bus and trolley lines because of a 35-cent flat fare for taxicabs may be eliminated, is seen in the recent move in Worcester, Mass., to have the taxis return to the meter system by May 1.

The license board of the city is not satisfied that the flat rate has worked out well and has given its unofficial approval to the 15 and 5-cent basis of charge rather than the old 30 and 10-cent plan in effect before meters were abolished.

The plan is opposed by taxi patrons who, by clubbing together, have been taking advantage of the flat rate much to the disadvantage of the railway.

The number of taxis has increased about 50 per cent since Oct. 1, while the number of drivers has tripled since that time. Mayor O'Hara has informed the license board that he is opposed to any further increase in numbers. On Oct. 1, the date of the introduction of the 35-cent flat-rate fare by the entry of the Ring Cab, Inc., into the field, 224 taxicabs and 423 drivers were licensed in the city. At present there are 1,146 licensed drivers and 355 licensed cabs.

Toledo High School Students Swell Bus Receipts

Special bus service operated by the Community Traction Company, Toledo, Ohio, for high school students in February carried 18,000 passengers and brought in a net profit from operation of \$520. Total revenue was \$1,339 and expenses \$818. The revenue of 40,074 cents per mile was highest in the entire bus operations of the company.

Financial and Corporate

First Common Dividend by Eastern Massachusetts

On April 1 the Eastern Massachusetts Street Railway, Boston, Mass., will pay its first common dividend of the public trusteeship, which began early in 1919. The 37½-cent payment ordered by the trustees was not labeled a quarterly dividend, but the opinion of the Boston News Bureau is that in the road's strong financial condition is found basis for the belief that the stock is now on a 37½-cent quarterly basis.

After all charges and dividends on senior stock issues the Eastern Massachusetts in 1928 earned \$1.55 a share on the 82,664 shares of common outstanding. This is a shade larger than common dividend requirements at a 37½-cent quarterly rate. Signs are not wanting that the new managerial régime in the Eastern Massachusetts is committed to the policy of its predecessors of going vigorously after business and low-operating ratio. If the result is to increase the net earnings the common dividend would then naturally appear to be so much more secure. The News Bureau says:

After the maturity of \$3,352,000 Lynn & Boston bonds on Dec. 1 next is out of the way, which amount incidentally will be met from treasury cash and investments the Eastern Massachusetts will have no obligations coming due until Jan. 1, 1948. This freedom from nearby maturities, combined with a strong showing as to current assets, constitutes an unusual condition of affairs for an electric railway in these times.

Circuit Court Affirms St. Louis Fare and Valuation Finding

City Counselor Muench, of St. Louis, Mo., is preparing to carry to the Supreme Court the city's fight against the straight 8-cent fare and \$66,000,000 rate-base valuation, awarded the St. Louis Public Service Company by the Missouri Public Service Commission. On March 12 the Circuit Court for Cole County affirmed the commission's order in the fare case. The commission's ruling was handed down on June 21, 1928, and the 8-cent fare went into effect on July 1, 1928.

Of the \$66,000,000 value placed on the property the commission decided \$63,500,000 represented tangibles used or useable for service. The values are as of Jan. 1, 1927. This valuation is an increase of \$14,000,000 over a tentative value of \$52,000,000 fixed by the commission in June, 1927, when the company was granted a temporary fare increase from 7 cents to 8 cents, with two tokens for 15 cents, pending a final order.

In its appeal to the Supreme Court the city will contend that the commission did not give proper consideration to investment cost but based its ruling on

the theory of reproduction new less depreciation.

The company sought confirmation of a valuation of \$75,000,000 with an allowed return of 8 per cent on that value and a depreciation allowance of \$1,500,000 a year. The commission fixed the return of 7.14 per cent and cut the depreciation allowance to \$800,000 a year.

In sustaining the commission, Circuit Judge Westhues merely announced his ruling with an entry of affirmation on the court docket.

Foreclosure Sale at Binghamton May 15

The properties of the Binghamton Railway, Binghamton, N. Y., will be offered for sale on May 15 in mortgage foreclosure proceedings, with initial bids to be at a set-up price of \$2,300,000, as ordered by the federal court. The sale will include the lighting plant and franchise in Endicott, N. Y., a tract of more than 50 acres in the center of Binghamton and other holdings.

W. S. Appleyard Buys Railway at Burlington, Vt.

William S. Appleyard, who for the past three years has been operating the Burlington Rapid Transit Company running bus lines at Burlington Vt., has bought from the People's Light & Power Corporation, New York, all the stock of the Burlington Traction Company, which in 1926 was valued by a Stone & Webster appraisal engineer at \$1,231,500. The Burlington Traction Company includes the Military Post Street Railway, operating between Burlington and Essex Junction, 8 miles, including a stop at Fort Ethan Allen. Other than the electric railway operating between the villages of Stowe and Waterbury the Burlington Traction is the last city system of its kind in the state.

Extension of Time for Deposit of Brooklyn City Stock

The committee for stockholders of the Brooklyn City Railroad, Brooklyn, N. Y., under plan and agreement of Feb. 13, 1929, has announced extension of the time, up to and including April 1, 1929, at 3 p.m., within which deposit of stock may be made. The Brooklyn Trust Company is the depository of the stock. The stock is being deposited under the plan for the consolidation of the property with the street surface lines of the Brooklyn-Manhattan Transit Corporation. The terms under which the roads will be brought together were outlined in the *ELECTRIC RAILWAY JOURNAL* for Feb. 16, page 301.

Massachusetts Route Discontinued

The Massachusetts Northeastern Street Railway ceased operations at midnight on March 17 on its line between Lawrence, Mass., and Salem, N. H. Service by railway in the town was at one time supplied by the line from Haverhill, Mass., which operated to Canobie Lake Park, connecting Salem with Salem Depot. Another line operated via Salem Depot to Hampshire Roads, Lawrence and Methuen, Mass. A month back no cars were operated beyond the Massachusetts line but the Massachusetts Northeastern took over the route between Lawrence and Salem and had cars connect with the Hampshire road.

Hudson Valley Properties Sold

Sale of all the properties of the defunct Hudson Valley Railway, extending from Warrensburg to Troy, N. Y., was announced on March 16 by the Delaware & Hudson Railroad, owners of the company. Included in the transactions were tracks, wires, rights-of-way, substations, the waiting room in Saratoga Springs and other real estate in Saratoga and Ballston Spa. The property was disposed of to eighteen persons and companies. Figures for the deal could not be learned.

The announcement set at rest rumors that the Delaware & Hudson was planning to build a new line between Mechanicsville and Fort Edward, since the

rights-of-way of that area were included in the disposal.

Large purchasers of the various properties were the New York Power & Light Corporation, the Eaton Wrecking Company, Albany, the Schenectady Railway, the Boston & Maine Railroad, the Hudson Transportation Company, the United Paper Board Company, of Thompson, and B. M. Frank, New York.

Short Brooklyn Three-Cent Line Succumbs

Final action has been taken by the Board of Estimate in acceptance of the \$206,000 selling proposition of the Manhattan Bridge Three-cent Line. This marks the end of an adventure in transportation begun in 1912 by a combination of Brooklyn business men to connect the junction of Fulton Street and Flatbush Avenue with the east side of Manhattan by a short line, using the Flatbush Avenue extension and the Manhattan Bridge. The price the city is to pay includes the whole plant and equipment. It also includes a franchise running to 1937.

For years the road did a fairly good business, with sixteen cars and 5 miles of track. Power was purchased, but there came accidents on which heavy damages were assessed against the line.

The city plans to convert the space on the bridge now occupied by the trolley tracks into two additional lanes for automobiles and to arrange for a bus service to supplant the former service by trolley.

Disputes Nashville Valuation

The Nashville Railway & Light Company, Nashville, Tenn., has entered exception to the order of the Tennessee Railroad and Public Utilities Commission of Dec. 22, 1928, in which the commission fixed the valuation of the properties of the company. The formal protest and exception was filed by Attorneys W. E. Norvell and J. M. Anderson, and says that the value as determined by the commission "is grossly inadequate and insufficient and is substantially less than the valuation to which the company is entitled under a correct and proper application of well-settled principles of law to the facts as they appear in the record."

As mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 26, a \$17,500,000 value was placed on the Nashville property.

Service to Be Restored on Rockaway Road

Plans are in the making by H. E. Salzberg Company, Inc., New York, for the early restoration of service by the Ocean Electric Railway, purchased recently. It is intended to operate service by electric railway from Hammels to Neponsit over the streets of these and intervening towns. To this end a new company is being organized. A survey of the traffic possibilities has already been made and the intention of the purchasers is to put on new cars. The road runs the length of the Rockaway Peninsula, a territory very heavily populated particularly during the summer months, and the feeling of the new owners is that under rehabilitation the road can be made profitable. An indiscriminate service by bus is now being given in the territory, but this has been so unsatisfactory that the new owners have received the pledge of support of the business interests. The physical changes in the property are to be carried out so that the road will be in condition properly to handle the expected seasonal patronage.

Auburn & Syracuse to Abandon

Operation of the Auburn & Syracuse Railroad will be abandoned within the next two months. The bondholders protective committee has decided that it would not be advisable to bid in the property at a sale to be ordered by the court. An asset of real value is Owasco Lake Park, near Auburn, N. Y., leased to others during the last few years. Operation of the trolley line has brought successive losses.

T. C. Cherry was appointed receiver for the railway two years ago when the road defaulted in payment of interest on its first mortgage bonds. Last August Rolland B. Marvin was appointed referee to compute the amount due on the mortgage.

Alexander H. Cowie, the receiver, and attorney for the bondholder protective committee, will apply soon for

Conspectus of Indexes for March, 1929

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last 5 Years	
				High	Low
Street Railway	March	Feb.	March	Feb.	Jan.
Fares*	1929	1929	1928	1929	1924
1913 = 4.84 *	7.75	7.75	7.61	7.75	6.91
Electric Railway	March	Feb.	March	March	Feb.
Materials*	1929	1929	1928	1924	1928
1913 = 100	144.8	145.0	140.1	163.9	139.5
Electric Railway	March	Feb.	March	March	Jan.
Wages*	1929	1929	1928	1929	1924
1913 = 100	230.1	229.9	228.8	230.1	217.4
Am. Elec. Ry. Assn.	March	Feb.	March	March	Sept.
Construction Cost	1929	1929	1928	1924	1927
(Elec. Ry.) 1913 = 100	203.4	205.2	200.5	206.8	199.4
Eng. News-Record	March	Feb.	March	March	Nov.
Construction Cost	1929	1929	1928	1924	1927
(General) 1913 = 100	207.8	210.4	204.6	224.7	202.0
U. S. Bur. Lab. Stat.	Feb.	Jan.	Feb.	Nov.	April
Wholesale Commodities 1926 = 100	1929	1929	1928	1925	1927
	96.7	97.2	96.4	104.5	93.7
Bradstreet	March	Feb.	March	Dec.	July
Wholesale Commodities 1913 = 9.21	1929	1929	1928	1925	1924
	13.00	12.98	13.34	14.41	12.23
U. S. Bur. Lab. Stat.	Feb.	Jan.	Feb.	Nov.	May
Retail Food	1929	1929	1928	1925	1924
1913 = 100	154.4	154.6	151.6	167.1	141.0
Cost of Living	Feb.	Jan.	Feb.	Nov.	April
Nat. Ind. Conf. Bd.	1929	1929	1928	1925	1928
1914 = 100	161.0	160.9	161.5	171.8	160.8
Industrial Activity	Feb.	Jan.	Feb.	Feb.	July
Elec. World—Kw.-hr. used 1923-25 = 100	1929	1929	1928	1929	1924
	140.4	132.5	127.7	140.4	73.4
Bank Clearings	Feb.	Jan.	Feb.	Feb.	May
Outside N. Y. City	1929	1929	1928	1929	1924
1926 = 100	110.1	108.7	99.0	110.1	84.4
Business Failures	Feb.	Jan.	Feb.	Jan.	Sept.
Number	1929	1929	1928	1924	1928
Liabilities (Millions)	1720	2184	1882	2231	1348
	62.26	56.19	51.30	122.95	23.13

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

the sale of the property to the highest bidder.

The decision of the committee in this case is expected to result in the property going to some bidder who will operate the park at Owasco Lake and junk the tracks and equipment. Auburn city lines owned by the company were junked sometime ago and a bus corporation is operating in that city.

Interests identified with the railway also organized the Mid-State Coach Lines, which is operating buses between Syracuse and Ithaca by way of Auburn.

The railway extends from Syracuse through Taunton, Spit Rock, Marcellus and Skaneateles to Auburn. There is no bus service now from Syracuse to Marcellus or Skaneateles, but it is understood the Mid-State company is planning to move soon for permission to extend its network to include these places.

Boston January Receipts \$74,244 in Excess of Cost

Trustees of the Boston Elevated Railway, Boston, Mass., report for January a revenue of \$74,244 in excess of cost of service compared with similar excess in January, 1928, of \$191,382.

For the seven months of the trustees' fiscal year ending Jan. 31, 1929, cost of service exceeded revenue by \$629,520 compared with a similar excess of \$323,417 in the preceding year.

The road carried 32,038,239 revenue passengers in January of this year compared with 33,164,520 in the corresponding month a year ago. Average fare per revenue passenger decreased from 9.262 cents to 9.255 cents.

A greater amount of service was provided, however, for the smaller number of passengers. Trips operated increased from 633,881 to 654,205 and total miles operated increased from 5,013,084 to 5,107,130.

Hears Argument on Illinois Abandonment

Hearings on an application of the Chicago & Illinois Valley Railroad for authority to discontinue service and remove the tracks over that portion of its line between DePue and Princeton, Ill., were begun in Chicago recently before the Illinois Commerce Commission. In seeking permission to abandon this 14-mile section of its interurban system, the railroad presented evidence showing that operations were being carried on at a steadily increasing loss.

\$11,556 Balance on Utah Commission Report

The annual report of the Public Utilities Commission of Utah, for the year 1928, shows appropriations, allowances and receipts for the year of \$35,819, which included a balance from the report for the year ended on Jan. 1, 1928, of \$10,617. Expenditures were \$24,263, leaving a balance on hand of \$11,556.

Real Progress Noted in Toledo in 1928

Surplus earnings of \$125,150 credited to the stabilizing reserve after all operating expenses, taxes, and charges, compared with a deficit of \$361,825 for the previous year, tells the story of 1928 or the "year of greatest progress and achievement so far as public transportation in Toledo is concerned." This was revealed in the annual report of Commissioner E. L. Graumlich submitted to the City Council. Operations of the Community Traction Company show the marked benefits of a co-ordinated railway-bus operation, improvement in railway equipment, new bus equipment, economical and centralized storage of buses, elimination of competition, and the general benefits of good industrial conditions in the city.

During the year the transportation ordinance passed by the City Council with approval of Mayor W. T. Jackson, the Street Railway Board of Control, and company representatives of Henry L. Doherty & Company provided a lower power rate, a refund of \$150,000 on power charges, a definite paving and repaving program for the next five years, payment of old paving obligations to the city, establishment of crosstown bus service, reduction in bus fares, restoration of control of service to the city and elimination of bus competition.

Passenger revenue for 1928 was \$3,479,628 compared with \$3,251,198 for the previous year. There were 48,230,315 revenue passengers compared with 45,503,270 in 1927. Increase in patronage came largely from extensions of service to parts of the city not served before. Increases in revenue were also obtained from special services, subsidies and the rent of tracks and terminals for interurban use. Total revenue from all sources was \$3,691,071, an increase of \$259,288 over the previous year.

In the face of an increase of 10 per cent in service, operating costs were reduced from \$2,044,191 in 1927 to \$2,018,119 in 1928. While wage costs went up due to increased service, cost of power was cut about \$30,000 and settlement of injury and damage claims reduced about \$50,000 through continuous safety campaign and careful handling of claim cases. Taxes were \$230,356, a considerable increase. This sum was almost equivalent to half the amount paid in bond interest and preferred stock dividends.

Bus operation provided total revenue of \$495,633 which is 118 per cent gain over the previous year. Revenue passengers on coaches increased from 2,795,052 in 1927 to 6,150,851 in 1928. Net income from the coach operation was \$50,065 against a deficit of \$15,457 the previous year.

INCOME STATEMENT OF THE COMMUNITY TRACTION COMPANY FOR YEAR ENDED DEC. 31

	1928	1927
Passenger revenue.....	\$3,479,628	\$3,251,198
The fares collected from street car and coach passengers.....		
Special revenue.....	42,526	36,176
The revenue derived from cars and coaches used for special services and from subsidies.....		
Express revenue.....	274	491
Collected for carrying newspapers on the cars and coaches.....		
Station and car privileges.....	33,417	32,305
Paid to the company for advertising cards on the cars and coaches.....		
Rent of equipment.....	3,455	6,220
Received from other companies for the use of company cars (Point Place).....		
Rent of tracks and terminals.....	110,748	81,512
Paid to the company by interurban lines for use of city tracks.....		
Rent of buildings and property.....	287	481
Received for the use of land or buildings—bill board space.....		
Non-operating income.....	20,734	23,396
All revenues which are not the result from operation—interest earned on the several funds, cash discounts.....		
Total revenue from all sources.....	\$3,691,071	\$3,431,783

OPERATING EXPENSE AND DEDUCTIONS FROM INCOME OF COMMUNITY TRACTION COMPANY

	1928	1927
The Miller ordinance directs that the revenues of the company shall be used as follows:		
Operating expense.....	\$2,018,119	\$2,044,191
This is the cost of operating the cars and coaches—conductor and motormen wages, cost of power, injury and damages, and gasoline.....		
Maintenance.....	547,044	570,992
The amount provided for repair of tracks, cars and coaches.....		
Taxes.....	230,356	209,524
Real and personal tax, state excise tax, public utilities, automobile license, gasoline tax.....	0	0
Total operating expense and taxes.....	\$2,795,521	\$2,824,708
Income from operation.....	\$895,549	\$607,074
DEDUCTIONS FROM INCOME		
Depreciation.....	199,323	139,888
The amount set aside for renewals and reconstruction.....		
Sinking fund—(city's purchase fund).....	72,603	317,323
2 1/2 per cent of capital value must be set aside out of operating revenues for the purchase and retirement of bonds and preferred stock for which common stock is issued to the city.....		
Interest—unfunded debt.....	50,002	31,306
Interest on money borrowed for current needs, coach contracts.....	0	0
Total deductions from income.....	\$321,929	\$488,518
Balance is available for:		
Stabilizing reserve.....	\$573,620	\$118,555
Ordinance requires that from this fund shall be paid:		
Interest on bonds.....	375,515	392,665
Dividends on preferred stock.....	87,955	87,715
Total interest and dividends.....	\$463,470	\$480,380
Net increase deficit.....	\$110,150	\$361,825
Add—refund on power—ordinance No. 6480.....	15,000	.....
	\$125,150	.....

Personal Items

C. H. Jones Heads Illinois Association

C. H. Jones, general manager Chicago, South Shore & South Bend Railroad, South Bend, Ind., was elected president of the railways group at the recent joint sessions of the three organizations, namely, the Illinois Gas Association, the Illinois State Electric Association and the Illinois Electric Railways Association. In this capacity he succeeds R. F. Palmblade.

Mr. Jones' name has long been identified with accomplishment in the electrical field. Since his affiliation with the



C. H. Jones

Chicago Rapid Transit Company in 1909 he has given unstintingly of his time and effort to electrical development. He was made electrical engineer of the Chicago Rapid Transit Lines and the North Shore Line in 1917. Prior to this he had made a reputation for himself in the rebuilding of the power distribution system of the Rapid Transit Lines and he was to add to his record later in the work on the new Skokie Valley Route of the North Shore Line. The expeditious handling of the thousands who visited Chicago during the Eucharistic Congress in 1926 was attributable in great measure to his leadership.

Of his latter-day accomplishments is the high standard of service maintained on the South Shore Line and mentioned in these pages under date of Aug. 21, 1926, at the time of his assuming the duties of general manager of the company. In this capacity he succeeded Charles W. Chase. At that time the company's operating headquarters were removed from Gary to Michigan City, Ind. Since the purchase of the insolvent Shore system by the Insull interests in 1925, the company has been domiciled in Gary.

Mr. Jones was born in Chicago. He was graduated from Armour Institute of Technology in 1909 with the degree of electrical engineer. Mr. Jones has

always been interested in association activity, particularly the work of the body of which he has now been made the head.

F. W. Hoover in Industrial Survey Work

Fred W. Hoover, former vice-president Consumers Power Company and later associated with Hodenpyl, Hardy & Company, Inc., has established department headquarters at Jackson, Mich., in charge of the Allied Power & Light Corporation's newly formed industrial development department to co-operate with and supplement activities of commercial organizations operating in the various local communities served by companies with which Allied Power & Light is identified. Work of this character has been carried on for several years by various operating companies, but the new department not only will consolidate the activities of such companies but will provide a clearing house and will make available engineering and economic advice and data to each community expert for directing industrial promotion efforts.

Within the territory served by the operating companies, Mr. Hoover believes the organization can do a lot of effective preliminary work, and supply the local chambers with a mass of valuable data and information which will be helpful in guiding and confining their activities and enthusiasm to channels which promise the greatest degree of permanent, constructive benefit to their communities. Primarily the work will be of an advisory nature, but, in the last analysis, it will have to be the Chamber of Commerce or some other local industrial development agency which brings the new industry into the community and gets the credit for the accomplishment.

Changes in St. Louis

G. Z. Ledford is now temporary superintendent of car operation for the St. Louis Public Service Company, St. Louis, Mo. He formerly was division superintendent of the North Broadway station.

F. A. Wilson, who was division superintendent of the DeBaliviere car station, has been made temporary division superintendent of the North Broadway car station while John H. Rippen, former superintendent of methods, is temporarily filling Mr. Wilson's old post at the DeBaliviere sheds.

James Stewart has been promoted to the superintendency of the Virginia and Walsh station, which houses the Grand and Belleville cars. He had been day dispatcher at this station for the past eight years.

M. L. Cummings Directs Salt Lake Advertising and Publicity

M. L. Cummings, Jr., associated with the advertising and public relations activities of the Utah Power & Light Company for several years, has recently been placed in charge of advertising and publicity for the Utah Light & Traction Company, Salt Lake City, Utah. Mr. Cummings is also editor of the Utah Power & Light Company's house organ, "The Synchronizer." He will retain his present connection with the power company, and assumes the additional duties with the company operating the railway and bus lines.

Mr. Cummings became associated with public utility work in March, 1915, at which time he entered the employ of the Utah Power & Light Company as secretary to S. R. Inch, who at that



M. L. Cummings

time was general superintendent of that company. About three years later he became identified with the commercial department, was appointed editor of the company's house organ, and in that capacity gained his first experience in public relations work. In 1922 he began to devote the major part of his time to the company's advertising and publicity activities, and in the latter part of 1924, when the Utah Power & Light Company organized its own advertising department, he was made assistant manager of that department.

Mr. Cummings has been closely associated with the activities of the Electrical League of Utah ever since it was organized about nine years ago. He has served as chairman of its publicity committee; and as chairman of its Christmas home lighting committee for the past four years. He was recently elected secretary and treasurer of that organization for the year 1929.

L. F. YETMAN, newly appointed chief clerk for the El Paso Electric Company, El Paso, Tex., has reached that city. He was formerly with the Blackstone Valley Gas & Electric Company, where he had long experience. More recently he had been active head of the accounting department of the company at Woonsocket, R. I.

R. J. S. Pigott Rejoins Stevens & Wood

R. J. S. Pigott, for three years mechanical engineer with Stevens & Wood, Inc., and later consulting engineer with the Public Service Production Company and Smoot Engineering Corporation, has returned to the Stevens & Wood organization as consulting mechanical engineer.

J. H. Shearer Elected Head of Pennsylvania Utility

J. H. Shearer, vice-president and general manager Penn Central Light & Power Company, Altoona, Pa., was elected president of that company, at a meeting of the board of directors held March 20, and of its subsidiary and associated companies, including the Keystone Public Service Corporation and subsidiaries, the Altoona & Logan Valley Electric Railway and subsidiaries, the York Railways and subsidiaries and the Chester Valley Electric Company.

Mr. Shearer entered the public utility field with the Thomson-Houston Company in 1890. He became identified with the public utility industry in the East as general superintendent of the Eastern Shore Gas & Electric Company at Salisbury, Md., and later Day & Zimmermann, managers of the Eastern Shore utility, selected him for the position of general superintendent of the Penn Central Light & Power Company. In 1923 he was elected vice-president in charge of operation and three years ago, when the National Electric Power Company acquired the Penn Central properties, he was appointed vice-president and general manager and a member of the board of directors.

Samuel A. Lockhart Promoted at Fall River

Samuel A. Lockhart, formerly operating foreman, was appointed superintendent of transportation of the Fall River, Mass., division of the Eastern Massachusetts Street Railway on Feb. 18. Mr. Lockhart has served in several capacities for the company through a period of 26 years. His first employment with the company in 1903 was as a motorman, operating from the old North carhouse in Fall River. Later he was promoted to foreman of the North carhouse, the headquarters for all the cars of the division. His next step was to the transportation department, in which he became chief operating foreman. Mr. Lockhart served in this position for sixteen years before receiving his recent appointment.

When Mr. Lockhart started his career as a motorman, the Old Colony Street Railway was furnishing transportation in Fall River. While serving in his various positions he saw the company change to the Bay State and then to the Eastern Massachusetts Street Railway.

Mr. Lockhart was born, reared and

educated in Fall River. He has participated in several local activities in the city, and at the present time is president of the Maplewood Baseball League, composed of the leading amateur teams of Fall River. He also has been successful in developing the athletic activities of his division.

EDWIN D. CROWLEY, Lynn, has been appointed treasurer of the Eastern Massachusetts Street Railway, Boston, Mass., by the public trustees of the company. Mr. Crowley is a graduate of Dartmouth College, 1923, and the Amos Tuck School of Administration, 1924, with the degree of Master of Commercial Science. He was admitted to the bar in 1927 and authorized to practice as a certified public accountant in 1928.

W. D. SCHUYLER, for 21 years traffic superintendent of the railway lines in Muscatine, Iowa, has joined the new Muscatine Coach Lines. This service supplanted the electric railway on March 1. He will be traffic superintendent of the new transportation system.

OBITUARY

John L. Heins

John L. Heins, who was president of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., before its absorption some years ago by the Brooklyn Rapid Transit Company, the predecessor of the Brooklyn-Manhattan Transit Company, is dead, in his eighty-fifth year.

Moving to Brooklyn when still in his twenties, Mr. Heins became superintendent of the Franklin Avenue line there, but ill health subsequently caused his resignation. He returned to one of the roads that later was included in the merger that formed the Coney Island & Brooklyn Railroad, and remained in that field during the remainder of his active career, assuming the presidency and chairmanship of the board of the Coney Island & Brooklyn Railroad on its formation 30 years ago.

As president of the Coney Island & Brooklyn Railroad he succeeded Col. John L. Partridge. He was in turn succeeded as president of the company by Slaughter W. Huff, who later became a vice-president of the Brooklyn Rapid Transit Company when control of the Coney Island property passed to the Brooklyn Rapid Transit. The Equitable Life had been a large holder of stock of the Coney Island & Brooklyn Railroad, one of the most prosperous companies of its kind in the country in its day, but competition and other circumstances militated against the company and the Equitable holdings eventually found their way to the ownership of the Brooklyn Rapid Transit at prices considerably under par, whereas at one time the stock had sold at a magnificent premium. To Mr. Huff, as the successor of Mr. Heins, fell the task of rehabilitating the road.

George B. Cornell

George Birdsall Cornell, for nearly 50 years actively identified with the construction of electric railways in the United States, and in the evaluation of public utility properties throughout the world, died on March 14. Mr. Cornell's earliest notable work was as chief engineer of construction of the Brooklyn Elevated Railway, in 1884-'86. He retired in 1927, after completing an evaluation of the property of the Philadelphia Company.

From 1895 to 1898 Mr. Cornell, as chief engineer New York & Brooklyn Bridge Railway, installed the first elevated trains to cross Brooklyn Bridge. He also installed the first electrical equipment in the Brooklyn elevated system. Before that he had been chief engineer of the construction of the South Side Elevated Railroad in Chicago, and of the Union Elevated Railway in Brooklyn.

He was associated as resident engineer of Ford, Bacon & Davis, Inc., and was engaged in the construction of the railway power plant and overhead lines of the Memphis Street Railway, Memphis, Tenn., in 1906 and 1907. For the next six years he was chief engineer for Meiklehan & Dinsmore, engineers and bankers. Mr. Cornell returned to Ford, Bacon & Davis as resident engineer in Richmond, Va., from 1918 to 1921. He designed utility plants and evaluated properties in and around New York and gave expert testimony in various public utility investigations.

He was graduated from the Columbia College School of Mines in 1877 and held the degrees of Civil Engineer and Engineer of Mines. He was a life member of the American Society of Civil Engineers.

HORACE J. COCHRAN, former president Maysville Public Utilities Company, operators of utilities prior to the sale of the power, light and street car divisions to the Kentucky Power & Light Company, about three years ago, died recently. Mr. Cochran, a native of Maysville, was 52 years old.

CHARLES BRUCE WHITE, Chicago representative of the Cochrane Corporation and vice-president and general manager of the Cochrane Engineering Company, Chicago, died in Chicago recently. He had charge of building the electric railroad at Lynchburg, one of the first of its kind in the South. At the age of 34 he went to Chicago and was chief electrician for the Calumet Street Railway; he later entered the service of the Western Electric Company as a salesman, and in 1900 became manager of the Sprague Electric Company's office in St. Louis. In 1901 he became associated with A. Sorge Jr. & Company, then representing the Harrison Safety Boiler Works, (now the Cochrane Corporation), with which he was associated until the death of Mr. Sorge seven years ago. He was then made vice-president and general manager of the Cochrane Engineering Company, which succeeded A. Sorge Jr. & Company.

Equipment Orders Continued

Grand Forks Street Railway to purchase car and bus equipment.
Louisville Railway tests trucks. Track and shop construction planned

EXPANSION and renovation of railway systems and equipment have played an important part in the market activity of the electric railway industry during the past winter. With the coming of spring there appears to be no abatement in the announcement of projected improvements for this year. The delivery of 100 cars to the city of Detroit has just been started and now that city is making a special survey to ascertain if an additional 100 cars will be needed. Chicago has placed orders for 100 cars and other cities have either ordered or are contemplating the order of car equipment. Several large construction projects have been commenced and additional rehabilitation is being proposed or planned in a number of cities.

CARS FOR GRAND FORKS

Grand Forks Street Railway, Grand Forks, N. D., is considering the purchase of two or three new street cars of the Birney safety type. If these cars are to be ordered equipment similar to the present cars will be preferred. These cars are built for extremely cold weather operation, being equipped with double flooring, head lining and storm windows. The trucks are the St. Louis No. 7 type and the cars are equipped with G. E. No. 264 motors, No. 25 C P air compressors and are heated with Peter Smith hot-air heaters.

The Grand Forks Street Railway is also considering the purchase of buses to be used as feeders or possibly to replace one or two branches of its system where track conditions are such that it may be found prohibitive to rebuild them. Although a definite decision has not been made, the matter is being thoroughly investigated and some plan will be adopted in the very near future.

The Street Railway Department of the city of Detroit, Mich., has returned five mechanical-drive buses to the manufacturer for the installation of General Electric gas-electric drives. These five buses have been in service for some time and it is believed that this is the first case of conversion of buses already in service to gas-electric drives. The Street Railway Department now has in service 100 gas-electric buses.

Work on the three-year program of relocating elevated columns at the downtown street intersections in Chicago has been completed. A total of 35 columns were relocated from the center to the side of the street at an approximate cost of \$470,000.

Louisville Railway, Louisville, Ky., has placed orders with the Timken

Detroit Axle Company for two trucks. These trucks are each to be equipped with two 50-hp. motors of the Westinghouse high-speed type. These two trucks are to be installed for experimental purposes on car No. 1050, operating on the Fourth Avenue line. This car, which is one of the company's better steel cars, has been completely rebuilt and equipped with treadle-exit doors, safety devices and leather upholstered seats. The seating capacity is 43 passengers. The car with the old trucks weighs approximately 43,000 lb., while it is estimated with the new trucks the weight will be reduced to 33,000 lb.

It is figured that the car will have an acceleration of 3 to 3½ m.p.h.p.s. as compared to 2 m.p.h.p.s. with the old equipment. The drive is of the worm-gear type and the brakes are on the end of the armature shaft. Delivery of these trucks is expected about May 15, and if tests prove satisfactory, similar trucks will probably be installed on a number of the railway cars where a quicker acceleration and less current consumption is desired.

EQUIPMENT ORDERED

The Pacific Gas & Electric Company has ordered two carloads of weather-proof wire and four carloads of bare copper wire. Among track material ordered by the Connecticut Company, New Haven, Conn., is one double-track three-part Y; one double-track branch-off; one double-track electric over single-track steam crossing and two crossovers. This company has also ordered four 29-passenger Mack coaches. The Portland Electric Power Company, Portland, Ore., has ordered three A. C. F., 40-passenger, metropolitan type coaches. One Mack six-cylinder, 33-passenger, city type bus has been ordered by the Houston Electric Company, Houston, Tex. The Portland Electric Power Company, Portland, Ore., plans two equipment storage and distributing plants, one costing approximately \$200,000 and another about \$50,000. The Puget Sound Power & Light Company, Seattle, Wash., will make improvements in its power plant costing approximately \$200,000.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has placed orders for ten cars of poles, two cars of wire and cable and one car of crossarms. This company has also let contracts for the construction of a new substation. The Dallas Railway & Terminal Company, Dallas, Tex. has placed orders for one carload of creosoted pine poles, and 150 21-in. rolled-steel wheels.

The Public Service Co-ordinated Transport, Newark, N. J., has received approval of the Board of Public Utility Commissioners of New Jersey on a contract between this company and the city of Newark on the construction of a rapid transit railway to be built in the bed of the abandoned Morris Canal.

It is understood that until about March 27 the Pennsylvania Railroad, Philadelphia, Pa., will receive bids for the construction of a modern twenty-story office building to be built between Sixteenth and Seventeenth Streets, in Philadelphia. Graham, Anderson, Probst and White, Chicago, Ill., are the architects.

Montreal Tramways, Montreal, Ont., is contemplating the erection of a car-house and two substations. One of the substations to be located in the west end of the city will have a capacity of about 4,000 kw. and the other in the east end of the city will have a capacity of about 3,000 kw.

Laying of a second track on the Hamilton Road line for a distance of about 1½ miles is being considered by the London Street Railway, London, Ont. The estimated cost of this work is \$36,000 a mile exclusive of the cost of removing the present single track.

The Ford City Council has passed a resolution requesting the management of the Ontario Hydro-Electric Railway to extend its car line on Seminole Street from George Avenue to Norman Road. This work, which is estimated to cost approximately \$8,000, is to start at the opening of this year's construction season, if the request is approved.

TACOMA TRACK CONSTRUCTION

Extension of the Municipal Belt Line around the head of Hylebos Water Way and along the east side thereof as far north as Lincoln Avenue has been approved by the Tacoma Chamber of Commerce, Tacoma, Wash., in its ten-year program for the development of that city, particularly the east side of the Hylebos Water Way, for industrial purposes. This improvement also includes the extension of the line as far north as East Eleventh Street. At present there is no bridge across the water way which can carry the belt line tracks and there is no roadway serving the east side south of Lincoln Avenue.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has received a decision giving it the right to move a park statue in Caledonia, thus permitting the construction of straight tracks on the railway's new right-of-way.

Ohmer Company to Expand

The Ohmer Fare Register Company, Dayton, Ohio, said to be the largest manufacturer of taximeters in the world and an important manufacturer of truck auditors, hubometers and other fare registers, as well as cash registers, plans a large expansion program. The company has authorized the sale of a large block of its class A stock to F. J. Lisman & Company, New York, and will use the proceeds of such sale to provide for the retirement of its short term notes, the payment of existing bank loans, the retirement of all or substantially all of its preferred stock and for expansion purposes, particularly in the field of recording and registering machines. The company has also authorized the issue of 20,000 shares of the class B stock in exchange for certain valuable patents.

At a special meeting of its stockholders and a special meeting of its board of directors, action necessary to carry out a plan of recapitalization of the company was taken. The plan of recapitalization provides, among other things, for an increase in the authorized capital stock of the company from 15,000 shares (par \$100) to 504,922 shares, of which 4,922 shares, known as preferred stock, will have a par value of \$100 per share, 100,000 shares, known as class A stock, will have no par value, and 400,000 shares known as class B stock will have no par value. It is contemplated that the 4,922 shares of preferred stock, which are temporarily carried over from the old capitalization, will be retired out of the proceeds of the sale of class A stock by the company, and that there will presently be outstanding 100,000 shares of the class A stock and 270,000 shares of the class B stock. Holders of present common stock will receive in exchange for each share held 2 7/9 shares of the new class A stock and 25 shares of the new class B stock.

The board of directors has been increased from six members to nine, and F. J. Lisman and A. M. Chambers of the banking firm of F. J. Lisman & Company have been elected to the board.

It is expected that F. J. Lisman & Company will, in the near future, make a public offering of a block of the class A stock.

John F. Ohmer, president Ohmer Company, has made it plain that no business change is being considered which might bring about a merger of his company with others engaged in similar lines of industry. Expansion is contemplated, but whatever is done will not in any way affect the present directorate of the concern. He is quoted as follows:

The increase which we have enjoyed in our business during the past year and the prospects for the future in cash register and accounting machine business, a field we entered some time ago, has made it necessary that we be prepared to have a financial structure that will take care of the expansion.

The Ohmer Company will soon place in production its new models

METAL, COAL AND MATERIAL PRICES F. O. B. REFINERY

	March 20, 1929
Metals—New York	
Copper electrolytic, cents per lb.	22.45
Copper wire, cents per lb.	24.875
Lead, cents per lb.	8.
Zinc, cents per lb.	6.825
Tin, Straits, cents per lb.	49.
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$4.425
Somerset mine run, f.o.b. mines, net tons.	1.875
Pittsburgh mine run, Pittsburgh, net tons.	1.80
Franklin, Ill., screenings, Chicago, net tons.	1.50
Central, Ill., screenings, Chicago, net tons.	1.125
Kansas screenings, Kansas City, net tons.	1.70
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000ft.	\$6.95
Weatherproof wire base, N. Y., cents per lb.	25.875
Cement, Chicago net prices, without bags.	2.05
Linseed oil (5-bbl. lots) N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.5
Turpentine (bbl. lots), N. Y., per gal.	64.5

of cash registers and accounting machines, while continuing with the manufacture of fare-recording machines which has been the nucleus of the business since its inception.

Westinghouse Annual Report

Business of the Westinghouse Electric & Manufacturing Company during the year 1928 was the best for any twelve months in its history, according to the company's annual report, which was made public recently. Sales billed for the year were \$189,050,302, and net income was \$20,814,940, which figures exceed previous records by \$3,500,000 and \$2,700,000, respectively. The net income per share of stock (preferred and common) was \$8.78, or 17.5 per cent on the par value, which compares with \$6.59, or 13.2 per cent for the period covered by the last annual report. Both classes of stock are now receiving annual dividends of \$4 per share of \$50 par value.

Owing to a change in the fiscal year, which now ends Dec. 31, instead of March 31 as heretofore, the present report covers officially only the nine-months period extending from April 1 to Dec. 31, 1928, but the figures above given are for the entire year of 1928 to provide a basis for comparison with previous full fiscal years.

The company's total current assets are given as \$135,679,223 (a gain of

over \$13,000,000 in nine months), and its total current liabilities are only \$17,000,000. The surplus is now \$67,000,000, a gain of \$10,000,000 in nine months.

The value of unfilled orders on Dec. 31, 1928, was approximately \$47,000,000. During the nine-months period the value of orders received exceeded by almost \$20,000,000 that of the same period in 1927, due largely to the increase in demand for radio products and industrial motor apparatus.

Weekly Business Conditions

The volume of money turnover during the week ended March 16, as indicated by check payments, was smaller than in the preceding week but considerably greater than a year ago, according to the weekly statement of the Department of Commerce. Industrial activity, as reflected by steel-plant operations, was greater than in either the preceding week or the similar period a year ago. The production of bituminous coal during the latest reported week was smaller than in either the previous week or the similar week of 1928. The output of lumber showed a decline from the previous week and no change from a year ago. Petroleum output showed a sizeable recession from the previous week but was considerably greater than at this time last year. Freight-car loadings, covering the latest reported week, showed a gain over both the previous week and the similar period of last year.

The general level of wholesale prices showed no change from the preceding week, but was fractionally higher than a year ago. The price of copper continued to mount, while prices for iron and steel, showing no change from the previous week, averaged higher than a year ago. Loans and discounts of federal reserve member banks showed further expansion, as compared with both the preceding week and the similar period a year ago. Interest rates on call loans averaged lower than in the previous week but were higher than a year ago. Bond prices averaged lower than in either period. Prices for stocks were higher than in either the previous week or the similar period of 1928. Business failures were fewer than in either period.

Weekly Business Indicators

(Weeks ended Saturday. Average 1923-25 = 100)

	1929				1928			
	March 16	March 9	March 2	Feb. 23	March 17	March 10	March 3	Feb. 25
Steel operations	123.7	122.4	118.4	117.1	109.0	108.0	109.0	111.0
Bituminous-coal production	105.4	105.4	114.5	120.6	102.0	106.6	103.0	104.4
Lumber production	99.1	101.4	96.4	102.3	99.1	101.4	101.4	108.6
Petroleum production (daily average)	128.0	129.8	129.3	114.7	113.1	113.2	113.2	112.8
Freight-car loadings	101.9	101.9	94.6	98.3	99.2	100.1	100.1	90.7
Building contracts 37 states (daily average)	93.2	124.5	93.1	139.4	110.0	111.0	111.0	122.2
Price iron and steel, composite	87.9	87.9	87.9	87.6	86.7	87.6	86.5	86.0
Copper, electrolytic, price	139.9	139.1	129.0	100.7	100.7	100.7	100.0	100.0
Check payments	130.6	157.8	124.8	145.5	114.4	126.6	123.7	105.3
Bank loans and discounts	131.5	131.4	130.9	129.5	122.6	121.2	121.2	120.4
Interest rates, call money	178.8	218.2	187.9	169.7	109.1	103.0	109.1	103.0
Business failures	113.0	120.4	131.9	101.0	117.0	125.3	126.8	118.7
Interest rates, time money	180.0	177.1	177.1	177.1	105.7	105.7	105.7	105.7
Federal reserve ratio	91.2	89.9	90.2	91.4	95.9	96.0	95.6	96.4

“The man at the wheel

*was made to feel secure
from the winds that blew”*

So runs an old song of the sea. But does it hold good for your own men at the wheel? Do they feel secure in the knowledge that they have a good hand brake for emergencies?

Can they feel certain their car is going to stop when they apply that brake? Can they rely on it functioning in spite of worn brake shoes or slack rigging?

If not, it is high time for you to consider installing a set of Peacock Staffless Brakes on each of your present cars, and for you to specify them on your new equipment.

May we tell you about the five big safety features of Peacock Staffless Brakes that give both you and your motormen that feeling of security?



“Peacock”

Reg. U. S. Pat. Off.

Staffless Brakes

NATIONAL BRAKE COMPANY

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.
The Elleon Co., General Sale Representative:
50 Church St., New York



Next Issue—

The *New*

Electric Railway Journal Monthly

The next issue of this magazine will introduce your business paper in its new *monthly* form and will inaugurate an expanded program under which the editorial and advertising pages will be concentrated into a bigger and stronger publication.

Electric Railway Journal *News*, to be issued each Saturday except in those weeks in which the monthly publication appears, will supplement the monthly magazine and give to busy executives the important timely news of the industry.

Please advise us promptly

There will be 13 issues of the monthly—twelve regular issues and the 13th issue which will be either a Convention Issue or Report Issue depending upon the date of the A.E.R.A. Convention itself.

Present subscribers are now offered a choice of:

1. The regular subscription price of the magazine is being reduced from four dollars to three dollars yearly. The price of the News Service will be one dollar for subscribers to the magazine, two dollars for all non-subscribers. If you wish the new monthly—*without* the News Service—your present subscription will be *extended* on a dollar-for-dollar basis.

2. If you are interested in receiving *both* the 13 large monthly issues and the 39 weekly News issues, your subscription will not be extended, but will retain its present expiration date.

Which choice do you prefer? Your advice will be appreciated at an early date so the mailing of future issues can be made in line with your wishes.

The April issue, in addition to inaugurating the new monthly schedule will be one of the most important Annual Maintenance and Construction Numbers that Electric Railway Journal has published. It will be a comprehensive survey of local transportation maintenance practices and methods covering the many phases of electric railway operation. A survey of new car experience . . . How southern properties reduce equipment costs . . . Bus garage and shop design on 50 properties . . . Using track maintenance as a guide in design . . . are only a few of the important subjects to be discussed.

Next week the April issue will be in your hands. We will appreciate your comments and suggestions—and urge that you advise us of your subscription choice immediately.

Electric Railway Journal

A.B.P.

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A.B.C.

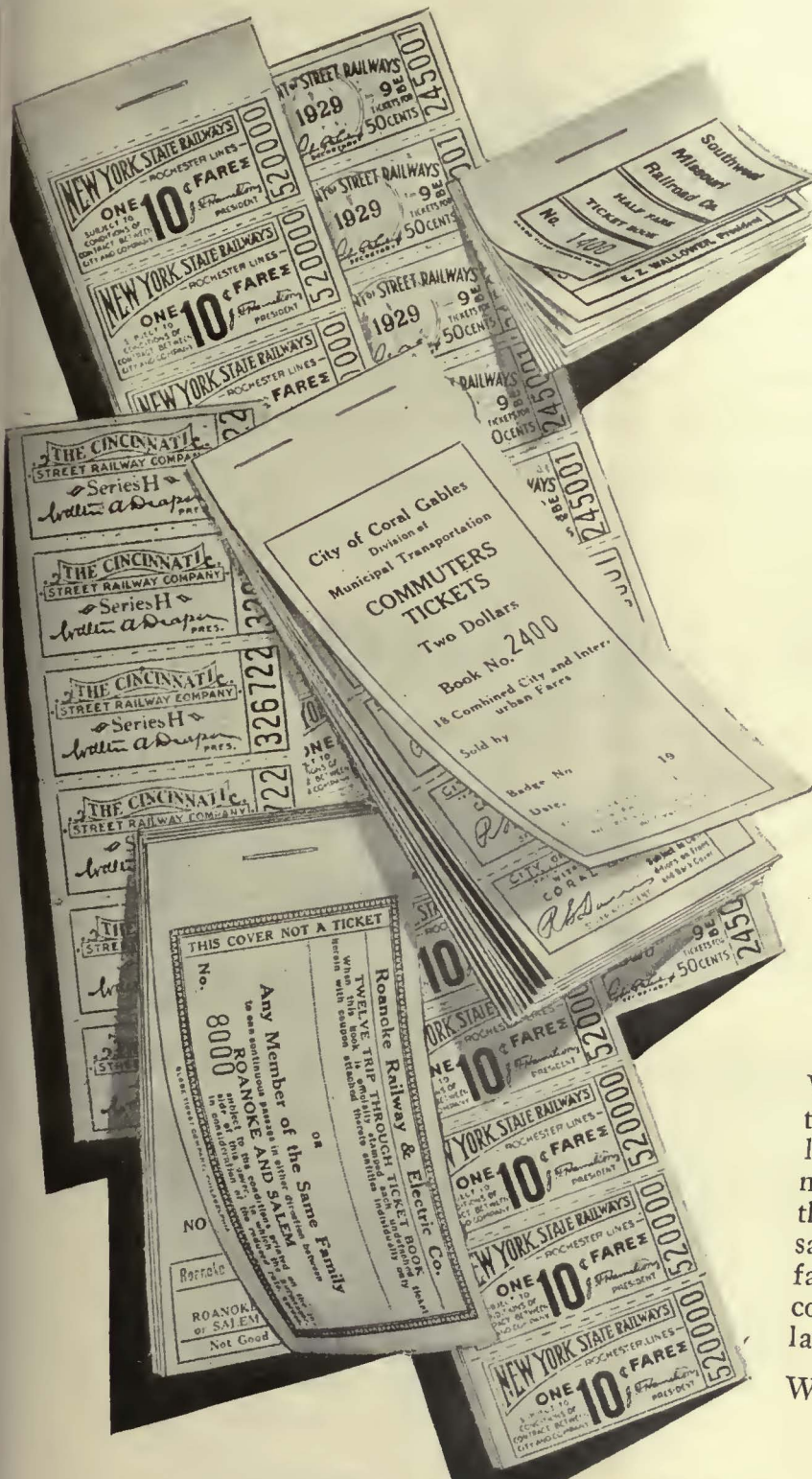
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By C. FRANCIS HARDING
Professor of Electrical Engineering; Director, Electrical Laboratories,
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Assisted by DRESSEL D. EWING
Professor of Electric Railway Engineering, Purdue University
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gives way to that entitled "Sources of Electrical Energy," which contains in detail one of the most recent and complete contracts for electrical energy ever negotiated.

Chapter Headings

- | | |
|--|---|
| <p>PART I.—Principles of Train Operation.
1. History of Electric Traction.
2. Traffic Studies (Predetermined).
3. Traffic Studies (Existing).
4. Train Schedules.
5. Motor Characteristics.
6. Speed-time Curves (Components).
7. Speed-time Curves (Theory).
8. Distance, Current, and Power-time Curves (Theory).
9. Speed-distance, Current and Power Curves (Concrete Examples).
10. Speed-time Curves (Straight-line).
11. Locomotive Train Haulage.</p> <p>PART II.—Power Generation and Distribution.
12. Substation and Power-station Load Curves.</p> | <p>13. Distribution System.
14. Substation Location and Design.
15. Transmission System.
16. Sources of Electrical Energy.
17. Bonds and Bonding.
18. Electrolysis.</p> <p>PART III.—Equipment.
19. Signals and Dispatching Systems.
20. Track Layout and Construction.
21. Cars.
22. Motor Busses.
23. Motors.
24. Control Systems.
25. Brakes.
26. Car-house Design.
27. Electrical Locomotives.
28. Electrification Systems.
29. Electric Traction on Trunk Lines</p> |
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"He is not idle who has nothing to do; but he is idle who might be better employed."

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WHAT is idle in your organization today? Obsolete cars are idle—not so much because they are out of service as because they might be "better employed."

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May we tell you more in detail of the service we have rendered for the past thirty years to other traction companies and what we can do for you?

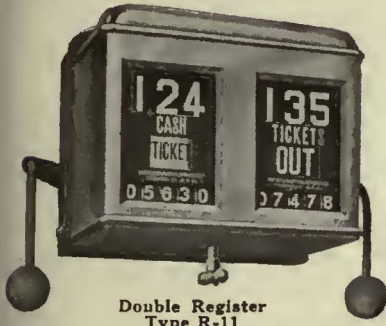
We are not alchemists—but—we turn iron and steel into gold and silver.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue
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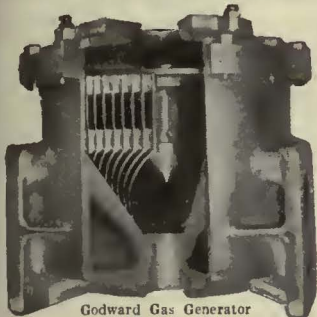
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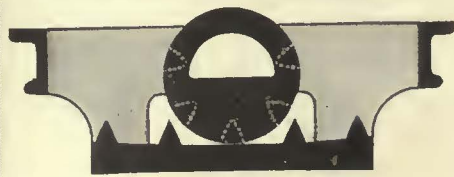


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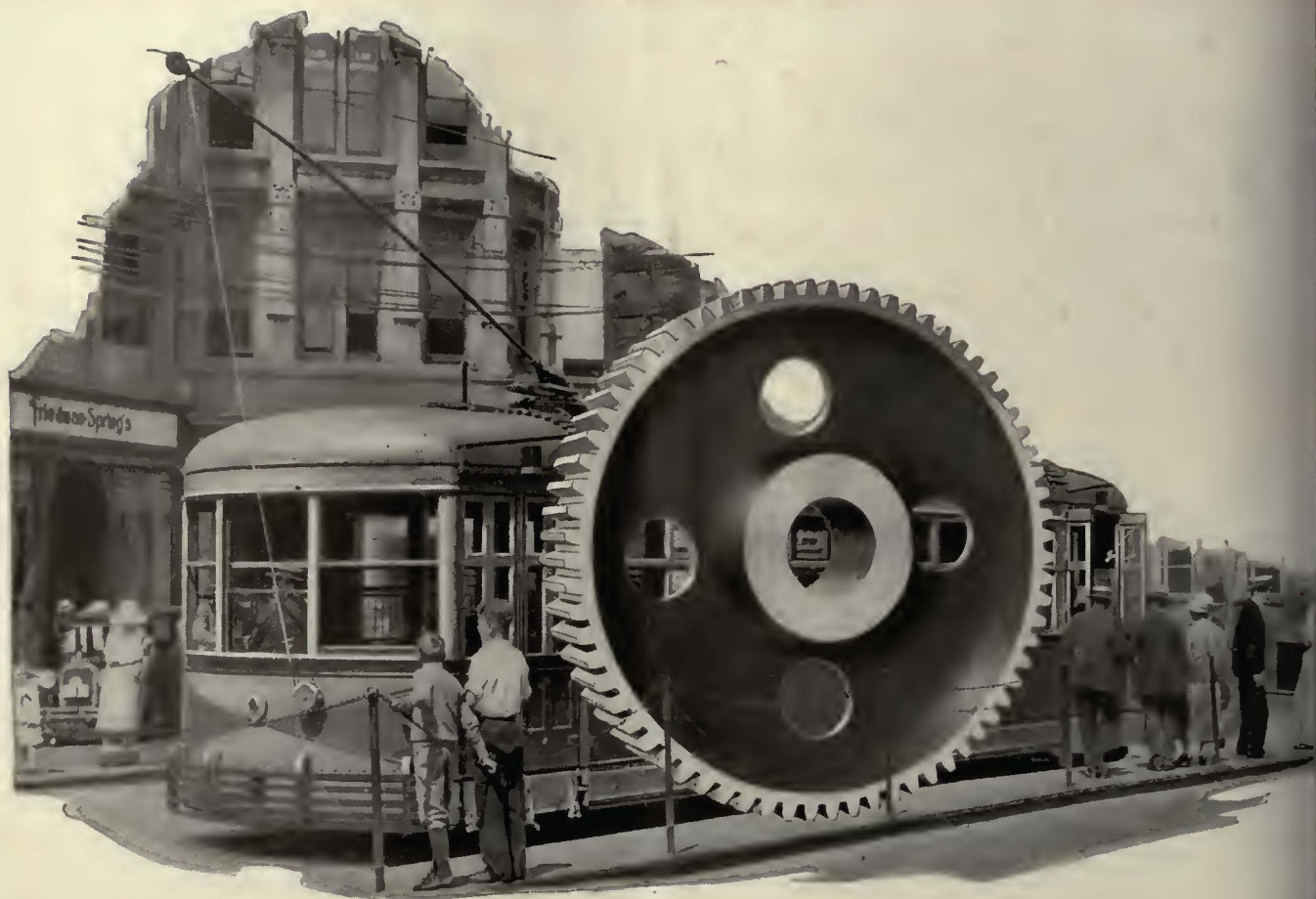
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