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ELECTRIC RAILWAY JOURNAL

Graw-Hill Publishing Company, Inc.

MAY 5, 1928

Twenty Cents Per C



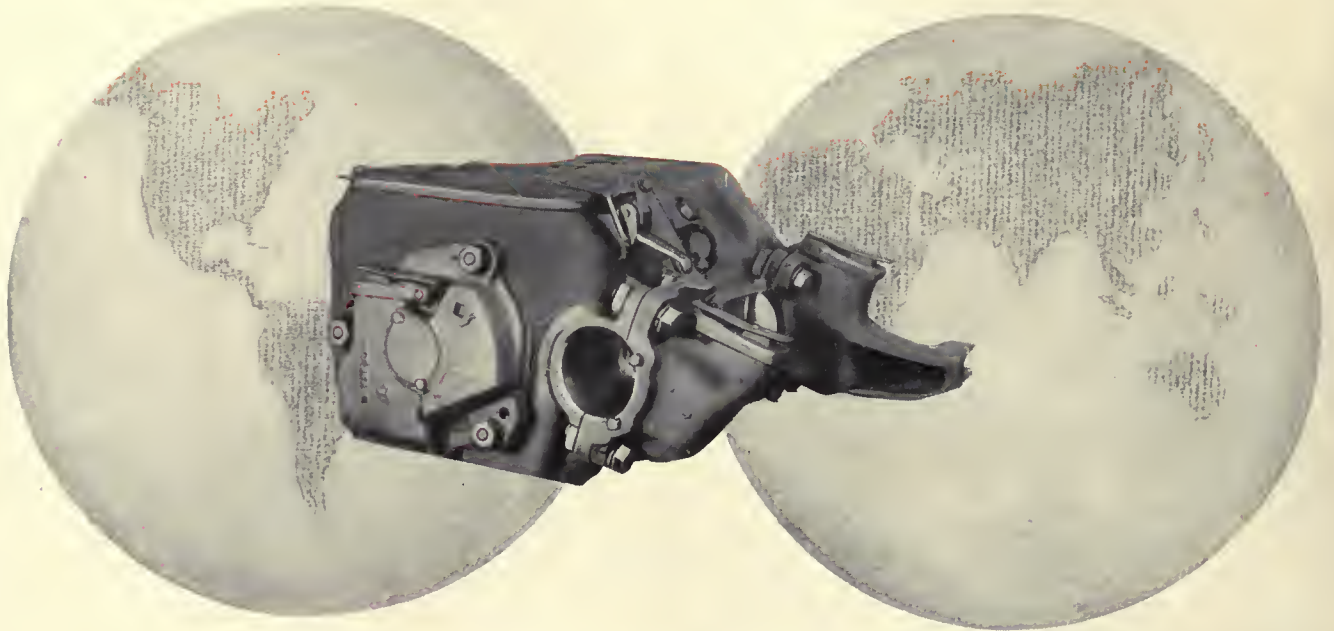
*The Most
Significant
Vehicle in all
1928 Transportation*



The Pittsburgh Motor Coach Company operates 17 Twin Coaches on a 25¢ de luxe line using the same equipment for special charter service.

6400 Type 510 Motors ~

(35 Horsepower)



~ are useful transportation servants the world over

Where Type 510 Motors are used

United States

Alabama
Florida
Hawaii
Iowa
Illinois
Indiana
Kansas
Louisiana
Maryland
Massachusetts
Michigan
Missouri
Nebraska
New Jersey
New York
Ohio
Pennsylvania
South Carolina
Texas
Virginia
Washington
West Virginia
Wisconsin

Abroad

Canada
Costa Rica
Japan
Mexico
Newfoundland
Spain

THERE are 6400 Westinghouse Type 510, 35 horsepower motors powering more than 1600 modern electric street cars at the present time. Most of these cars are in congested city service where frequent stops and high accelerating rates are necessary.

Geographically, the operation of cars equipped with this dependable motor is distributed over numerous transportation arteries in cities throughout 23 states and in 6 countries abroad. Many of its users repeatedly have ordered this motor for their new cars.

The large number in service attests to the ability of the Type 510 motor to withstand the grind of difficult city service with reliable operation, high quality of performance and the minimum cost of upkeep.

The nearest Westinghouse representative will furnish reference to railway properties using the Type 510 motor in your territory, and detailed information about its construction and performance.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

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



Westinghouse

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, Editor

Vol. 71
No. 18

May 5, 1928

Pages
721-760

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Modernization in Little Rock Brings Successful Year724

Increase in revenue, reduction in accidents, curtailed expenses and promotion of good will result from the application of modern methods and equipment in mass transportation. How the Little Rock company did all this is told in the story.

Truck Repairs Put on a High-Speed Basis729

By CLARENCE W. SQUIER

Cars are never withdrawn from service on account of faulty trucks because repaired trucks are substituted immediately when the others are removed. The equipment, facilities and methods employed to accomplish this are described.

Rules to Guide Executive Action735

Service improvement on the North Shore Railroad was the inspiration for these rules to guide executive action. Proper treatment of customers, which is, of course, an essential in the maintenance of good public relations, is covered in a rule book for ticket agents and one-man car operators.

* * *

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Molehills and Mountains

MEN stumble over molehills, not mountains." The statement of Confucius, the sagacious old Chinese philosopher, is just as true today as it was when he made it more than 2,000 years ago. Big problems are recognized and vigorously attacked, but the little economies or means for improvement often are neglected. Not infrequently, however, attention to details will spell success or failure.

Since there is no detail of operation too small for presentation in ELECTRIC RAILWAY JOURNAL, constant efforts are made to discover new and better ways of doing the countless little jobs that are part of the business of furnishing transportation. The mountains receive their share of attention in the longer articles, but the molehills are not overlooked. The proof of this is to be found in the short items published each week telling of the latest developments in shop, track, line and all other departments of the railway.

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Publishers of
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Ingenieria Internacional
Bus Transportation
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Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

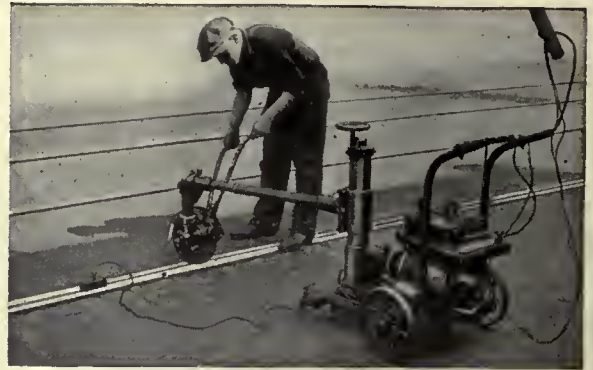
 BETTER RAIL, BETTER TRANSPORTATION

Increasing speed with safety.

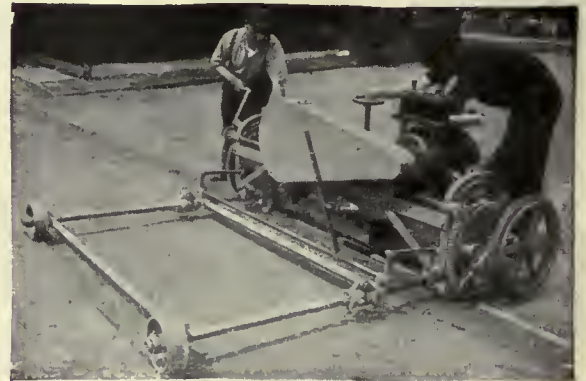
Mr. E. J. McIlraith, Staff Engineer, Chicago Surface Lines, speaking before the Wisconsin Utilities Association listed sources of delay in city operation. Among them are:

- “Car operating on too slow schedule speed.
- Trolley pole comes off.
- Crew has trouble throwing switch.
- Car develops a defect.
- Car must take curves slowly.
- Car moves over special work slowly.
- Car weaves, jerks or pounds low joints so as to make slow speed necessary.”

Each of these delay factors may be directly or indirectly traceable to lack of adequate track maintenance. Rail grinding and Ajax Arc Welding make economical track maintenance easy.



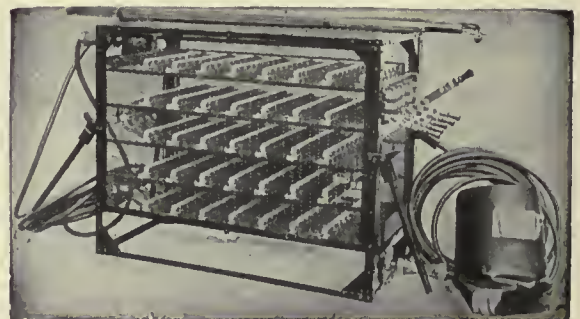
Eureka Radial Rail Grinder



Vulcan Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York City
 Chas. N. Wood Co., Boston
 Electrical Engineering & Mfg. Co., Pittsburgh
 H. F. McDermott, 208 S. LaSalle St., Chicago
 P. W. Wood Railway Supply Co., New Orleans, La.
 Equipment & Engineering Co., London
 Fraxar & Co., Japan

⊕ 2335

 BETTER RAIL, BETTER TRANSPORTATION

DOLLARS AND SENSE!



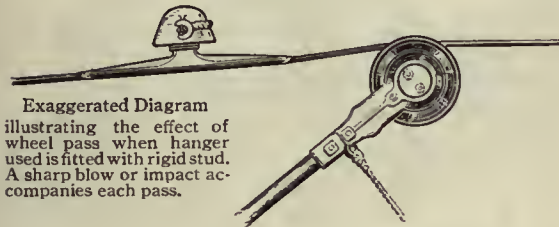
SMALL savings, in themselves insignificant, grow into vast sums when totalled. All have a distinct value in reducing operating expenses, thus increasing net profits. O-B Spring Lock Hangers contribute their share of the small savings.



The O-B Spring Lock Hanger provides a flexible connection between hanger and ear, and alignment of ear and trolley wire without affecting the tight union between ear and hanger stud.

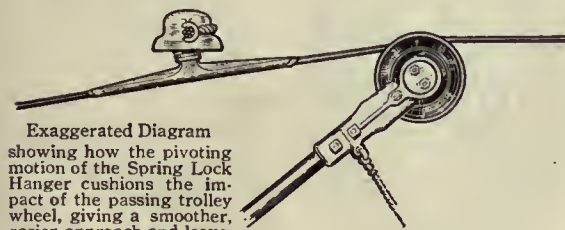
Cushion the Hammer Blow

OBSERVE the diagrams at the left. In the upper illustration the effect of a wheel pass on an ordinary rigid stud hanger is shown. No flexibility is provided. The wheel strikes the end of the ear with a sharp blow. The shock of this blow causes excessive wear on the ear—severe strain of the hanger insulation, and tends to cause crystallization of the trolley wire.



Exaggerated Diagram illustrating the effect of wheel pass when hanger used is fitted with rigid stud. A sharp blow or impact accompanies each pass.

The lower diagram illustrates the effect of a wheel pass on an O-B Spring Lock Hanger. The slight pivoting motion which takes place as the wheel approaches softens the shock or impact—cushions the sharp blow of the wheel—and thus lessens wear on the ear. Less strain is placed on the hanger insulation because of the large bearing surface of the spring and stud assembly and the pivoting action of the stud itself.



Exaggerated Diagram showing how the pivoting motion of the Spring Lock Hanger cushions the impact of the passing trolley wheel, giving a smoother, easier approach and leave.

The result is longer life of the ear, wheel and hanger—and less likelihood of trolley wire crystallization. A trial of O-B Spring Lock Hangers on your overhead will convincingly prove their greater value.

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co., Limited
Niagara Falls, Canada
859L

Ohio Brass Co.



- PORCELAIN INSULATORS
- LINE MATERIALS
- RAIL BONDS
- CAR EQUIPMENT
- MINING MATERIALS
- VALVES

NEW YORK CHICAGO
PHILADELPHIA

PITTSBURGH ATLANTA
ST. LOUIS SAN FRANCISCO

CLEVELAND
LOS ANGELES



“We Prefer AIR!”

A prominent transportation company which operates a large fleet of buses prefers air brakes to other types because:

“From operating standpoint: they take hold quickly in an emergency, but do not unbalance standees under ordinary stopping conditions . . . they work equally well whether bus is fully loaded or empty . . . they do not require excessive pedal pressure and therefore eliminate driver fatigue.

“From maintenance standpoint: they do not require constant adjustment nor frequent relining . . . they have a “velvet” action that does not tend to rock the body and chassis every time the brakes are applied.”

This is representative of the opinion voiced by many operators and manufacturers as well—who have adopted Westinghouse Air Brakes as standard equipment.

WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Brake Division: WILMERDING, PENNA.

WESTINGHOUSE AUTOMOTIVE AIR BRAKES

Golden Glow



Safety !

Safety is the watchword of today's transportation needs. Accidents are dangerous, costly and a constant drain on resources. Safety pays dividends.

Good headlights provide this safety in night operation—while makeshift headlights or marker-lights are entirely inadequate in competition with the brilliant lighting of swiftly moving automobile traffic.

Let us tell you about Golden Glow Headlights fully described in our latest pamphlets. Send for copies today.

Type DG Golden Glow Headlight for city service. Being fitted with a Golden Glow prismatic reflector it illuminates a wide area adjacent to and for about 50 feet ahead of the car.



Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District Offices at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

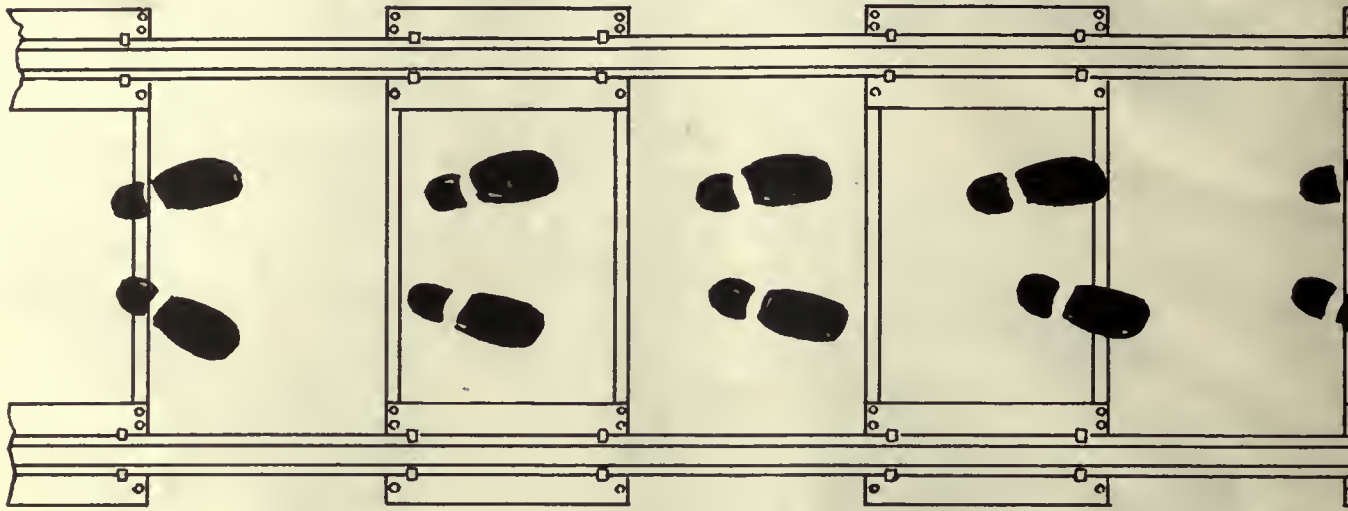
ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

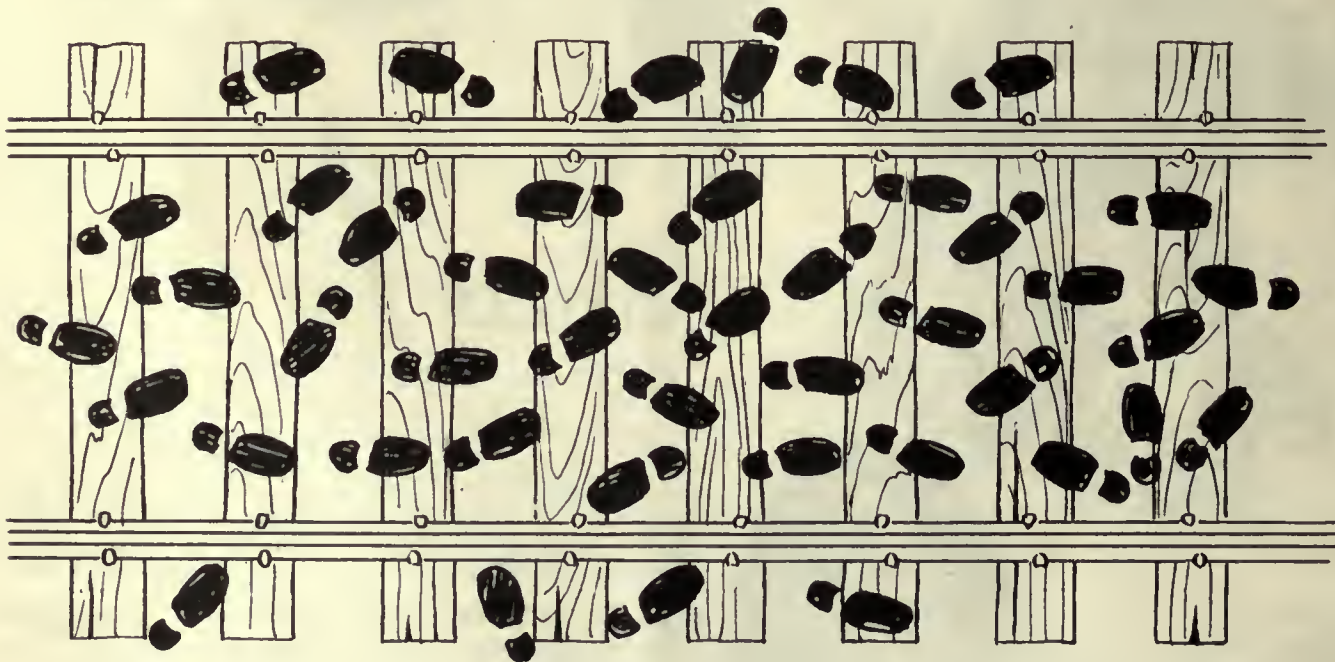
AND INDUSTRIAL ELECTRICAL MATERIAL



MASS PRODUCTION OF



THE path of *mass* production is the path of men and machinery. Machinery that uses *electric* power instead of *man* power—machinery that produces a better job in less time, at less cost, with greater efficiency. This mass production path is the only efficient way to build any kind of paved track, the *only* way to build the *best* paved track.

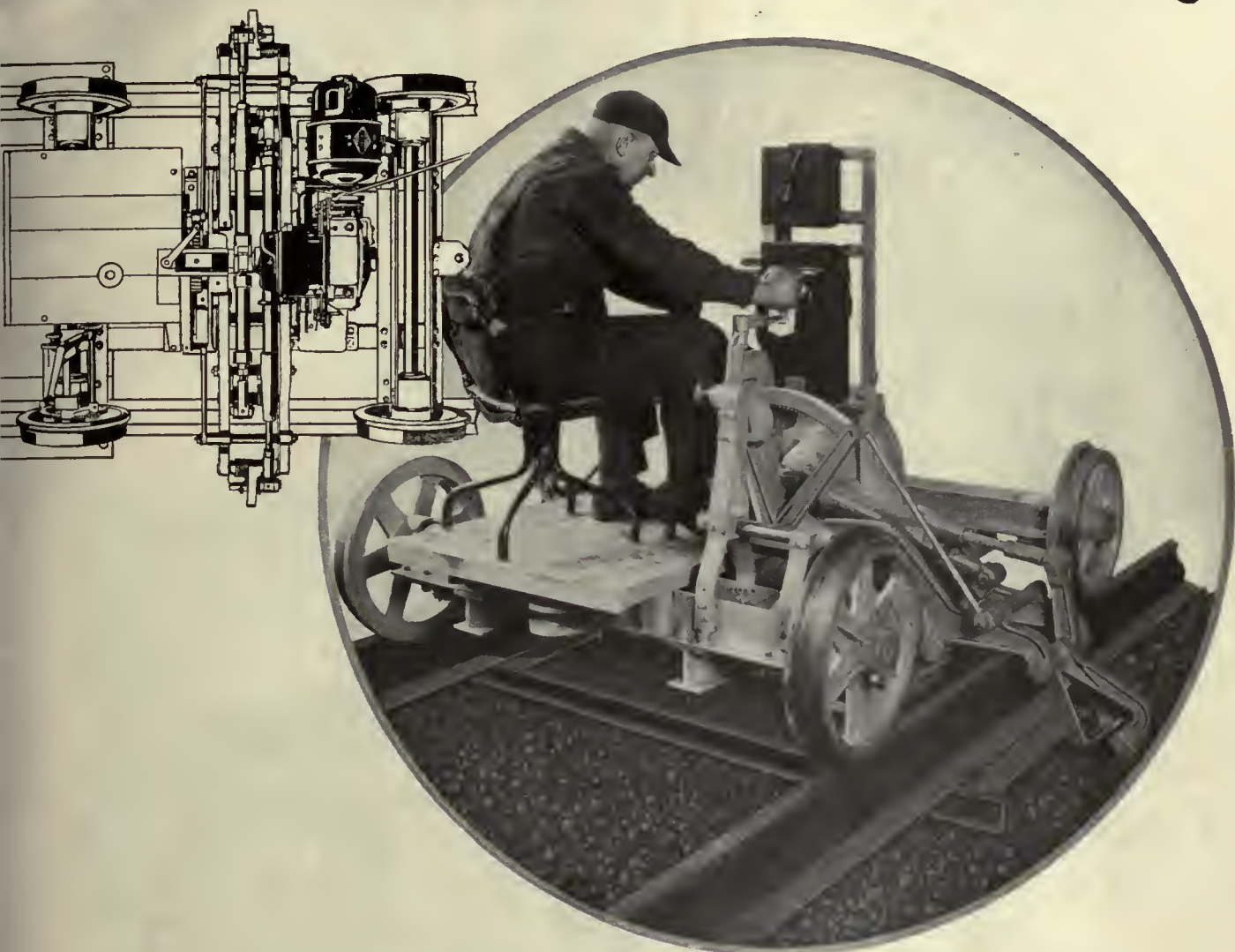


THE path of *man* production is the path of labor gangs with picks, shovels, mauls, tongs, tampers and other tools that utilize *man* power. It is the path of high labor costs, inefficiency and hazardous results. Good paved track *has* been built with labor gangs—but with modern machinery *better* track can be built at *less* cost than gang labor ever has or ever will produce.

STEEL TWIN

THE BASE OF

MAN PRODUCTION?



THE underlying principles of mass production methods are familiar to all, but perhaps a re-statement of two of them will help to show their application to paved track construction. A first principle of mass production is that human energy can be *profitably* employed only for the control and guidance of power, never for its supply; and the second, that parts and processes *must be standardized, uniform and interchangeable.*

Steel Twin Ties, by their uniformity and inherent labor saving features readily

adapt themselves to such methods and to the new track laying machines. And as in most applications of mass production methods where they replace the haphazard efforts of common labor, there is a vast improvement in the quality of the work, particularly with the Compression Tamper in the tamping operation.

May we send you our latest bulletins on Steel Twin Tie Track construction, compression tamping, and quote you on Steel Twin Ties for 2nd quarter delivery?

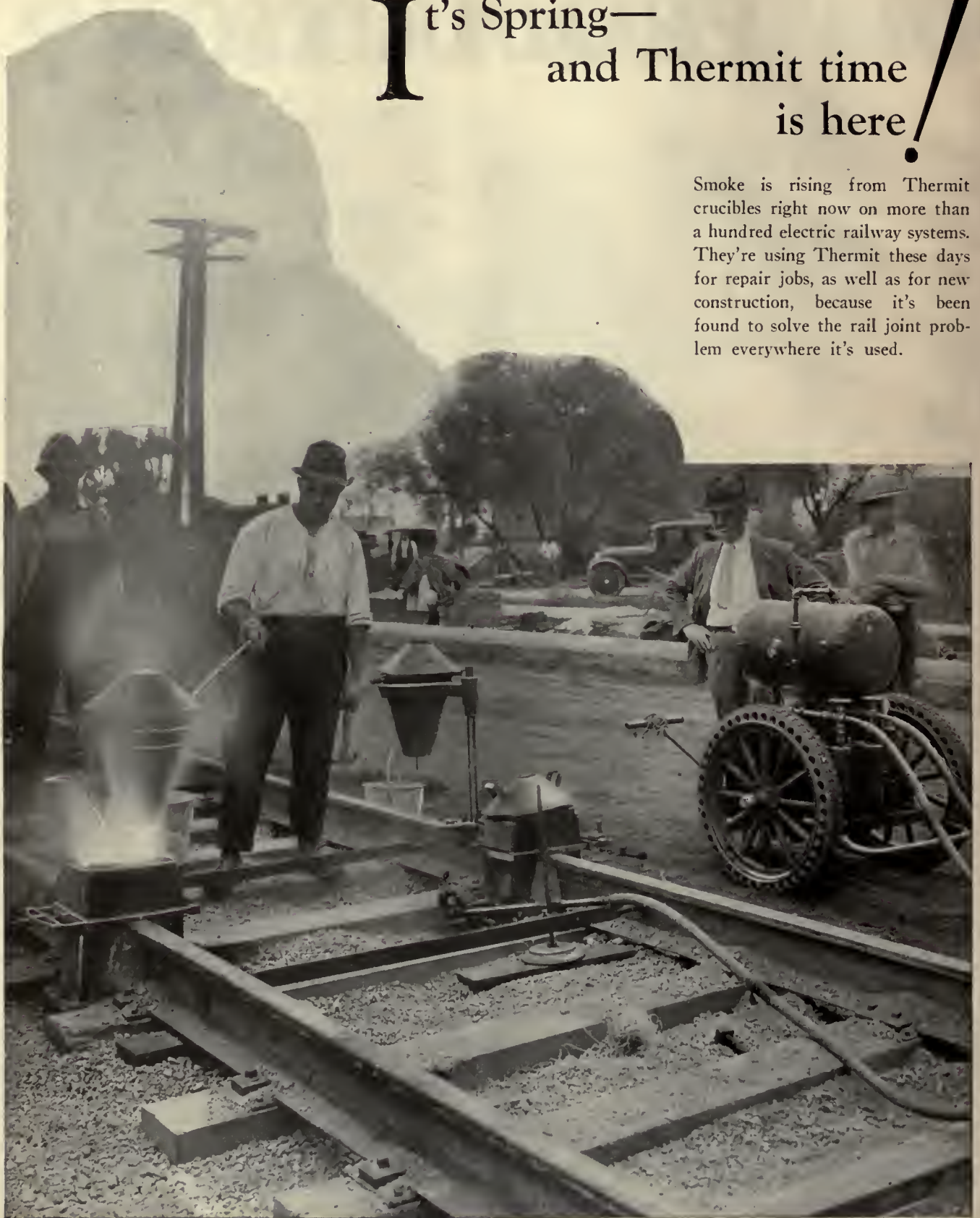
THE INTERNATIONAL STEEL TIE CO., Cleveland, Ohio

TIE TRACK

MODERNIZATION

It's Spring— and Thermit time! is here!

Smoke is rising from Thermit crucibles right now on more than a hundred electric railway systems. They're using Thermit these days for repair jobs, as well as for new construction, because it's been found to solve the rail joint problem everywhere it's used.



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

PITTSBURGH

CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO

More

VERSARE

Transportation Units



**Added to Fleets
of Boston El.
and N.E. Trans-
portation Co.**

Recognizing the safety, power, speed, reliability, comfort and capacity—combined with remarkable operating efficiency and economical maintenance—of Versare Transportation Units, the Boston Elevated Co. has added five units and the New England Transportation Co. six to their fleets.



Successful Performance



THE successful performance of Versare Highway Units under practically every operating condition in New York, Boston, Montreal, Albany and elsewhere evidences the sound engineering and fine construction embodied in these Units.

They enable electric railway companies and subsidiaries to tap profitable territories and maintain schedules in crowded city traffic and over long stretches of interurban highways.

Their attractiveness, convenience, comfort and safety are important factors in holding the good will of the traveling public and increasing patronage.

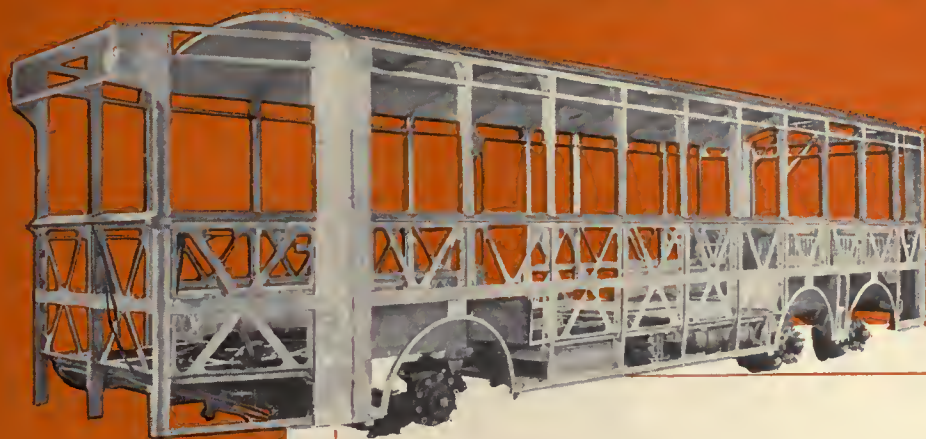
All space is utilized with ample capacity for 37 seated passengers and 37 standees. Seats are wide and comfortable. Features that appeal to passengers are absence of engine fumes, vibration and noise, wide doors, low steps, unobstructed view, convenient push-buttons, separate entrance and exit doors, and various other refinements, add to the appeal.

The Versare Six-Wheel Highway Unit makes efficient use of the time-saving, comfort-promoting "circulating load."



The rear cross seat above the engine. Notice that this is normal and comfortable in height. Drastic insulation, against noise, heat, and fumes, precludes any trouble from these sources.

Remarkable Construction



Side view of Versare frame, showing girder construction, extruded side posts, and wheel housings. This entire fabric is of Duralumin and Aluminum.



Rear view of Versare frame showing engine mounting and heavy channels affording protection at corners. When engine is installed this channelling extends clear across the back behind the bumper.

PARTICULARLY pleasing to the experienced engineer is the rigid, trussed girder construction of the Versare body. It follows the design of the strongest modern bridges, securing utmost rigidity and stiffness.

The body framework is sectionalized. Should damage occur entire units are easily replaced without dismantling the rest of the body.

The girders, angles and castings are made of Duralumin—light, yet enormously strong; comparable to finest steel; and so extensively used in dirigibles. The side posts are of extruded Duralumin with a tensile strength of 55,000 lbs. Panels, and housings are Aluminum.

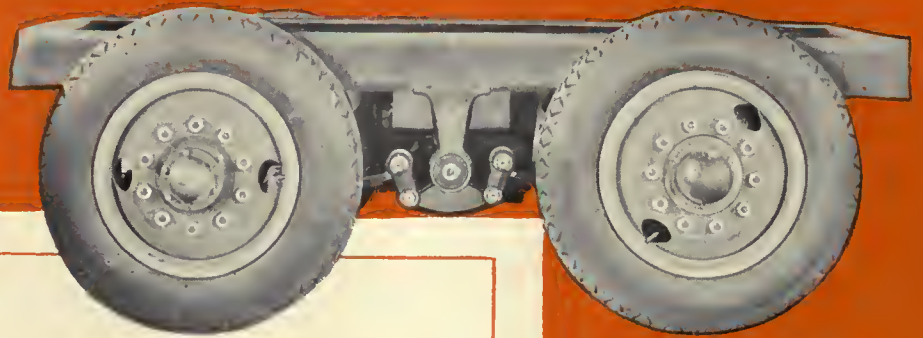
The 125 hp. gas-electric power unit is the latest development—with quick pick-up, extraordinary hill climbing ability under full load and fast.

The power equipment is in the rear, well protected and very accessible.



Showing engine installed and manner in which panel lifts up for inspection or removal.

Superior Features



The fact that Versare Highway Units have covered 500,000 miles without one dollar expense for body maintenance speaks volumes for Versare Unit construction.

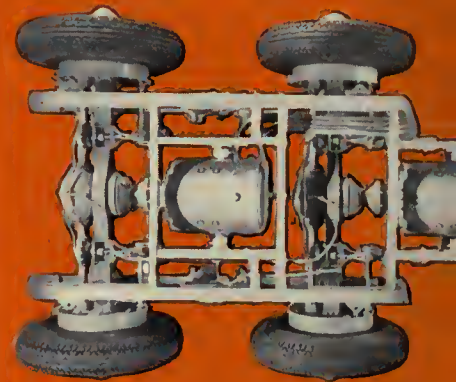
General Specifications

- Engine: Heavy duty 6 cylinder 25 hp.
Electrical Equipment: Versare-Westinghouse Type 177 generator; two Versare-Westinghouse 33 hp. vehicle type motors; Westinghouse standard vehicle control equipment.
Brakes: Westinghouse Air on four wheels. Mechanical hand brakes on two wheels. Resistor for electric braking in emergency.
Axles: Versare-Eaton, both front and rear Patented Versare Equalizer on rear truck.
Wheels: Van Type 728.
Body: Duralumin truss construction.
Doors: Front, 36 in. duplex outward folding. Rear, 29 in. dual duplex outward folding with or without Automatic Treadle control.
Length: 28 ft. { overall. Wheel- { 180 in. base { 195 in.
29 ft. 11 in. {
Beadth: 8 ft. overall. Aisle width 21 in. at seat base. 24 in. at seat back.
Height: 9 ft. overall. Headroom 6 ft. 6 in.
Turning Circle: 56 ft.
59 ft .

We will gladly tell you more about this remarkable transportation vehicle on request.

Versare Corporation
Albany, N. Y.

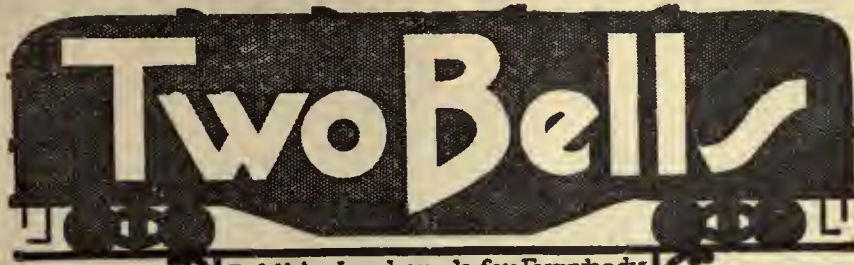
Side view of rear truck showing the Versare Patent Equalizer which distributes road shocks over four springs and achieves "floating ease in riding."



Plan view of rear truck showing arrangement of drive motors and their method of suspension in trunnions.

The Versare - Westinghouse power plant. Smooth, quiet and amply powerful to give high sustained speed and snappy pick-up. This is in position of mounting. Note extreme accessibility of all vital parts.





ATLANTA
Vol. 2, No. 9

Published each week for Everybody
by the Georgia Power Co.

GEORGIA
Feb. 27, 1928

The Treadle—What Is It?

TREADLE—a rectangular piece of corrugated aluminum located just in front of the rear door of each of Atlanta's safety cars. When properly used, it automatically opens the rear door, adding greatly to the convenience of car riders who have learned to use it.

Neglected Kitchen Week" Holds Sway Feb. 27-Mar. 3

Yes, Genevieve, this is "Neglected Kitchen Week," but that doesn't mean you have to neglect your kitchen until the calendar turns over a new leaf. It simply means that the Georgia Power Company and Davison-Paxon Company week are sponsoring a movement aimed to modernize all neglected

kitchen is one of the most inter-oms in any home, and usually which gets the least attention. Modern idea calls for colors in things, the same as in any

of this trend, Roper every housewife, have which satisfy all pop- demands for color are porcelain enam- imperial red, jade with soft grays gling colors.

Georgia Power is display- ators and colors, uring ish-

And that, dear readers, is the defini- tion of a treadle as found in the diction- ary of W. H. McAloney, the Company's Superintendent of Equipment. However, it doesn't begin to tell of the many ad- vantages offered by the treadle.

In the first place, the treadle offers a safe, convenient method by which you may alight from the car. You simply ring the bell in time for the operator to stop the car before you reach your corner. You stand on the treadle and wait. The car stops and the door opens. You alight. Easy enough, isn't it?

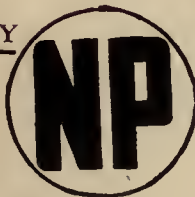
Mechanical attachments make it im- possible for the door to open before the car comes to a stop and also prevent the car from starting until the door has closed again, eliminating all possibility of accident.

If you are seated toward the rear of the car, it is much more convenient for you to leave by the rear exit. It saves you time and prevents the necessity of your crowding through any group of passengers who may be congregated at the front of the car.

The treadle is there for your conven- ience. Use it!

"I see that you've given up teaching your wife to..."

CONSTANTLY



BETTER

TREADLE-IZATION

The above is a reprint from the weekly house organ that the Georgia Power Company sends to its riders. They are using the Treadle in their public relations work because it has a rider-appeal.

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works, Rahway, New Jersey

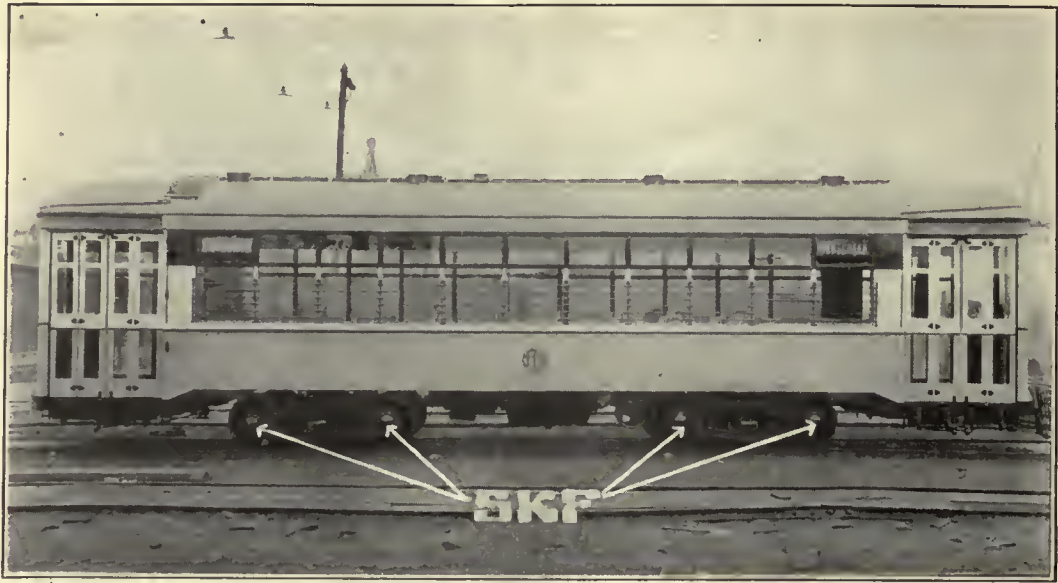
CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Nothing is apt to cost so much as a bearing that cost so little!



Operating Economies Plus Public Good-Will Demand the Use of **SKF** Journal Bearings

IMPROVEMENTS in electric railway equipment invariably call for the consideration of roller bearing journals. That **SKF** Journal Bearings reduce maintenance costs and improve service has been conclusively proven on steam and electric roads in the United States and on the railroads of 21 countries abroad.

SKF Journal Bearings are rugged, de-

pendable units which do not require continual vigilance and inspection to keep cars on the road. Journal wear, collar wear, hot boxes and waste of oil and packing are entirely eliminated. The oil supply is sufficient for three to nine months according to service. Added to these advantages is that of smooth riding cars—a certain builder of public good-will that pays dividends.

*You men who plan, build, use or pay for machines of any kind, remember this: It costs more to replace a poor bearing than to buy the best one that **SKF** ever produced. AND **SKF** ANTI-FRICTION BEARINGS ARE THE HIGHEST PRICED IN THE WORLD.*

SKF INDUSTRIES, INC., 40 East 34th Street, New York, N. Y.

2057

SKF

Ball Bearings



Roller Bearings



Do you care to know how much a
two second advantage is worth
in accident prevention?

By actual test the Cincinnati Duplex Air and Magnetic Brake has increased the rate of retardation of an average double truck car by 53% at 19.5 m.p.h. and at 45 m.p.h. by 66%. This means an absolute stop in from 2.4 seconds to 6 seconds sooner—emergencies met—accidents prevented. Cincinnati Duplex Air and

Magnetic Brakes are standard equipment on all Cincinnati BALANCED Lightweight cars.

Data—actual reports of accidents prevented by motorman on Cincinnati BALANCED Lightweight Cars—are available.

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI
BALANCED
LIGHTWEIGHT **CARS**



THE

4



“STANDARD”

FACTORS

Longer Periods Between Renewals
Dependable Uninterrupted Service
Lower Repair Costs
Safety at all Times

LET THESE FACTORS BE YOUR GUIDE IN THE SELECTION OF

STEEL AXLES

STEEL SPRINGS

ARMATURE SHAFTS

ROLLED STEEL WHEELS



STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS

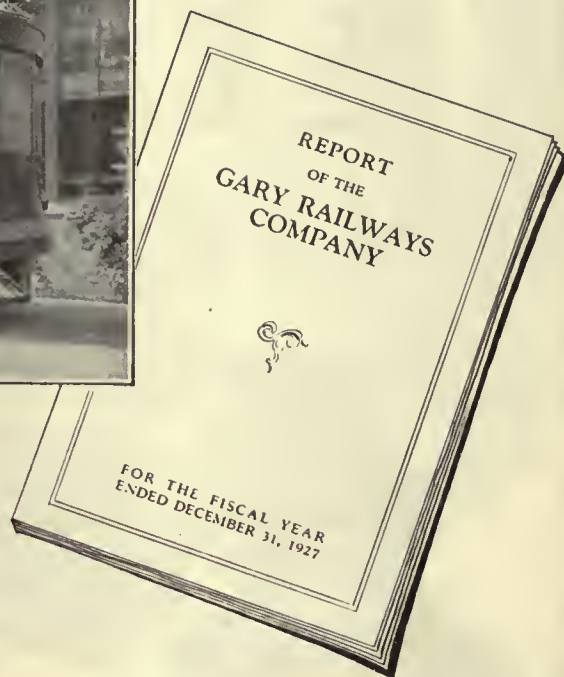
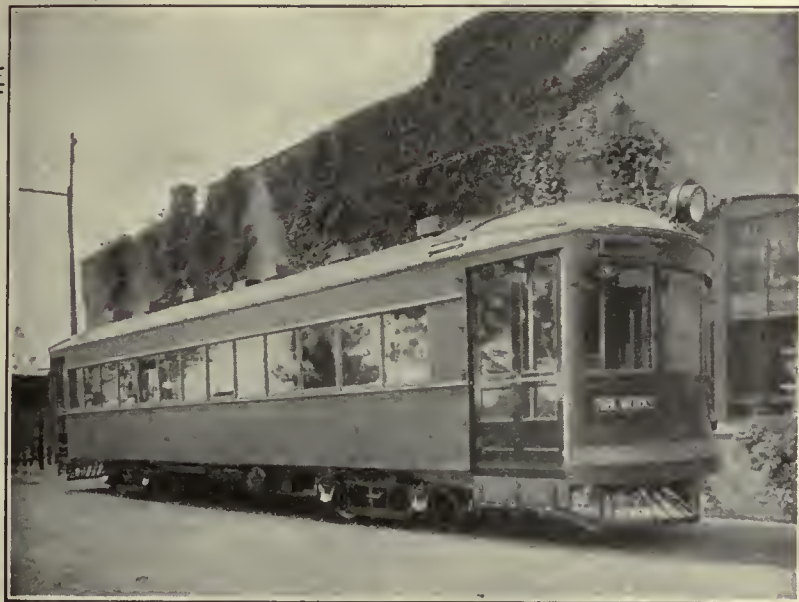
NEW YORK
HOUSTON

PORTLAND
RICHMOND

SAN FRANCISCO
ST. PAUL

PITTSBURGH
MEXICO CITY

WORKS: BURNHAM, PA.



Plain facts on the
“public approval” of

Modern Cars

The following is a paragraph from the Annual Report of the Gary Railways Company:

“The 23 light-weight, one-man cars which were acquired during the past two years represent a notable advance in street car comfort and design and in economy of operation. With their low stream line construction, comfortable, upholstered seats, linoleum-covered floors, low steps, and complete safety equipment, these cars have brought about a marked improvement in the speed and safety of service and have *won wide approval among patrons.*”

Further proof that properties we have served are realizing on their investment in Modern Cars.

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Mfg. Co.

111 W. Monroe St.
 Chicago, Ill.



Out Go Defects.... In Comes Mileage

Here a ten-thousand-ton hydraulic press is transforming GARY "wheel blocks" into GARY "wheel blanks."

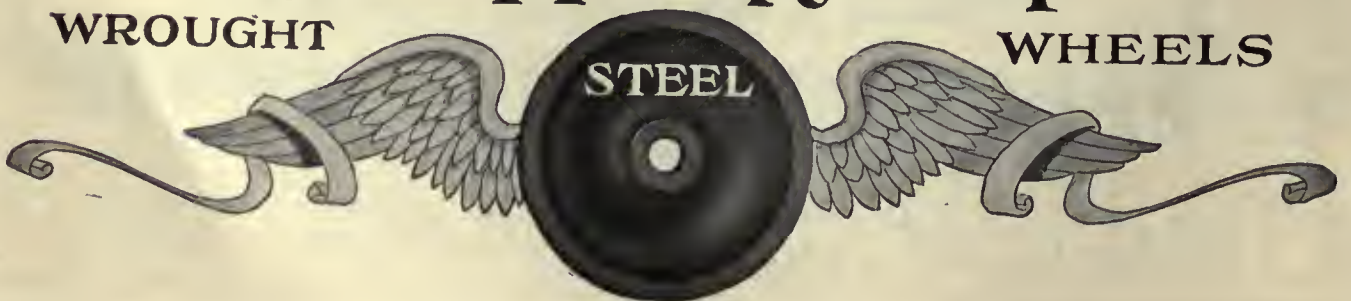
Defects are forged out—and extra mileage forged in. The hub is formed, the flange and rim partially formed. The blank is being made ready for the rolling operation where further reduction and refinement is to take place.

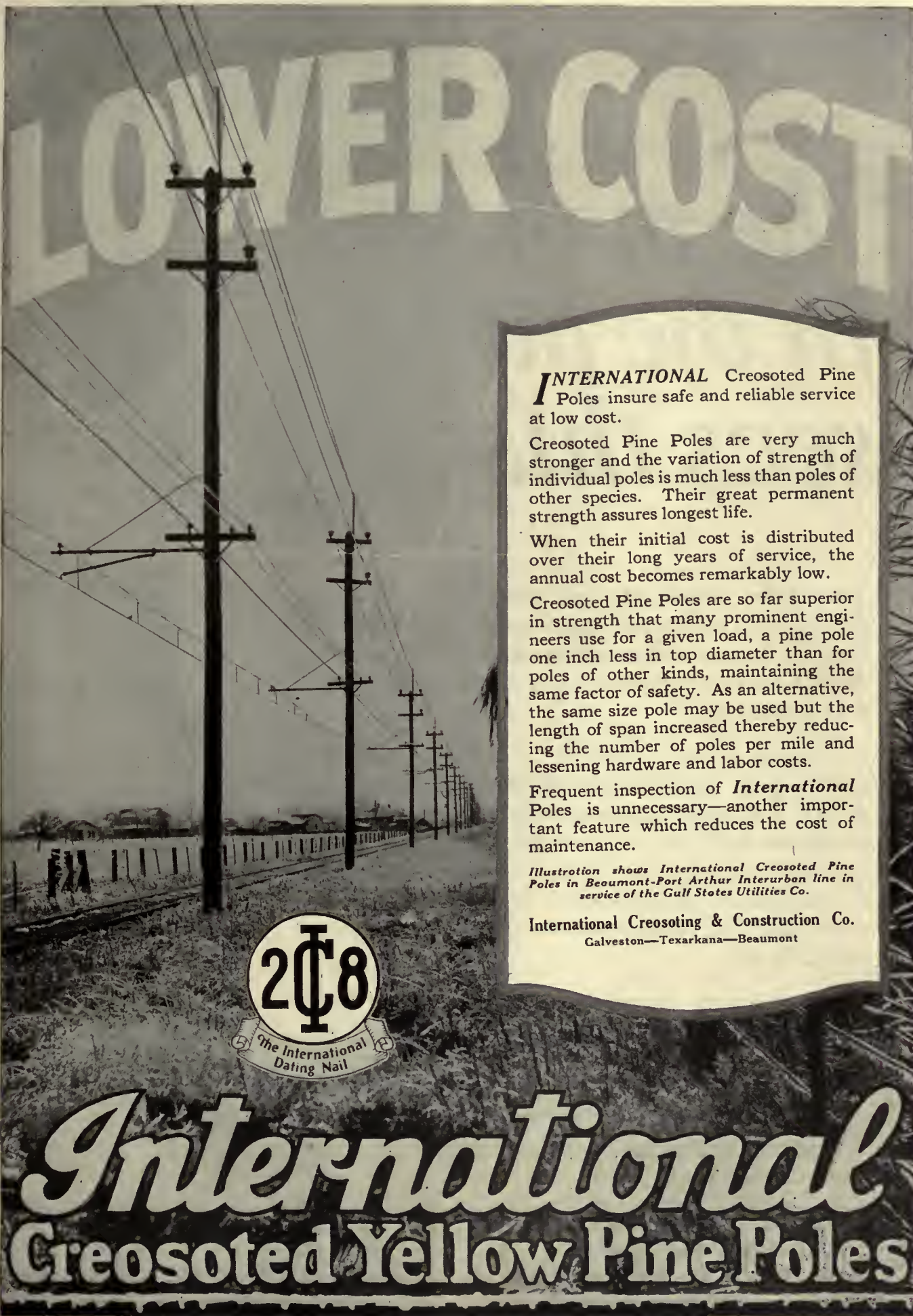
The course of GARY WROUGHT STEEL WHEELS from block to finished product is a steady one toward mileage. Our wheel engineers are at your service.

Illinois Steel Company

General Offices: 208 South La Salle Street
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International Creosoting & Construction Co.
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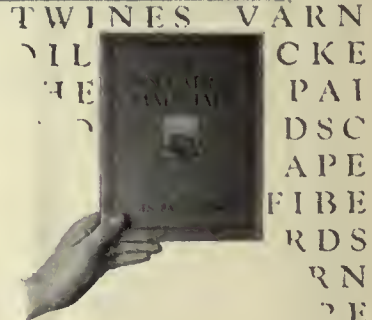
The man in the pit sees this



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Electric Railway Journal

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Consolidation of
Street Railway Journal and
Electric Railway Review

CHARLES GORDON
Editor

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When a Contract Is Not a Contract

PROVISION against confiscation of property without due process of law, as stated in the Constitution, has been a life saver to utility corporations in these days of advancing operating costs. For years New York City has waged the fight to prevent utilities from increasing rates to the point where they would become self-sustaining. True, the Consolidated Gas case was decided in favor of the company, but that only made the authorities more adamant in their refusal to grant relief to the transportation companies. The contracts were considered unbreakable. They had been drawn by astute corporation lawyers at a time when it was feared the city would force a reduction in rates. With the tables turned, the city has stood ready to collect its pound of flesh.

The decision of the federal statutory court, rendered May 2, if sustained by the United States Supreme Court, will change all this. It holds the 5-cent fare on the subway and elevated lines of the Interborough Rapid Transit Company to be confiscatory, and for that reason enjoins the Transit Commission from enforcing various rate limitations, restricting the fares charged on the Interborough lines to 5 cents.

The decision is of greater moment locally than outside of New York, since in nearly all other cities the fares have been readjusted along business principles. It does confirm the judgment of those who have fought for the application of the rule of reason in dealings between regulatory bodies and the utilities, and so is greatly to be welcomed. It is to be hoped that it will prevent for all time the policy of some city administrations of making an issue out of the rates charged the public for transportation, and allow development to proceed along economic rather than political lines.

That the Executive May Be a Leader

RULE books for trainmen are common. Those for other railway employees are few in number. Rule books outlining the duties of executives are rare indeed. Nevertheless, one of the latter has been developed by the Chicago, North Shore & Milwaukee Railroad as part of its service improvement program. The book is unusual, not only because very few of this type exist, but also because of its contents and the purpose for which it was intended.

Containing as it does a collection of principles to guide all the men in the company in supervisory work in their relation with subordinates, it is a means of showing them the way to respected leadership. Of course, it is evident to anyone that the mere knowledge of principles such as these will not in itself make a man become a capable executive overnight. Nothing can replace character and personality. These cannot be obtained from the study of

any book of rules. Study of principles, however, should give the executive working tools, and if he will use them in a practical way he will naturally become a better leader.

The material in the rule book is merely suggestive. In executive work it is difficult if not impossible to make a hard and fast set of rules. The style used is the most effective, in that it leaves to the initiative of the individual the detail of the course he should follow in meeting any particular situation. Good judgment of course is essential in using any such code of principles.

The book was intended to foster good will and co-operation between employers and employees. Two of its five sections, headed "Building Morale" and "Relations Between Executives and Subordinates," bear this out. The method of securing the information, by informal conferences, discussions and questionnaires, also indicates that the purpose of preparing the book was to establish better relations.

Any executive who practices the principles outlined in the book is certain to command the respect and receive the co-operation of every employee and thus make himself, in the true sense of the phrase, a better leader.

The Carcass of a Former Giant

OUT of the ashes of the receivership of the once magnificent Detroit United Railway there shortly will arise a new company. Physically, it will be only a semblance of the former giant system of city, suburban and interurban railways, but it will be articulate. The city lines once included in the system are under municipal ownership, one of the interurbans formerly considered most promising has been cut off entirely as not consistent with the plan now in view, and, finally, the holders of the common stock have been wiped out entirely.

The present management had nothing to do with the situation; it was inherited. The problem before it was almost insuperable. That it has been able to work out the present plan is a matter of congratulation. But how much better it would have been if the régime that went before had had a keener appreciation of the value of good public relations and been endowed with only an iota of the vision that has characterized the rehabilitators of the system!

The management of the old Detroit United dissipated its energies in a fight with the city while it neglected the suburban and interurban lines. It lost out in the city and then found itself confronted with problems elsewhere with which it was ill equipped to deal. Its code was antiquated. If it distinguished correctly the growing pains of the colossus that is now Detroit, it was staggered by what it sensed. And, as often happens, a man who had come up from the bottom, made an immense amount of money and had succumbed to the political

itch, turned out to be the David who slew the giant with weapons of the giant's own choosing. Meanwhile the industry as a whole watched in disgust the unequal combat and saw the gladiator ride from one political office to another, and finally into Washington, the crowning compensation of a people who could do no more for him. These were the days in which the electric railways were just beginning to awaken to the fact that industry consciousness and industry responsibility did not begin and end with an annual convention.

The handling of the old property is in strange contrast with the quite heroic battle of the representative of the road's creditors. It is a contrast not flattering to the régime which in practicing the art of public utility management regarded by some at that time as Machiavellian and the beginning and the end of all things was about as successful as was Machiavelli himself in his efforts to turn to his own account the shrewd practice which he expounded so succinctly. The charitable thing is to dismiss the matter on the ground that the executives know no better. That, however, is small compensation to an industry which now finds it difficult to explain away the physical fact of municipal ownership in one of the biggest cities in the country and still smaller compensation to security holders of one class or another who have had to bear the colossal shrinkage incident to failure and foreclosure.

Cultivating an Unworked Field

WHILE freight has been mentioned many times as a potential source of revenue for the interurban railway, it is not so often that actual results are obtainable to prove the point. The article appearing in the JOURNAL last week, however, indicates the extent to which a line can build up its freight business in a short time. When the present management took over the Chicago, South Shore & South Bend Railroad less than three years ago freight was a minor source of revenue. To remedy this situation an intelligent and constructive program was adopted. Interchange arrangements with other carriers were effected, passing tracks were lengthened, new freight houses were built and new rolling stock and locomotives were purchased.

These changes in the physical layout of the plant and in the arrangements were not in themselves enough to bring in the business. The management took the viewpoint that if the patronage of the public was to be secured, entirely new methods of doing business would have to be adopted by the freight department. Accordingly through routes were established in conjunction with other railways and tariffs were made accordingly. Attention was paid to the development of a fast overnight service, particularly between Chicago and the principal points on the line. Delayed shipments were not left to take their own course, but care was taken to trace them by wire. Personal contact between the solicitors of the road and the shippers also assisted in an understanding of the problem, so that better and quicker handling of shipments has become possible.

As a result the freight business has grown by leaps and bounds. The revenue doubled in two years, and is still on the increase. As an indication of the growth, the company originally ordered four main-line locomotives for the service. Within a year two switchers were added, and in March of this year two more main-line locomotives were placed in service, doubling the original equipment. Nor has the increase in the freight business been at the

expense of passenger traffic, for that has shown an equal growth. But that is another story.

Examples such as this justify faith in the interurban railway when it is rightly placed. Not every property has equal possibilities; but there are many roads that today are not profitable which could, with the use of considerable brain power and relatively little expenditure, become sources of revenue that would make them attractive to investors as well as to the shippers in their territory.

Distribution—Industry's Greatest Problem

WASTEFULNESS in the distribution system is considered by many authorities the gravest issue now before American industry and commerce. Our production methods are without an equal. As a nation we have been eliminating waste, standardizing and simplifying manufacturing methods, and increasing production efficiency, but according to Dr. Julius Klein, director of the U. S. Bureau of Foreign and Domestic Commerce, the wastefulness of our distributing methods, viewed from any angle, looms up with compelling magnitude. In amount it is estimated at some \$8,000,000,000 annually.

There is no way of checking accurately the losses involved through practices such as the careless administration of credit, careless installment selling, ignoring of good markets, overselling of poor markets, and mistakes in other distributive elements such as warehousing, delivery, advertising, clerical hire and management of traveling salesmen. When the actual returns of wholesalers and retailers are examined, it is found that their average profit in 1925, the latest year for which complete statistics are available, was 2.2 per cent of their total revenue, as compared with 5.9 per cent for manufacturers and 12.5 per cent for bankers. Next to agriculture, the wholesale and retail trade had the lowest net profit.

Recently when executives of a large number of firms were asked what efforts they were making toward remedying this condition 73 per cent replied that they were endeavoring to reduce production costs, but only 29 per cent indicated any effort to cut sales expenses. Evidently there still is much to learn if retail selling is to pay a profit.

But what should we know about distribution and how can we discover the wastes and their remedies? The problems which are uppermost in the minds of thousands of distributors, according to queries received by the Department of Commerce, seem to be primarily of two varieties: (1), where can things be sold and (2), how much should it cost to sell them? Blind marketing and the exploiting of remote territories seem to be our chief shortcomings.

To gain information on these subjects requires no elaborate research agency. The facilities of the Department of Commerce and numerous other organizations are ample to keep any far-sighted manufacturer advised as to market changes and factors which affect the demand for his product. With this information and the efforts of literally hundreds of agencies, it would seem that the actual materials for the improvement of this situation are available. The next major problem is to apply the data produced by these agencies to the actual problems of marketing. Therein lies a great field for the future improvement of distribution conditions in this nation.

Keep Cars on the Road Where They Can Give Service

SINCE the business of electric railways is to provide transportation every effort should be directed toward keeping cars on the road. That cars are too valuable to be held in shops any longer than necessary should be the governing principle on which a modern electric railway repair shop is designed. Whether small or large the modern shop should be equipped with every practical device for making repairs quickly and returning cars to service speedily.

The better the shop and the faster it can turn out work the smaller it can be on a particular property. It should store virtually no cars, for they should be kept on the road where they can earn money. To keep an investment of \$15,000 or more per car working as nearly full time as possible justifies a large investment in spare parts and shop equipment. Then, too, the number of spare cars can be reduced. If this policy makes it possible to provide a given service with fewer cars the saving both in the investment in cars and in the investment in shop buildings is obvious.

An outstanding example of what can be done in speeding truck repairs so that cars will be available for service a maximum part of the time is furnished by the truck repair methods used in the Coney Island shops of the Brooklyn Manhattan Transit Lines, which form the subject of an article in this issue. Here the time that a car is in the shop for truck repairs is only that needed to drop out the disabled truck and replace it with a repaired one. This is made possible by adequate cranes, drop-pit transfer tables and other handling equipment so arranged that no time is wasted in the transfer. Repairs to the trucks themselves are also completed more speedily, since the work can be organized as a continuous process and no time is lost waiting for trucks to be placed in the shop.

A Sword That May Cut Two Ways

ECONOMY, at best, is only a negative virtue, and unwise economies are worse than none. Especially in furnishing transportation service, an economy is of doubtful value when it increases the difficulty of using that service. For a transportation company to withhold necessary expenditures for route and destination signs is an extremely poor economy. The company has nothing to sell except transportation, and transportation always involves a destination. If it makes a mystery of the destination of its vehicles it will ultimately find that it has no buyers for its wares.

Too often the managements of electric railways regard route and destination signs merely as a source of expense. Ostensibly in the interest of economy, for example, the management of one large property recently decided to remove all route signs from the rear and from the left-hand sides of its cars. Some time earlier the same company had abandoned the use of illuminated route signs in favor of a cheaper type. Of course these changes did not make it impossible for prospective passengers to determine the destinations of cars, but they did make it considerably more difficult to do so. After so much has been said in this industry about merchandising transportation it is almost incredible that any management should show such a woeful lack of salesmanship. The worst of it is, that this particular company is one of a considerable

number which still practice "economies" of this kind.

On the other hand, many railways are cheerfully assuming a greater and greater obligation of telling the public where their cars are going rather than leaving it to the passengers to find out for themselves. Large, legible, well-lighted destination signs have been placed on the front and rear of the cars and on both sides as well. Smaller signs in several places tell the destination on each particular trip. Some companies go even further and display prominently big numbers or letters to designate the route. Money expended for these signs is one of the best investments which any transportation company can make. The foolishness of buying a pig in a poke is proverbial. No sensible person would do it. No transportation company should ask people to buy rides on a vehicle when they cannot easily ascertain its destination.

Industry Results Reflected in Statistical Study

TRULY representative of the financial trend of the electric railway industry, the figures compiled annually by the Association from the operating returns of typical groups of roads for the previous year are always significant. This year they are, perhaps, especially significant since for the first time in recent years they reflect results in a period of restricted business. Interest just at this time is not so much in confirmation of the fact that the city lines are holding their own the best, but in the need for driving home the lesson of greater and greater vigilance by the interurban and suburban companies, which are the ones finding it more and more difficult to maintain themselves. From this latter group the private automobile and the intercity bus are taking a heavy toll of traffic. On the other hand, the city lines sustained a loss of only 1.26 per cent in revenue passengers in a year of subnormal industrial activity. Best of all, the city group was able to increase its net income substantially. Its operating ratio, 70.91 per cent, is still high, but the expenses have been pretty well stabilized.

It is encouraging that the study of the industry as a whole has established the fact that while buses were operated by the railways at a deficit in 1926, there was a substantial margin above expenses from this source in 1927. At first this might seem relatively unimportant since the gross of the bus lines is small compared with the gross for the whole group, but the results with buses are more significant than the stark figures would seem to indicate. They show that the industry is using the bus more intensively and more intelligently.

The greater operating efficiency shown in the statistics certainly reflects the more intensive effort being made to watch the little leaks. For one thing cars are being used to better advantage. But these are details the compiler of the figures has discussed in his own comments. Not for a moment can a single company in any one of the groups afford to let down in its efforts, but the suburban and interurban railways especially must be constantly on their guard. By and large, their case is acute, but the many instances of what individual roads in this group have been able to do should tend to spur on to greater and greater effort even the roads most sorely beset. In the past the suburban and interurban railways have had the majority of failures, but it also is in this group that instances have been furnished of the greatest hardihood and the most significant successes.

Modernization in Little Rock Brings Most Successful Year

Last two years show attractive earnings. One-man operation of cars has increased revenues, reduced accidents, curtailed expenses and promoted good will



"Be our guest—ride free and inspect this car," was the greeting that Little Rock citizens received from dash signs on the front end of their modernized transportation system

FURTHER confirmation of the success which is possible through modernization is furnished by the results achieved by the Little Rock railway property of the Arkansas Power & Light Company. As the capital of a state some 240 miles square in the heart of the Mississippi valley, Little Rock, with a population of slightly more than 75,000, finds it difficult to conceive of civic development without adequate mass transportation. Arkansas claims the distinction of not having had a single electric railway abandon its service with the advent of many things, including the automobile, that in recent years have caused concern to many street railway properties.

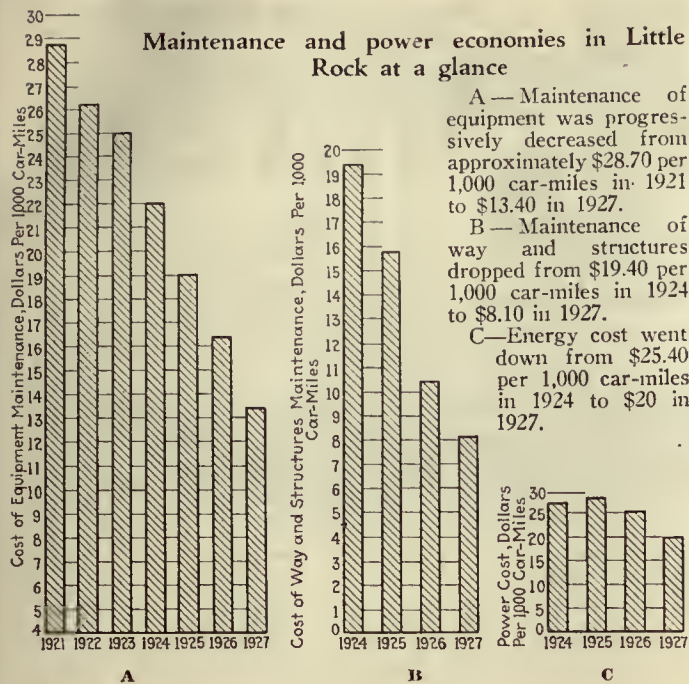
Realizing the greatest advantage of the automobile is its speed, the street car service in Little Rock has been given all the speed considered consistent with safety, as an accompanying table shows. Speed had much to do with the choice of 30 new single-truck "rail coaches" put in service early in 1926. For the same reason the company's double-truck cars were rebuilt in the same year and equipped with four motors instead of two in order to provide increased acceleration and higher speed.

In the modernization program the one-man system has

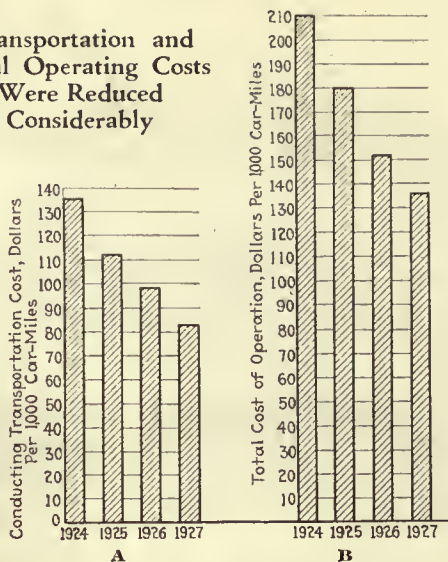
been adopted 100 per cent. New cars and those rebuilt since the change to the one-man plan was decided upon include, in addition to the 30 mentioned above, an earlier purchase of eight double-truck cars. In 1926 twenty existing double-truck cars were rebuilt and in 1927, automatic rear treadle doors were added to twelve cars to fit them for one-man service.

Because of the increases that were made in service when one-man cars were introduced, the total number of trainmen employed was not radically decreased. Subsequent resignations, discharges, and transfers to other positions have reduced the number of trainmen from 185 in 1925 to 105 as of March 1 of the present year. One immediate result of the use of one-man cars was the decrease of headways made possible on two of the more heavily patronized city lines, Fair Park-East Ninth, and South Highland-East Fourteenth. The improved service, backed by an extensive advertising campaign, is credited with having turned the tide of electric railway receipts in Little Rock. The increased receipts and a notable decrease in expenses account for the favorable net earnings which have accrued during the past year.

One bus line was started by the company to extend



Transportation and Total Operating Costs Were Reduced Considerably



A—Economies in the transportation department reducing the cost of conducting transportation from approximately \$136 per 1,000 car-miles in 1924 to \$83 in 1927.

B—Total operating costs, including conducting transportation, maintenance of way and structures, maintenance of equipment, power and traffic expense, dropped from \$210 per 1,000 car-miles in 1924 to \$136 in 1927.

service to two sections of the city not reached by street cars. Thus people living in Pulaski Heights may now go to the west end of the city without having to travel through congested downtown traffic, which means a considerable saving of time.

TABLE 1—NUMBER OF CARS ON VARIOUS LINES BEFORE AND AFTER ONE-MAN OPERATION

Lines	Rush Hours		Base Schedule	
	Before	After	Before	After
West Fifteenth—Missouri Pacific.....	8	9	5	5
South Main—Pulaski Heights.....	12	17	8	8
West Ninth—Rock Island.....	6	9	5	5
*Fair Park—East Ninth.....	12	14	6	7
*South Highland—East Fourteenth.....	7	12	6	6
Biddle.....	2	2	2	2

*Decreased headways on these lines resulting from the change to one-man cars have produced substantial increases in revenue.

During the year 1925 all the street cars, with one minor exception, were handled by two men. The exception was a line with two cars serving a small industrial section. In 1926 the company began substituting one-man cars in the place of two-man cars and by the latter part of the year the entire railway had been converted to the one-man system. With the change to one-man, the company has followed the plan adopted in many cities of having the name of the operator placed in the vestibule of the car. It is believed that the name plates have done much toward personalizing the service and creating a more friendly spirit between employees and their passengers.

Recent stringent restrictions to downtown parking in Little Rock have caused more people to appreciate the advantages of the street car service. Many persons who



Both single and double-truck cars are used to give efficient modernized service in Little Rock, Ark. One-man operation has permitted frequent headways with resulting increased revenue and reduced expense



Twenty double-truck cars of this type were completely renovated and equipped for one-man operation. Automatic rear-exit treadles have since been installed on twelve of them

formerly came to work in their automobiles are now using the street cars. To park three blocks from their places of business or else move their cars every hour has come to be regarded as entirely too inconvenient. Matinee fans are also finding that the parking restrictions are a serious drawback to the use of their cars. With the street car lines passing the doors of all important places of amusement, many theater-goers are leaving their automobiles at home.

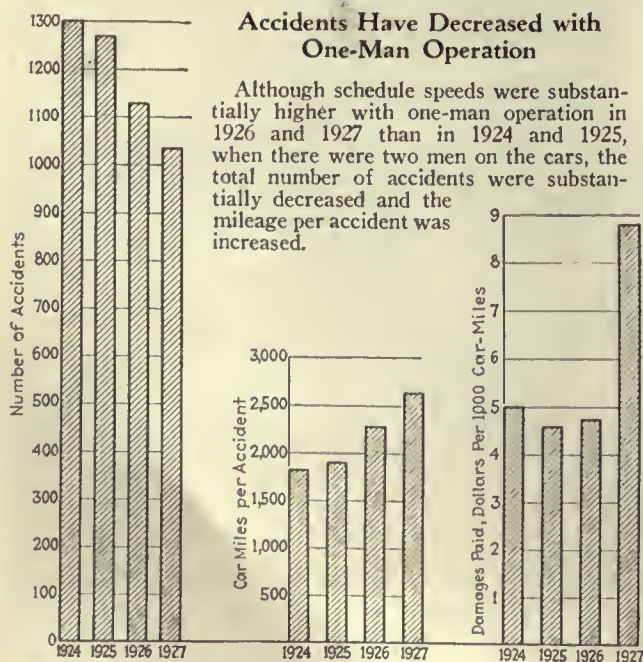
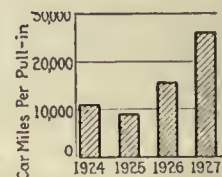
Coincident with the introduction of one-man service, street fare collectors have been stationed at three of the more important downtown corners which are transfer points. These men issue and collect transfers, sell tokens and make change prior to the arrival of the street cars. It has been found that the collector, during the few moments that he and the company's patrons have together while awaiting the arrival of a car, has an opportunity of making friends for the company and selling its service. With this in mind, particular care has been exercised in selecting these men. This idea was expanded during the holiday season by placing additional uniformed men at strategic points throughout the business section of the

city to assist Christmas shoppers in boarding the street cars in the more congested districts." In addition to supplementing the regular fare collectors these men carried bundles, and even babies, from curb to car-loading zones for the street car passengers and rendered such other help as was possible.

Comfortable seats have been ranked of first importance in equipping the cars in Little Rock. Lights, heating, and ventilation are other matters to which particular attention has been given. A schedule of daily cleaning for each car was set up when the new equipment was

Car-Miles Per Pull-In More than Doubled

When the cost of equipment maintenance is substantially decreased, pull-ins are a valuable guide in checking the condition in which equipment is being kept. While maintenance cost was reduced from \$28.70 per 1,000 car-miles to \$13.40, the number of miles operated per pull-in increased during this period from 11,000 to more than 26,000.



acquired. Vacuum cleaners are used for the de luxe cars that have upholstered seats.

An interesting exhibit which the company arranged for selling its service was that made the week of June 1, last year, in a downtown display window that showed an attractive street scene in which a moving street car figured prominently. The detailed story of this window display appeared in the Feb. 19 issue of the JOURNAL. Thousands of people were attracted by the novelty and considerable favorable publicity was obtained.

An intensive study of car doors and steps has been made in Little Rock in conjunction with the company's safety program. The decline in platform accidents which resulted was most encouraging. Accident figures month by month are shown on an accompanying graph. The Arkansas Power & Light Company was among the first to use rear-exit treadle doors. These were especially desirable in the South because of the so-called "Jim Crow law." By using both front and rear exits, loading and unloading of passengers was expedited and unnecessary mixing of races was avoided. Before the adoption of automatic treadles the cars had front entrances and rear exits operated with pneumatic control.

Power cost for three of the principal city lines was

TABLE II—COMPARATIVE RAILWAY STATISTICS BEFORE AND AFTER ONE-MAN SERVICE BEGAN

	Two-Man Service				One-Man Service	
	1922	1923	1924	1925	1926	1927
Car-miles.....	2,375,220	2,443,387	2,368,981	2,452,960	2,534,817	2,721,442
Car-hours.....	271,854	279,444	254,216	257,140	267,771	285,203
Energy consumption, kw.-hr....	8,371,308	9,125,022	9,193,230	9,195,280	8,637,526	8,500,000*
Average speed, m.p.h.....	8.74	8.74	9.32	9.54	9.47	9.55

*Approximate.

decreased 30 per cent. it was estimated, by the installation three years ago of an automatic substation. This station was built at a cost of approximately \$215,000, and is served by a 13,000-volt line from the company's main power plant. The station is also tied in with an inter-connected high tension distribution network of which the Arkansas Power & Light Company is a unit.

Logging Railroad Is Electrified

UNIQUE among the electrification programs carried on by many of the short-line railroads is that of the logging railroad of the Red River Lumber Company. The center of operations of this company is at Westwood, Cal., in the heart of the white pine forests in the northeastern part of the state. Nearly 25,000 loaded cars of logs are transported each season to the mill at Westwood from Chester, over 17 miles of standard gage road. In addition to the main line over this distance, there are also four passing tracks, totaling approximately 6,000 ft. in length. The electrification program of the company includes these passing tracks besides the main line. The change-over from steam to electric operation was completed on Sept. 15, 1927. The principal electric equipment includes two 61-ton, 1,500-volt electric locomotives, a two-unit 1,000-kw. 1,500-volt automatic substation, and overhead line material.

The two Baldwin-Westinghouse locomotives are of the steeply cab type and weigh 61 tons each. There are four driving axles, on each of which is mounted a Westinghouse type 582-FE-5 railway motor rated at 200 hp. The motors are arranged for field control and are direct geared. Although each locomotive is a complete unit, the cabs are arranged for multiple-unit operation by means of train line receptacles and jumpers and a power bus line between the two units. The two cabs working in multiple haul 20 loaded cars of logs over the 17-mile main line in approximately 75 minutes, giving a schedule speed

of 13.5 m.p.h. for the entire distance. The return trip can be made with as many empty cars as desired, up to a maximum of 50, in approximately 40 minutes. When operating on short field connections with the master controller in the full parallel position, the power peak required by twenty-car trains ascending grades will be approximately 1,265 kw.

The Red River Lumber Company owns and operates power plants, both steam and hydro-electric, totaling 16,000 kva. capacity. In addition to supplying power to their own interests, power is leased to the Pacific Gas & Electric Company. The company's three-phase, 60-cycle, 33,000-volt power line passes the railroad at Almanor Junction. A 33,000-volt branch line has been run from this point to the single substation at the load center of the electrification. The substation contains two 500-kw., 750-volt, shunt-wound, synchronous converters permanently operated in series to supply 1,500 volts direct current to the trolley. With the exception of a remote starting and stopping feature, the station is fully automatic. It is designed to carry 1½ times full load for two hours and a momentary rating of 300 per cent. A selector-type train dispatching system provides the remote control feature.

Because the logging equipment necessitated a large overhead clearance the distribution system was designed with an offset trolley. The trolley wire is 19 ft. 3 in. above the track and offset 9 ft. from the track center. A modified simple catenary suspension is used. For the greater part of the distance, a 300,000 circ.mil copper feeder is utilized as a messenger wire. Two parallel contact wires of No. 0000 copper are used, each of which is supported by alternate hangers. Because of topographical conditions it was impossible to extend the trolley along one side for the full length of the line. To meet this each locomotive is equipped with a double acting side-arm collector, whose normal position is at right angles to the track. Air cylinders move the arm to the right or left as required. A third cylinder brings the collector shoe in contact with the trolley. Pressure against the wire is maintained by tension springs.

Trains of loaded cars are made up and delivered to the electrified main lines by steam and Diesel-electric locomotives. As an overhead system would interfere with the switching of logging equipment on flat cars, these locomotives also handle the trains from the transfer at the Westwood end of the electrification. Empty cars to be returned are handled in a similar manner.



The two locomotives of the Red River Lumber Company pulling a train of twenty loaded cars

Bonuses Promote Efficiency on Denver Tramway

Trainmen with satisfactory records at end of the month receive a bonus of 2 cents per hour.

Five banquets are tendered each year

YEARS ago a merit and demerit system was adopted on the Denver Tramway System. The plan of giving minus points for rule violations and giving plus points for good records has proved an effective means of securing safe and efficient operation on the system. The trainmen with good records are given a cash bonus at the end of each month and, in addition, a banquet is given at the end of each three months for the division with the best record. Also, a banquet is held each year for the trainmen who have maintained a clear record for each month during the year.

From one-half to ten minus points are assessed against a trainman for any violation of a rule. A violation deserving a greater penalty than ten points means discharge. For operating any one month without minus points, five plus points are allowed. If the trainman has less than five minus points, the difference between the number assessed and five are given as plus points. The plus points give a trainman an opportunity of reducing the number of minus points or clearing his record entirely. A permanent trainman, after serving a six months' probationary period, is given a bonus of 2 cents per hour, providing his record shows ten or less minus points at the end of the month.

An additional bonus, competitive by divisions, of which there are four, is offered in the form of a banquet to the division operating most efficiently for a three months' period. The divisions are judged by the following rating:

Item	Per Cent
Adherence to schedule	35
Reduction of accidents	20
Energy saving	20
Reduction of complaints	10
Appearance of trainmen	5
Appearance of equipment	5
Condition of division headquarters	2
Reduction of guarantee paid	2
Reduction of division expense	1
Total	100

Besides the four banquets held annually for the most efficient divisions, a fifth is held at the end of each year for the 100 per cent men of the system—those who maintain a clear record at the beginning of each month during the year. Interest in these banquets is indicated by the increase in those eligible to attend. In 1926 the 100 per cent banquet was attended by 168 out of a total of 774 trainmen, while in 1927 the banquet was attended by 257 out of a total of 776. These banquets are enjoyed by both men and management and a spirit of good will prevails.

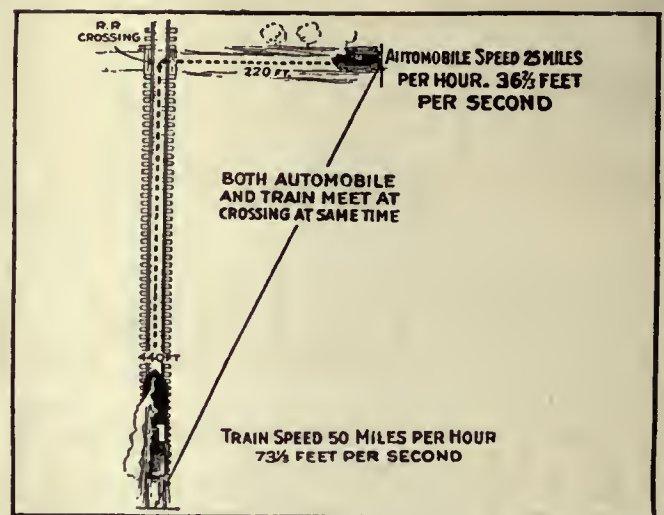
The 1927 banquet was held at the Albany Hotel, with Superintendent of Transportation J. L. Adams, as toastmaster. He introduced the officials and department heads of the company, including the president, chief surgeon, general attorney, chief engineer, auditor, purchasing agent, superintendent of power, traffic manager, claim agent, property agent and the assistant treasurer—all men with whom the trainmen do not often come in contact in the course of their work.

The outstanding number of the program was an address by President H. S. Robertson, which consisted of a review and explanation of the litigation with the city concerning fares and franchise rights. The trainmen welcomed the talk as a matter of information and appreciated the confidence reposed in them by a personal explanation of the corporation's side of the question.

A. Downing, representing the trainmen, spoke on the troubles of a trainman, or the effort required to maintain a 100 per cent record. With a liberal amount of entertainment by home talent to top off the evening, the banquet was pronounced most enjoyable.

A Deadly Geometrical Proposition

UNDER the caption "Let the Train Pass" the *Pennsylvania News*, employees' newspaper of the Eastern region of the Pennsylvania Railroad, invites the reckless driver to figure out this mathematical problem. It has



two answers; death or safety, and may well be applied to the interurban grade crossing. The drawing is credited to the Aetna Life Insurance Company.

Automatic Switch and Shift of Motormen Reverse Train in 30 Seconds

IN THE subway system at Sydney, New South Wales, Australia, an ingenious system has been adopted for turning the trains at St. James Station, where there are stub tracks and crossovers for passing trains from the down to the up-track. After a train has discharged its passengers at this station, an automatic track switch passes it to a stub track, after which another automatic track switch permits it to proceed in the opposite direction to the platform on the other track.

To economize time, motormen are changed during the process. The motorman who is to take the train on the return trip boards it at the rear platform of the last car at the platform where passengers are being discharged. While he is adjusting his equipment the motorman who has been in charge of the train runs it on to the stub track. On the return trip, the second motorman, who is then at the front end of the train, runs it to the loading platform where the first motorman leaves to cross the tracks and take another train back.

The time required in the whole operation of reversing the train is only 30 seconds.



Installing a pair of wheels in a truck in the intermediate repair section of the Coney Island shops. Repair work is done with the trucks on stands, to raise them to a convenient height for the workmen

TRUCK REPAIRS

Put on a High-Speed Basis

By *Clarence W. Squier*
Associate Editor *Electric Railway Journal*

In the intermediate truck repair section of the Brooklyn-Manhattan Transit Lines' Coney Island shops repaired trucks are substituted immediately for those removed so that cars are not withheld from service

WHEN repairs to car trucks of the Brooklyn-Manhattan Transit Lines are necessary between regular overhauls, they are made in the intermediate truck repair section of the Coney Island shops. The methods used are quite different from those common in other railway shops in that trucks are changed from one car body to another. Cars whose trucks require repairs are not withheld from service but are brought into the shop, the defective trucks are removed and replaced by others in good condition, and the cars are then returned to service without delay.

In considering this method it might appear that a large number of spare trucks would be needed. On the contrary, as the work is carried out on the Brooklyn-Manhattan Transit Lines, only six spare trucks have been found necessary, besides those actually required for car bodies, to take care of the truck repairs for the 900 sub-

way motor cars, 50 subway trailer cars and 121 triplex units which are operated on the system. The reason is that trucks from cars which are in the shop for general overhauling and repainting are used to carry out truck repair work. This releases enough trucks so that twenty can be placed in the repair section and worked on at one time.

The facilities and methods used make it possible to carry on the truck repair work continuously and to organize the shop forces along the most effective lines. Returning cars to service quickly or making them available for service without delay is the feature around which the plan for repair work has been built. Any additional cost for spare equipment to carry out the program will be met several times over by the added revenue from the increased service obtained from cars.

The intermediate truck repair section is 480 ft. x 80 ft. This long section has an electric drop pit transfer table,

For removal of trucks, cars are brought into the repair section on a single track with a drop-pit transfer table at the center. Two overhead cranes operate in conjunction with the drop-pit transfer table for truck removal



The drop-pit transfer table has a platform that raises and lowers. Longitudinal motion is provided by moving the entire table on rails at the bottom of the pit



The transfer table is provided with two tracks so that one truck can be moved into position for installing at the same time that another is removed from the car



The entire operation of dropping out a truck is controlled from a station alongside the drop-pit table

Overhead traveling cranes handle trucks between the transfer table and the truck repair stand





Workmen guide the motor so that the motor axle suspension seats properly as the motor is handled by an overhead crane

which runs across its center. All trucks enter and leave the repair department by this transfer table, being handled to and from the twenty repair stands on which the work is done by two 15-ton, overhead-traveling, cranes. Ten of the truck repair stands are placed in each of the sections on either side of the transfer table. Along the two sides of the section are numerous cabinets, material racks and bins, workmen's benches, machine tools, rivet heating furnaces and miscellaneous equipment used in the repair work.

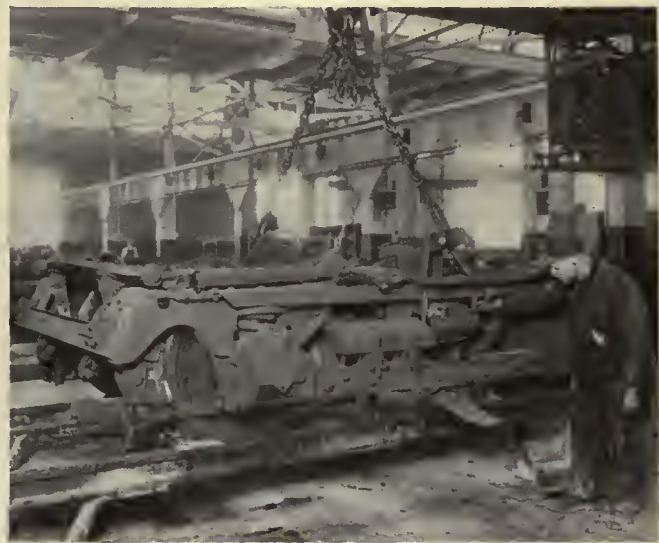
Motor leads and brake rigging of trucks which are to be repaired are disconnected in the inspection shop, which adjoins the truck repair section, so that removal is easy. Most of the subway cars of the Brooklyn-Manhattan Transit Lines are operated in groups of three. These



Bolts are installed under journal boxes quickly by means of a lever attachment that compresses the spring between the truck frame and the top of the journal box

are handled as units, being kept together and shopped at the same time. Whenever it is necessary to remove a particular truck the three cars are brought in.

The track over which the cars come in has an electric drop-pit table, supplied by the Whiting Corporation, Harvey, Ill. This is operated in conjunction with two special overhead cranes supplied by the Box Crane & Hoist Corporation, Philadelphia, Pa. The cranes have L-shaped hooks to support the car body while a truck is removed or replaced. When removing a center truck from an articulated unit it is necessary to support the ends of two car bodies at the same time, so there are two 15-ton overhead cranes with two sets of supporting arms. The crane equipment extends over the truck removal track and is fitted with trolleys and appliances for convenient operation. The cranes are equipped for longitudinal and transverse movements but not for vertical motion as this is taken care of by the drop-pit table. The entire equip-



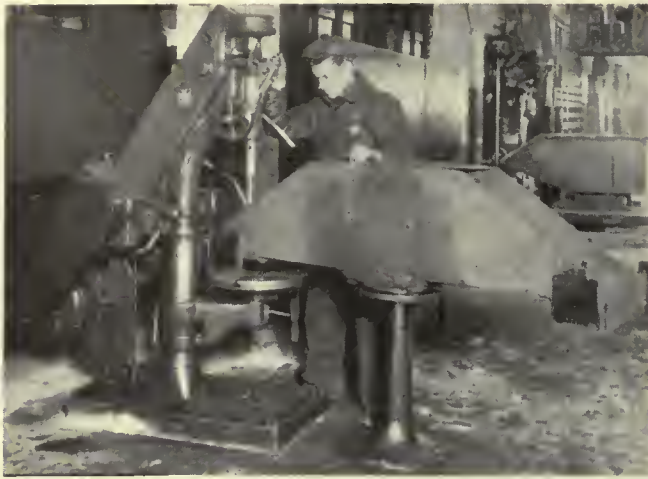
Stirrups fit over the ends of elliptic springs and lifting by the crane compresses them so that they fall into position readily

ment for the overhead cranes and the electric drop-pit table is controlled electrically from a station on the floor alongside the drop pit.

The electric drop-pit table is supported on four upright screws. The lower ends of these screws rest in blocks in a wheeled truck which runs on a track in the pit. Motors for the raising, lowering and transverse movements are mounted on the table, but are controlled from a stand on the floor of the overhauling shop. Locking bars take the live load while the train is moving across the table.

After the train has been placed so that the truck to be removed is in the center of the table, the table is elevated enough to give clearance for easy insertion of the body holding hooks from the crane. The locking levers are then released. There is an electrical interlock so that the table cannot be lowered until the locking bars are entirely unlocked or locked. The table is then lowered to give clearance for removal of the truck, and then, along with the truck, it is moved transversely.

As the transfer table has two surface tracks a truck in good order can be placed on one track before a train is brought in while the truck being removed will be placed on the other track. The transverse movement of the drop-pit table which takes out the defective truck then



With a truck bolster on a special stand the drilling for filler blocks is done quickly

brings the second truck into position, so that the table can be raised again and the new truck placed in position under the car body. The shop section adjacent to the pit table has three short spur tracks which line up with those on the table in either of its two stationary positions. Trucks can thus be run on and off the table and left on the spur tracks until it is convenient to handle them with the traveling cranes. A truck can be dropped out of a car and a new one installed in a very short time without uncoupling cars.

Control equipment has been ordered for this section so that trucks can be moved to and from the transfer table under their own power. This equipment consists of contactors and resistors controlled from push button stations alongside the tracks. A single lead will supply power to the truck to be moved.

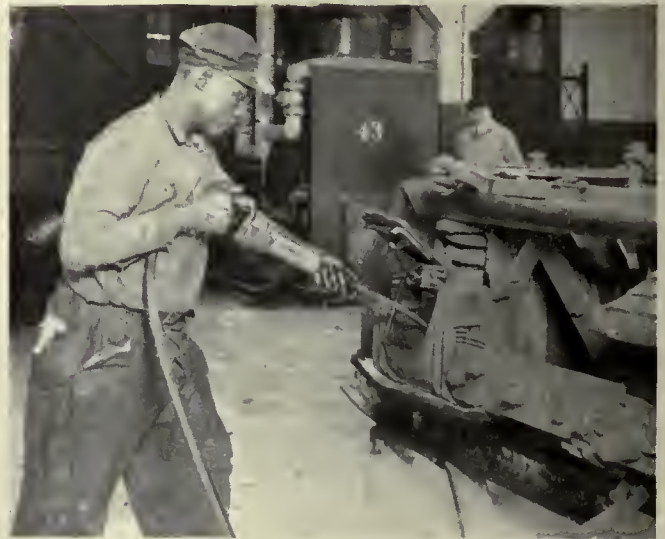
At present the truck repair section has a working force of 20 men during the daytime and 21 men at night and the section repairs an average of from 20 to 25 trucks per day. Running repairs are made only and no general overhauling is attempted. Some of the defects which



The riveting crews make up ends for truck frames and bolsters when not working on the trucks

require removal and repair of trucks are grounded or flashing of motors or armatures, burned off motor leads, grounded brush-holders, worn wheels or those with sharp flanges, worn spring-plank hangers, worn shoe head hangers, broken or worn axle bearings, loose rivets and worn pedestal liners.

A simple but effective record system is used for notifying the shop that repairs are required, for ordering in the cars, for supplying information for a permanent rec-



Journal boxes are packed with a pneumatic gun. This method is less fatiguing to the workmen and gives tighter packing for the waste

ord of truck or motor changes, and for showing the class of work done during each repair period. Two card record systems give immediate information as to the location of any particular truck. One of these is arranged by car numbers and the other by truck numbers. The car cards show the trucks in and out together with dates. The truck cards give the number of cars in which the trucks are installed or removed together with date. The drop table operator records the trucks as they are removed and installed. There are two sets of books so that one may be worked on in the office, while the other is in use at the transfer table. These books are arranged with columns for the number of the truck, the car from which it is removed, the time of removal, the number of the truck which is used for replacement, and the time that it goes under the car.

Attention has been given to labor saving tools so that the men may work efficiently, and so that many of the operations may be performed by a single man, where otherwise several would be needed. Many devices have also been worked out to assist in doing the work quickly and with few men. One example of such equipment is a lever device which is used to compress the coil spring underneath the truck frame and on top of the journal box while a binder bolt is put in position under the journal box. This device, shown in an accompanying illustration, has a block which rests on the truck frame. The short end of the lever has a link with a hooked end which fits into the inside of the wheel rim. A man pushing down on the extreme end of the lever can then compress the spring sufficiently so the binder bolts can be put in position.

Fixtures are used for seating the elliptic springs in position in the spring plank and also in the bolster. To



Motor suspension axle bearings are kept in cabinets and are marked with exact dimensions so that they can be fitted readily as needed. Accurate gaging is done on a bench

get them in place they must be compressed. Stirrups fit over the ends of the springs and with a chain connection between the two, the overhead crane lifts and so compresses the springs and they can be forced into place readily.

An accompanying illustration shows a stand that is used for supporting bolsters during drilling. This stand rests on the floor alongside the drill press with the center of the bolster resting on the top. The workman can then rotate and move it into a position for drilling.

A crew of three men does the riveting. When not at work on the trucks these men make up spare ends for trucks, transoms, etc., so that these parts are ready to be installed whenever a defective one needs replacement. Packing of journal boxes is speeded up considerably through the use of a pneumatic gun with a packing iron. This method also results in tighter packing and is less tiresome to the workman.

Journal bearings and motor axle bearings are fitted in the truck repair section. Each bearing is fitted to its particular axle, but to speed up repairs bearings are

bored out to certain standard sizes that are used most frequently. The diameter of a new motor suspension axle seat is $6\frac{1}{2}$ in. and the minimum diameter to which it is permitted to wear is $6\frac{3}{8}$ in. The bore of bearings will then vary between these extremes. The man responsible for the fitting of bearings tries to keep at least one bearing of each size on hand. These bearings are marked carefully with the exact bore and are stored in locked cabinets at the side of the truck repair section.

As axles come out of trucks, the bearing fits are trued up if they have worn tapered to any appreciable extent. There are thus two general classes for bearings. First, to fit new and worn bearing seats, sizes 6.550 in., 6.540 in. and 6.525 in. are used most frequently, and second, to fit turned and worn bearing seats sizes 6.490 in., 6.468 in. and 6.438 in. are needed most often. In fitting axle bearings the bore is kept between limits of 0.0025 and 0.003 in. per inch diameter larger than the axle seat.

To insure a correct fit, motor axle brasses are clamped in position between the motor frame and the axle cap with the latter bolted tightly. The bore is then gaged



The two halves of axle bearings are bored out at one operation in a vertical boring mill

carefully, after which the axle caps are taken off, the axle put in position and the bearings and axle caps then installed permanently.

Sometimes it is found that the bore is reduced in size, because of the squeezing, as much as 0.006 in. Axle bearings are of bronze without babbitt lining. The manufacturers furnish them finished to correct dimensions on the outside and rough-bored on the inside.

Axle bearings are bored in the truck repair section with a vertical boring machine, as bearings can be mounted for machining more quickly and conveniently in a vertical position than horizontally. The bearing revolves instead of the boring bar and this results in more accurate machining.

Truck journals have a diameter of 5 in. when new and are not permitted to wear less than $4\frac{3}{4}$ in. Only one size of journal bearing is used. This has a $\frac{1}{8}$ in. babbitt lining.

Freight Locomotive for Suburban Service

INCREASED suburban freight business in Tuscaloosa, Ala., necessitated the building of a locomotive for the Alabama Power Company. The railway system in Tuscaloosa transfers freight cars for three railroads and a large barge line, and in addition, serves about 40 wholesale and manufacturing customers.

The locomotive, which weighs 69,000 lb. complete, is



Locomotive of the Alabama Power Company used in belt-line freight service in Tuscaloosa, Ala.

equipped with four Westinghouse 310-C, 75-hp. motors, double-end HL control and two braking systems. Sufficient tractive effort is available to haul a 500-ton trailing load over the suburban trackage.

The type 480 switch group, reverser and control resistor are mounted inside the cab on an angle iron frame, so that covers are unnecessary for the switch group and reverser. As a safety precaution, the entire assembly is inclosed in a wire cage with removable sections. Resetting of the overload trip is effected through an opening in the cage. Grid resistors are mounted under the locomotive.

Two separate braking systems are used. Straight air is used on the locomotive only, while the automatic valve controls the brakes on the trailing load. Thus, while pulling a load, all braking occurs on the trailing freight cars. This plan saves wheels and brake shoes, and eliminates flat wheels on the locomotive.

The cab is built of steel with a floor of concrete, using



Interior of the locomotive. As a safety precaution, the control apparatus is inclosed in a wire cage

a 1:2:3 mixture, reinforced with $\frac{3}{4}$ -in. corrugated steel rods. A strip of linoleum covers the floor. The weight of the floor adds to the effective weight of the locomotive.

One crew of three men handled 10,000 cars on the Tuscaloosa system during the past year, with an average revenue for each car movement of \$4. This additional revenue from the belt line freight service has made the street railway system a profitable operation. The erection of a large paper mill and a milk condensing plant will increase the carload business to such an extent that a similar locomotive will be added this year.

Improved Hose Bridge Built at Los Angeles

RECENTLY an improved type of hose bridge has been designed and built by the engineering department of the Los Angeles Railway, Los Angeles, Cal. Care was taken to eliminate scraping or binding of car wheels on the underframe. As the illustration shows, the first wheel is on top of the bridge and the second wheel at a pitch or degree that prevents the first wheel from coming in contact with the underframe of the car.

Each bridge is composed of six pieces, four ends and two centers, and will take five lines of 3-in. fire hose. The four end pieces weigh about 148 lb. each and the center pieces about 40 lb. each. Two men can assemble a bridge quite easily. The length over all is 21 ft. 7 in., and the height is $4\frac{3}{4}$ in.



Easy grade of hose bridge prevents wheels scraping on car underframe

Rules to Guide Executive Action

Pamphlet on executive duties issued by North Shore Railroad. Somewhat similar rule books on proper treatment of customers also published for the use of ticket agents and one-man car operators

PART of the service improvement program of the Chicago, North Shore & Milwaukee Railroad has been the development of a rule book on executive standard practice, outlining the duties of the executives. The book is divided into five sections and contains a collection of principles for supervisory men to follow in their relations with subordinates. Rule books along the same lines have been prepared for the use of ticket agents and safety car operators.

The book on executive standard practice is the result of sixteen conferences conducted with the supervisory force of the company by those in charge of the company's service improvement program. The purpose of these conferences was to develop the best methods of obtaining from employees the prompt and faithful execution of all orders, and at the same time, of fostering a spirit of good-will and co-operation between employers and employees.

The conference method was used in securing this information because it seemed the least formal and most effective way of obtaining it. Stenographic notes were made at the conferences, and sufficient discussion developed on each of the various topics to give a composite idea of the opinions of those in the group interviewed on the best way of meeting various definite situations. At the close of the conferences, each person attending received a questionnaire on the subjects considered, and was asked to fill it out and return it. Later, the replies from these questionnaires were combined with the stenographic notes of the interviews to form the basis for the pamphlet on standard practice. The question and answer form was used, because it was thought to be most easily read and to be more interesting than cold statements.

The pamphlets on standard practice for ticket agents and safety car operators were developed in the same way. The conference leader used a carefully prepared outline, so that the conferences could be properly directed and controlled.

To ascertain to what extent the pamphlets are read and understood, checks are conducted from time to time. Questions based on the pamphlets are asked in printed form and three answers, one of which is correct, is furnished for each question, the employee being asked to check the answer which he thinks is correct. In this way, much time is saved. As a matter of fact, a review check for safety car operators requires only one hour and 45 minutes, whereas if the operators had simply the questions before them and had to write the answers, much longer time would be required, and the work in itself would be less interesting.

CONTENTS FOR EXECUTIVE PRACTICE PAMPHLET

This publication contains a collection of the principles intended to guide all the men in the company in supervisory work in their relation with subordinates. The

company realizes that a mere knowledge of the principles will not in itself make a man a capable executive. To be so requires courage, intelligence and other important qualifications, such as character and personality. However, it is believed that the executive who takes up these principles one by one to study and use them in a practical way will find himself gradually becoming a better leader. It is also understood that the material is suggestive only. In executive work it is believed to be difficult if not impossible to make a set of hard and fast rules. The principles can be expressed, but good judgment in applying them is essential.

The book on executive practice is divided into five sections, called respectively, "Orders and Instructions," "Enforcing Orders—Discipline," "Getting Work Done," "Building Morale," and "Relations Between Executives and Subordinates."

The first section relates to the method of giving orders and seeing that they are carried out. As it is not, of course, the purpose of this article to reproduce the contents of the pamphlet, only one excerpt will be made. It is of the first seven questions, with their answers, which follow:

EXCERPT FROM STANDARDS OF EXECUTIVE PRACTICE *Section 1. Orders and Instructions*

1. For what seven reasons do employees fail to carry out orders properly?
 - (a) Failure to understand because the order was not given properly and clearly.
 - (b) Forgetfulness, because so many orders are issued and issued so rapidly that some are overlooked.
 - (c) Inattention when order was given, or carelessness in reading written orders, because of a back-history of orders being issued and not followed up to see that they were carried out.
 - (d) Indifference because the proper disciplinary measures were not taken when previous orders were disregarded.
 - (e) Under-estimating the importance of the order.
 - (f) New men coming in have not seen the orders.
 - (g) Too much or too hard work is given.
2. In what ways can an executive avoid these seven difficulties?
 - (a) By giving or writing orders clearly and accurately.
 - (b) By issuing only such orders as are necessary.
 - (c) By following up the orders to see that they are carried out.
 - (d) By calling the attention of employees to their mistakes or failure to carry out orders.
 - (e) By taking proper disciplinary action if orders are ignored.
 - (f) By explaining reasons for orders so that employees will realize their importance.
 - (g) By seeing that new men are advised of former instructions, and, if possible, furnished copies of standing orders.
 - (h) By being sure that the employee is able to carry out the order.
3. What must I do to make my orders and instructions clear?
 - (a) First, picture to myself the whole situation, step by step, and know exactly what I want done.
 - (b) Avoid using technical terms, railroad slang, or big words, unless I am sure they will be understood.
 - (c) Continue to explain (if oral) until I am certain that the man understands.
 - (d) In written instructions, avoid being concise at the expense of completeness.
 - (e) Use illustrations, where appropriate and necessary.
 - (f) Explain the reasons for giving the order, when possible.
4. How can I tell when a man understands my instructions?

(a) I can watch his facial expression to see whether he looks blank and puzzled or intelligent. I will not depend entirely upon this method.

(b) I can ask him if he understands, but he may hesitate to confess that he does not.

(c) I can judge his understanding by the questions he asks.

(d) I can ask him to repeat the instructions. He may remember them well enough to repeat them but this does not always mean that he understands them.

(e) I can have him explain what he is going to do. This is usually better than having him repeat.

(f) I can have him show me what he is going to do. Very often it is not possible for him to do this. This works best when there is an operation which he is to repeat many times.

(g) I can ask him questions and his answers will show whether he understands. These questions should come at the problem from a different angle so that he will not know the correct answers unless he understands how to carry out the instructions.

5. What are the advantages of giving reasons for my orders and instructions?

(a) Knowing the reason makes it possible to carry out the instructions more intelligently.

(b) If the man knows the reason for doing the job, he may be able to suggest a better way of doing it. He begins to learn to think for himself.

(c) The work is more likely to be done well.

(d) If the man knows the reason he will realize the importance of the orders and be less likely to neglect them.

6. Do executives, on the whole, give reasons for their orders too often or too seldom?

Too seldom. Orders are much more likely to be explained too carelessly than too painstakingly.

7. How can I get my subordinate to ask freely about points he does not understand?

(a) Tell him, when talking with him for the first time, that no one can learn everything at once and that I expect him to have many questions; if there is anything about which he is at all doubtful I want him to come and ask me.

(b) Make it clear that no one ever learns everything about any job.

(c) When I am explaining, ask "Have I made that point clear?" instead of "Do you understand that?" He will realize that I assume it is my job to make him understand and if he does not understand it is because my explanation is not clear.

(d) Make clear to him that the person who never comes for help is the one who needs help but doesn't know it.

(e) Let my subordinates know that if I make mistakes I am willing to admit them. I can best do this by admitting error in their presence when I find I am wrong.

(f) When my subordinate comes to me for help, let him know I am glad he came and that I want him to come any time he is in doubt.

The second section outlines the correct way of maintaining a balance between strictness and leniency, of delivering reprimands, of explaining to employees how to correct mistakes, and of determining the extent of the discipline for improper work.

The third section relates to methods of laying out work for employees, the extent of the personal help which the executives should give and methods of getting work done by employees in other departments.

The fourth section contains suggestions for the ways in which an executive can earn the confidence of his subordinates and teach them to develop initiative and otherwise build up a morale. The final section is devoted to relations between the executive and his subordinates, the extent to which he should enter into their social activities, how he may settle disputes between them and similar matters.

PRACTICE STANDARDS FOR TICKET AGENTS AND CAR OPERATORS OUTLINED IN SIMILAR PAMPHLETS

The standards of practice for ticket agents are divided into five divisions: "Interest in the Customer," "Quality of Information," "Speech," "Politeness" and "Appearance."

The first section gives hints as to how to recognize certain types of customers, such as daily riders, occasional riders and strangers, and how to help each kind;

how to assist timid or elderly patrons, foreigners, customers in a hurry and people with children; suggestions on how to talk over the telephone, methods of dealing with angry or grouchy customers, etc.

The chapter on information lists the data which the agent needs to have about the service and things outside the service, suggestions on common mistakes made by agents, either in the way of giving too much information or not making the information clear, etc.

The chapter on speech tells the kind of tone to use, the importance of speaking distinctly, the common causes for poor enunciation, suggestions on selection of words to adults, children, and persons with little education, etc.

The chapter on politeness gives not only general rules but suggestions for special instances, as how to acknowledge a customer's thanks, what to do when the agent has to leave the customer suddenly, close an interview or refuse a request, and what to do when he cannot hear what the customer says.

The final chapter discusses what is meant by neatness of person, neatness of clothing and personal habits, and ways of maintaining good appearance while at work.

The safety-car operators' book was prepared primarily for the men at Waukegan and relates almost entirely to methods for maintaining good public relations in distinction from the information on operation contained in the usual rule book. The chapter headings are the same as in the handbook compiled for station agents, namely, interest in customers, quality of information, speech, politeness, and appearance. The topics are treated differently, of course, and relate to the duties of a trainman, rather than that of a station agent.

Keeping Coal Wagons Off the Car Tracks

EFFECTIVE co-operation between the United Railways & Electric Company of Baltimore and the Pikesville, Md., Improvement Association has been shown by the efforts of the latter organization to prevent tie-ups to cars. Printed cards of the type reproduced herewith have been distributed to members of this association. Whenever one of them sees an instance where a coal wagon blocks traffic, he makes out one of these cards and sends it to the coal company responsible.

PIKESVILLE IMPROVEMENT ASSOCIATION PIKESVILLE, MD

Gentlemen—

Our association is appealing to coal companies to cooperate for faster trolley transportation, believing the companies will do their bit by making deliveries along arterial streets in other than the early morning and late afternoon rush hours.

Slow travel and tie-ups on the trolleys cause reduced patronage, and reduced patronage brings higher carfare to those who depend on the cars. Riders rage inwardly when a coal truck holds up a line of cars, containing perhaps several hundred people. It is a mark of a hick town.

A delivery truck of your company today held up traffic on St. near St., at about o'clock. We hope this happened through an oversight on your part. In fighting tie-ups, can't we depend on your company's aid?

Yours very truly,

TRANSPORTATION COMMITTEE.

Fighting Snow on Rapid Transit Lines

Boston Elevated employs special equipment and methods peculiar to third-rail operation and the location of the tracks

REMOVAL of snow and sleet on the rapid transit lines, though done in a different manner, is as important as on the surface lines. Many problems must be met, such as keeping the third rail free from snow and ice, sweeping the snow from the car roofs before it thaws and freezes to form icicles, removing snow from the elevated structure and maintaining schedules. To fight the snow effectively on its rapid transit lines, the Boston Elevated Railway, Boston, Mass., uses special equipment and methods.

At the beginning of a snow storm men are dispatched from the maintenance division to watch the switches at junction points, in yards and terminals, and at other locations requiring special attention. Men are assigned, also, to assist station attendants in keeping station platforms and stairways clear of snow and ice.

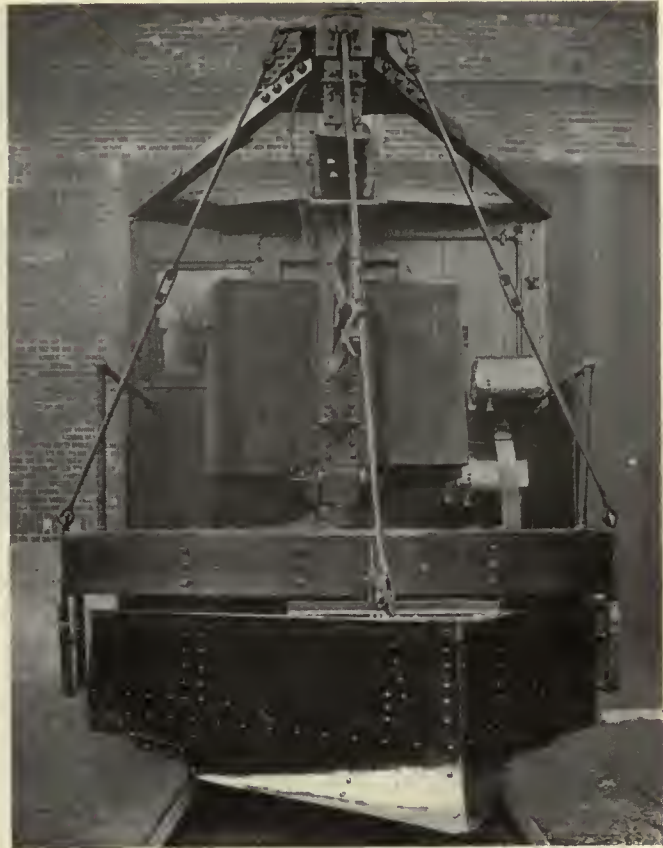
At the finish of the storm the snow is removed from yards, station roofs, subway and tunnel approaches, the East Cambridge viaduct and the Lechmere Square terminal, as well as the car roofs and the elevated structure.

BRUSHES USED TO CLEAN THIRD RAIL

The accumulation of snow on car roofs is removed to prevent the formation of dangerous icicles and interference with the action of car doors. For this purpose, small platforms are erected on either side of one of the tracks in the Sullivan Square yard and men with brooms quickly remove the snow as the trains are run by the platform.

A track car with special brush equipment is run over the line from Everett to Forest Hills to clear the elevated structure of snow. This removal eliminates the danger of icicles, which form during thawing and freezing periods, and makes the structure safe for track walkers and inspectors. Snow plows have been attached to a motor work car for plowing the Dorchester rapid transit extension when necessary.

To prevent the formation and accumulation of sleet on the third rail, each of the elevated and Cambridge-Dorchester cars is equipped with eight brushes, two attached to each third-rail shoe-beam. They are so arranged that they can be lowered to the third rail when needed. The dimensions of the brush head are $8\frac{1}{4} \times 3\frac{1}{2}$ in. It is made of hard wood and in it are set 540 flat steel bristles.



End view of the work car with snow plow used during severe storms

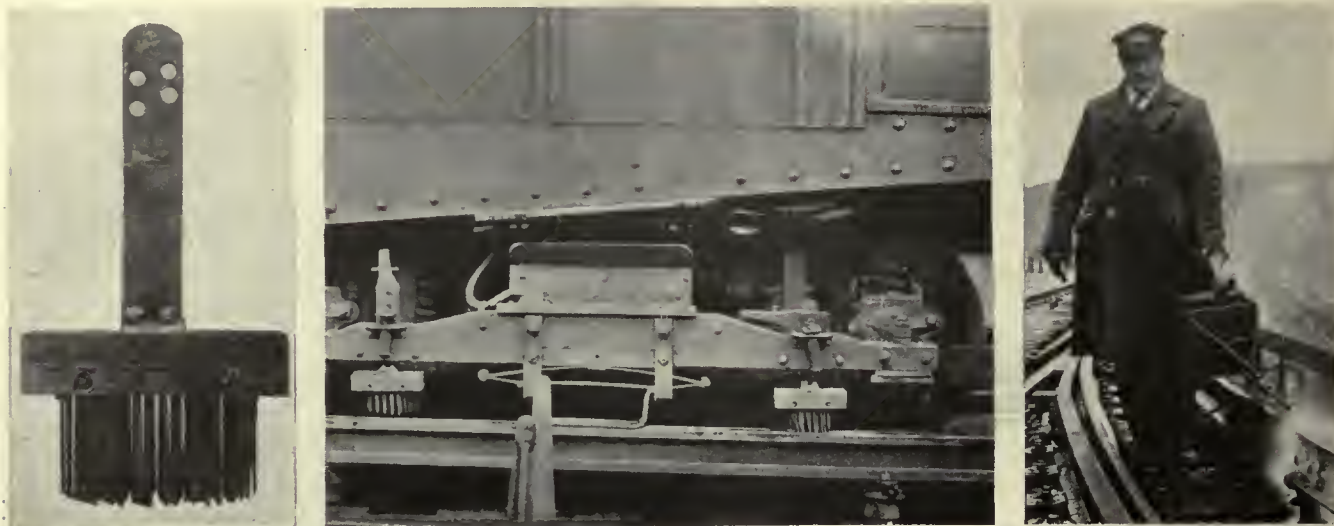
The bristles project $3\frac{5}{8}$ in., and are on a bevel. A spring arrangement provides about 40-lb. pressure on the brushes when they are in position. When not in use the brushes are elevated 1 in. above the third rail. The brush equipment is installed on the cars about Nov. 15 and removed about April 1.

Four flat cars on the elevated line and four flat cars on the Cambridge-Dorchester line also are equipped with these snow brushes, from five to seven brushes being provided on each shoe-beam. The flat cars are pushed ahead of the passenger cars and are used only in severe storms.

Hydro-carbon oil burners are used for removing the sleet, when the accumulation gets beyond the capacity of the brushes. Hydro-carbon oil, sometimes called "liquid fire," is approximately four times as inflammable as gasoline and when ignited gives off an intensely hot flame. It is very effective in removing sleet from third-rail or track switches. The oil containers have a capacity of



Snow plows have been attached to a motor work car for use on the Dorchester rapid transit extension



At left—The brush is made of flat steel bristles set in a hard wood block. Holes in the stem are for adjustment. *In center*—Two snow brushes are provided for each of the four third-rail shoe-beams of the cars. *At right*—When the snow brushes fail to remove sleet from the third rail, hydro-carbon oil burners are used

3 gal. each and are equipped with a long pipe nozzle with a suitable control valve. The burners are located at all the yards, terminals and barns. Because of the highly inflammable nature of the oil, the equipment is isolated from all buildings.

First Aid Graduates in Chicago Number 542

EMPLOYEES of the Chicago Rapid Transit Company, Chicago, Ill., and the three interurban electric railroads serving the Chicago metropolitan area, the North Shore Line, the South Shore Line and the Chicago, Aurora & Elgin Railroad, to the total of 542, completed the course in first-aid training during 1927 under the supervision of the medical department, according to figures given out recently by Dr. Hart E. Fisher, chief surgeon. Leading the list in number is the Chicago Rapid Transit Company, which during the past year graduated 202 men and 33 women employees from the first-aid course. The other employee-graduates are: North Shore Line, 104 men and 28 women; Chicago, Aurora & Elgin Railroad, 96 men and 24 women; South Shore Line, 47 men and 8 women. The increase in women graduates of the first-aid course is an interesting feature of this organized activity.

New Car for Metropolitan Railway, London

LONDON and Watford, a suburb, will be only a 30 minute run apart when the new subway cars operated by the Metropolitan Railway, London, England, are put into service. The company claims that this new train, recently exhibited, is the most powerful and expensive electric subway train in the United Kingdom. It has a maximum speed of 65 m.p.h., has motors developing 2,500 hp., has a tractive effort on starting of more than 30,000 lb. and a seven-car train can carry 482 passengers seated. One of the chief design features is that the whole control of its mechanism, heretofore placed under a motor coach, has been conveniently installed in a special compartment adjacent to the driver's cab. This will facilitate the handling of breakdowns particularly in tunnel sections where electrical fault location is very difficult, and will permit temporary failures to be instantly remedied. All of the company's rolling stock will probably be patterned by this standard because of the many improvements, including powerful braking, better lighting and more comfortable seats. The reason for holding the exhibition was for the purpose of allowing the public to inspect and criticize the new train. This new service is expected to prove popular with the people.

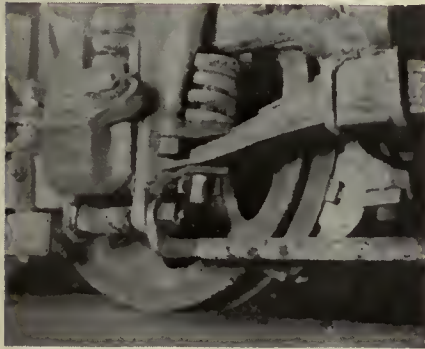


The new seven-car subway train for the Metropolitan Railway of London carries 482 passengers seated and has a starting effort of more than 30,000 lb.

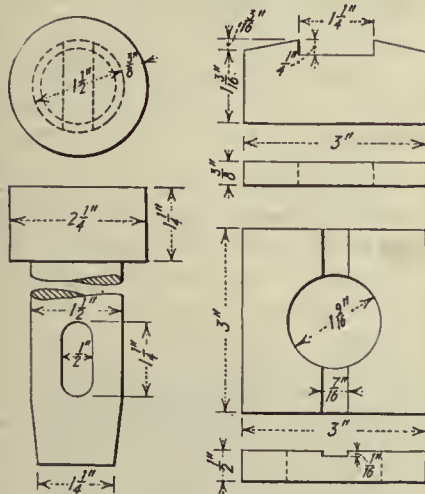
Maintenance Methods *and* Devices

Keyed Pin for Coil Spring Support

REMOVAL of a semi-elliptic spring from a truck was always difficult in the shop of the New York & Harlem Railroad, New York City, until a keyed taper pin was developed as shown in the cut. These springs originally were supported by a 1½-in. machine bolt. The threads of these



New keyed pin installed in truck



Details of pin, plate and key

bolts became badly rusted between overhauling periods so that almost always it was found necessary to cut off the rust before the bolts could be removed. This not only wasted a great deal of time but usually resulted in the destruction of the bolt. The overhauling was retarded as a result and the material and labor expense increased considerably.

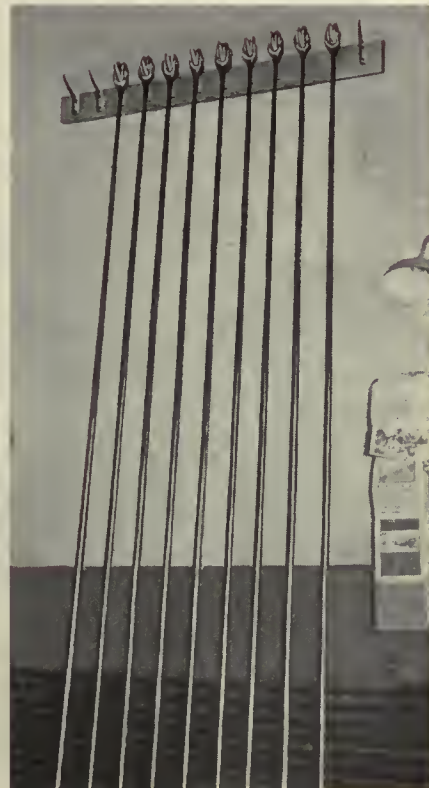
A keyed taper pin was designed and adopted to prevent this trouble. This pin is made of 1½-in. round stock and is tapered on one end to 1¼ in. A ½x1¼-in. slot is cut in this pin about

1 in. from the bottom of the tapered end for the reception of a key.

The head of the pin is formed by a ¾x1¼-in. band welded to the top. When the pin is installed in position a ½x3x3-in. plate is slipped over the end of the pin and rests against the end of the semi-elliptic spring. A ¾x3-in. key is then inserted in the pin slot. The top of this key fits into a 7/8-in. recess cut in the plate and the bottom, being recessed 1/8 in., drops downward in the pin slot, thereby locking it in a fixed position.

Trolley Pole Rack

OVERHAULED trolley poles are suspended on a wall rack near the door of the overhauling shop of the Binghamton Railway, Binghamton, N. Y. The motormen, troublemen and shopmen have ready access to the rack and they know that poles ready for service will be found in this spot only. This plan has eliminated confusion and the possibility of installing a pole which has not been overhauled thoroughly. The weight of the pole is suspended on

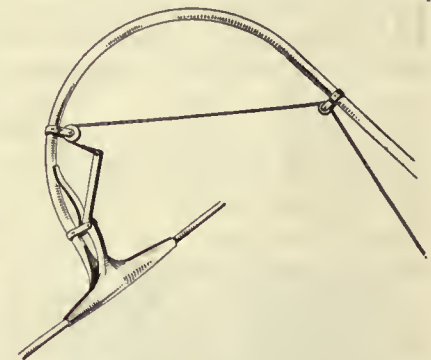


Convenient trolley pole rack

a hook made of ¾x1-in. stock with a curvature conforming to the contour of the wheel. The twelve hooks are bolted to a 2-in. x 6-in. oak timber, lagscrewed to the brick wall. Sufficient poles are kept on the rack to meet the daily requirements.

Contact for Track Tools

CONNECTION to the trolley wire to supply electrical concrete mixers and other track machinery operated by the trolley current can be made by the ingenious device shown in the accompanying illustration. It was developed by the Paris Surface Lines and is in use on that system. Particulars of it are given in a paper read at the recent Mar-



This trolley current collector for track machinery does not interfere with passing cars

seilles convention of the French association by M. Gros, way engineer of the Paris company. Its purpose is to provide a method of connection that will not interfere with the use of the overhead line by passing trolley cars. In this particular it is superior to the ordinary hook "fishing pole" that has to be lifted off every time a car passes, delaying both the cars and the track work.

The current collector consists of a bamboo pole, 19 ft. long, terminating in an aluminum gooseneck that carries a hinged clamp at its outer end. The two jaws of this clamp are about 10 in. long and each is semi-cylindrical, somewhat like the sides of a trolley ear, so that when closed they fit around the wire. Their ends are tapered to minimize the shock when the trolley wheel of a car passes beneath.

The jaw of the clamp attached to the gooseneck is rigid. The other jaw is hinged and can be opened by a hemp cord long enough to reach to the foot of the bamboo pole. The clamp is normally held closed by a spring.

It was found that with the old hook connector on a fairly busy line, current could be obtained for the operation of the track machinery during only about 50 per cent of the time. With the present collector, the track machinery can obtain current for 100 per cent of the time, and passing cars are not delayed.

When your equipment is run down, refer your operating problems to maintenance physicians and surgeons.

Tie Bar Prevents Spreading of Pedestal Jaws*

BY R. T. CHILES
Master Mechanic Cumberland County Power & Light Company, Portland, Me.

BREAKING of Brill 51-E-1 truck frames at the top of the pedestal next to the bolster has been overcome by the Cumberland County Power & Light Company, Portland, Me., through the installation of new pedestal tie bars. In the accompanying illustrations one shows the original arrangement and the other the improved type of tie bar. It was considered that the breakage was due to spreading of the pedestal jaws when brakes were applied. The new pedestal tie bar extends entirely across the pedestal jaws and is bolted to both ends of the front pedestal. The tie bar is made of $\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$ -in. angle. To apply it the lower end of the truck pedestals were evened up, old holes were filled in by electric arc welding and were then redrilled. This new arrangement has corrected the trouble.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



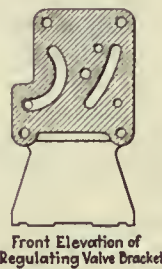
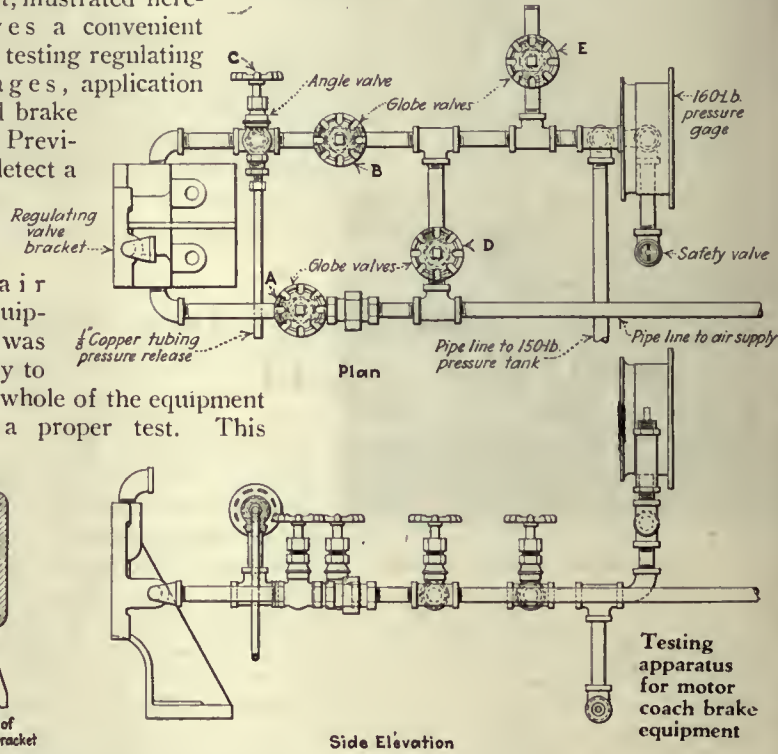
At left, truck with old type tie bar. At right, new tie bar arrangement

Test Rack for Motor Coach Brakes

BY EUGENE M. HETTINGER
Garage Foreman Wisconsin Power & Light Company, Sheboygan, Wis.

PROVISION for convenient testing of the four-wheel brake equipment of Yellow coaches was made by an assembly of pipes and valves in the garage of the Wisconsin Power & Light Company, Fond du Lac, Wis. This layout, illustrated herewith, gives a convenient means for testing regulating valves, gages, application valves and brake cylinders. Previously, to detect a failure in the motor coach air brake equipment, it was necessary to install the whole of the equipment to make a proper test. This

pressor pumping into a pressure tank of 10x20 in. of 150-lb. motor coach type. As the pressure rises, the cut out point for the regulating valve is indicated on the gage. Regulating valves are adjusted to cut out at 125 lb. pressure. In making this test the plug in the regulating valve bracket, which has a small opening through which the air escapes at 125 lb. pressure, is replaced with a street elbow turned to the rear of the



entailed considerable work and often the equipment required removal and reinstallation several times in order to make final adjustments. The equipment as shown is bolted to a work bench and takes up a space of approximately 24x36 in.

To test a regulating valve, it is bolted to the bracket shown in the left of the diagram. By opening globe valves, B and A, air passes from the supply line through the regulating valve into the gage and then through the pipe line to the pressure tank. Air is supplied by a garage com-

testing apparatus. This diverts away from the operator any grease or dirt that might be blown through.

To adjust the cutting-in point of the regulating valve, globe valve A is closed. If it is desired to save air in the pressure tank, the valve B is also closed. Then by opening valve C the pressure escapes and the by-pass valve is set to cut in at not less than 85 lb. By closing valves A, B and C and opening valves D and E, necessary pressure is provided with which to test application valves and brake cylinders for leaks.

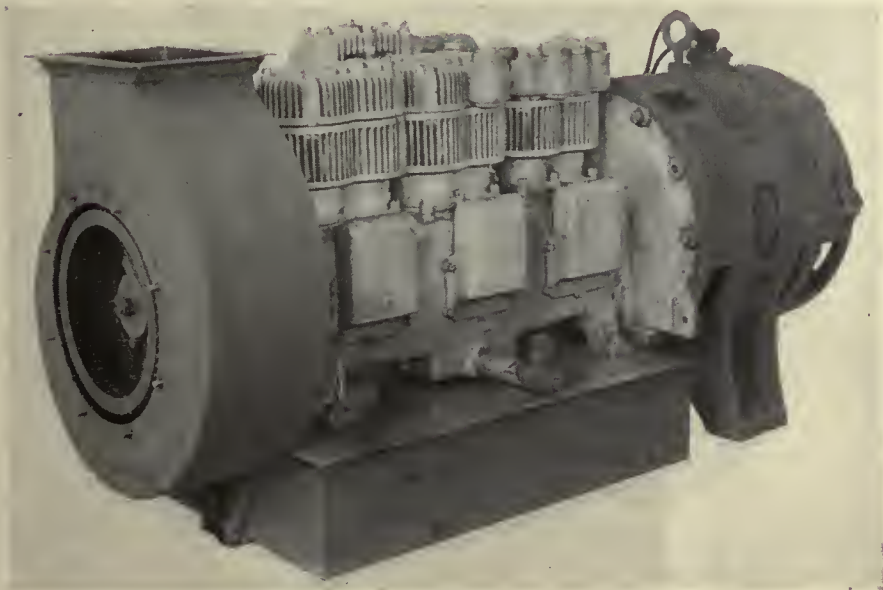
New Equipment Available

Pneuphonic, Not Pneumophonic

TWO extra letters crept into the name of the new Pneuphonic signal horn announced by the Westinghouse Air Brake Company, which was described in the April 7 issue of *ELECTRIC RAILWAY JOURNAL*. The proper designation for the horn is "Pneuphonic."

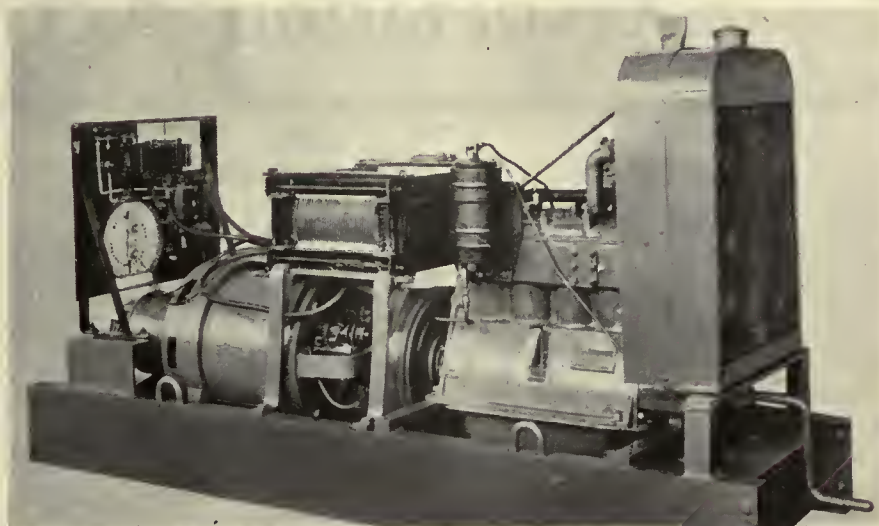
Motor-Driven Air Compressor for Electric Locomotives

HIGH speed features a motor-driven air compressor developed primarily for use on electric locomotives, announced by the Westinghouse Air Brake Company, Wilmerding, Pa. The compressor has a displacement of 150 cu.ft. per minute against 140 lb. air pressure and is driven directly by the motor at a speed of 1,500 r.p.m., the high speed being made practicable by a special type of mechanically controlled inlet valve. There are three stages of compression with a built-in intercooler for the first two stages. The cylinders are air cooled by a built-in blower attached directly to the crankshaft. The weight per cubic foot displacement and space required for installation are much less than that of low speed machines having a similar capacity.



High-speed motor-driven air compressor for electric locomotives

Gas Engine Driven Welder



GROWING demand of welding various classes of construction work, where electric power is not readily available, has led the Lincoln Electric Company, Cleveland, Ohio, to bring out a new model of the Stable-Arc welder. The new unit has a rating of 200 amp., with a current range for welding duty, of from 50 to 300 amp. It operates at a speed of 1,500 r.p.m. The motive power is provided by a four-cylinder Continental Red Seal engine.

The welding generator and engine are mounted on a structural base welded into a solid piece of steel. This welded steel base provides a maximum stiffness and rigidity with a minimum weight. The complete unit weighs 1,580 lb. and is 76 in. long by 25 in. wide. The generator is also constructed of steel instead of cast iron. This reduces the weight

and also the possibility of breakage in the field.

The complete magnetic circuit of the generator is of laminated steel, increasing the stability of the arc, which is highly desirable in welding work. A steel switchboard is also provided in place of the usual slate or composition board. This reduces the possibility of damaging the switchboard in the field.

Improved Light Switch for Buses



New toggle light switch for bus installation

SEVERE requirements of truck and bus service are met, it is claimed, by a toggle switch developed by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis. This switch is for use where rough usage and constant vibration make the ordinary switch impractical. Through more rugged construction this switch eliminates the common fault of flickering of lights. The switch is obtainable in single-pole or three-way units and in any combination of these units. Three-point switches have two "on" and "off" positions, generally used for dimming. Busbars across the common terminals reduce the number of connections to a minimum.

Association Activities

Psycho-technical Selection of Employees in Paris*

Tests for selecting motormen were begun in Paris in 1921, and were so satisfactory that they are now used for all wage earners on the Paris system

By HENRI VERDOLLIN
Assistant Engineer of Transportation of the S.T.C.R.P., Paris, France
(Paris Surface Railway and Bus Lines)

NEED of care in the selection of its employees by the Paris surface railway and bus lines will be realized from the following statement: Of the total expenses of operating during 1927, 12 per cent went for material, 15.5 per cent for electrical energy and fuel, and 62 per cent for wages. Moreover, the material is used up in a short time, say within a year on the average, but every employee taken on by the company should represent an investment from the time he is engaged until he is retired, perhaps 25 years later.

In 1921, the engagement of employees for the S.T.C.R.P. was put on a scientific basis, under the direction of M. Lahy, manager of the experimental and psychological laboratory of the École Pratique des Hautes Etudes in Paris. To determine the practical value of psycho-technical examinations, 200 men—100 motormen and 100 bus drivers—whose service records were unknown to the manager of the laboratory, were subjected to the psycho-technical tests. Their ratings thus determined were compared with the records which these men had gained in actual service. The gradings as determined by test and as determined in practice corresponded 80 per cent. This caused the company to decide to install the system for all new employees and a laboratory was established in the Hainault Street depot of the company.

TESTS FOR MOTORMEN

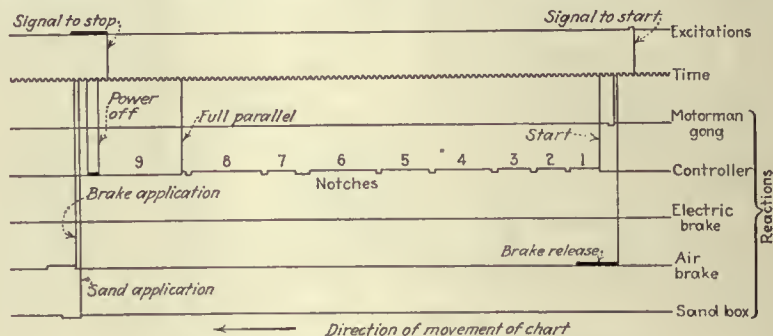
An account of the tests for motormen in use in June, 1924, was given by Mr. Bacqueyrise in a report before the International Street & Interurban Railway & Bus Association.† Mr. Bacqueyrise stated in his association paper that his company was preparing the construction of a model car platform and bus platform in which the candidates for car or bus drivers were to be tested. These platforms have been completed. They are models of those in use on actual cars and buses but are mounted on

*Abstract of paper presented at the convention of the Union Des Voles Ferrées et des Transports Automobiles (Railway and Bus Association of France) held in Marseilles, Nov. 6-8, 1927.

†See ELECTRIC RAILWAY JOURNAL for Aug. 23, 1924, page 280. For later developments see issue for Aug. 27, 1927, page 352.

springs so as to give their occupants during a test the same rocking motion as they would experience in actual service.

Now, when a motorman is to be examined, he takes his position on one of



Typical record made by prospective motorman

these platforms and faces a screen on which a moving picture is projected representing a street with all the customary incidents of a crowded thoroughfare. The motorman thus sees before him a picture of pedestrians crossing, automobiles cutting in front of the trolley car, etc. As these events happen, he is supposed to follow the same signals and visualize the same experiences as if the platform on which he is seated or standing was a car or bus in actual service. His reactions are then automatically recorded, as shown in the accompanying graph. Actual platform instruction does not begin until after an applicant has passed his psycho-technical test successfully.

The effectiveness of the psycho-technical tests in weeding out men unfitted for the work is shown by the statement that whereas, in 1923, the number of apprentices dropped, after otherwise being accepted, was 17.2 per cent, this figure has since fallen to less than 4 per cent. As the company pays applicants during the apprentice period, it makes a monetary gain in days not paid to persons who are eliminated by the laboratory before they start as apprentices. This reduction in cost represented an annual saving in 1926 of 200,000 fr. (\$8,000).

As regards accidents, there has also

been a notable reduction. Comparison made of the work of 200 motormen of whom 100 were selected and 100 not selected by the psychological tests shows in favor of the former a reduction of 16.5 per cent in accidents, representing an annual saving of about 1,500,000 fr. (\$60,000). These results are shown in an accompanying graph. Incidentally, it might be said that while the accidents of the company show a reduction, the figures compiled by the Paris police indicate that street accidents caused by automobiles and other vehicles on the street have had a constant increase.

CONDUCTORS AND SHOPMEN

Statistics of the Paris company show that prior to 1926, of every 100 applicants for the position of conductor ac-

cepted by the employment agents, only 34 were in service by the end of one year. Of the other 66, 10 never reported to the training school after passing the medical examination, 12 were dropped during the period of instruction, 3 at the time of the examination, 5 during the first month of service and 36 during the following eleven months for various causes. This indicated to us that a psycho-technical examination which had done so much in weeding-out unfit candidates for the position of motorman would be equally valuable if adapted to applicants for the position of conductor. A system of such tests was then drafted. Some of these were the same as those for motormen, such as rapidity and regularity of physical reaction, fatigue resistance and memory for words. In addition, certain special intelligence tests were added, both written and practical.

The latter included a test of giving to the candidate a number of wooden plates perforated with holes of different shapes and a number of wooden plugs of different shapes. If properly selected, these plugs would exactly fit the various holes in the plates. The time taken to fill these holes was recorded.

There were also several tests for memory. In one, the subject was shown a picture containing a certain number of

ordinary objects. After the picture was removed, he was expected to give from memory the names of as many of the objects shown as he could. Later, he was shown successively pictures of a large number of objects, including some of those which were in the group first shown to him. He was tested on the number which he could remember in the first group.

His ability to recollect faces was tested by a series of portraits showing the head and shoulders of individuals supposed to represent passengers. He was then told which of these portraits were assumed to be of passengers who had paid their fares. Then, when the portraits were shown to him again, he was expected to tell which were in the group assumed to have paid and which were in the group which had not paid. Another test was to throw on a screen for short times pictures representing car and bus platforms, each containing a different number of passengers. The candidate was expected to estimate rapidly the number of passengers on each platform so exhibited on the screen.

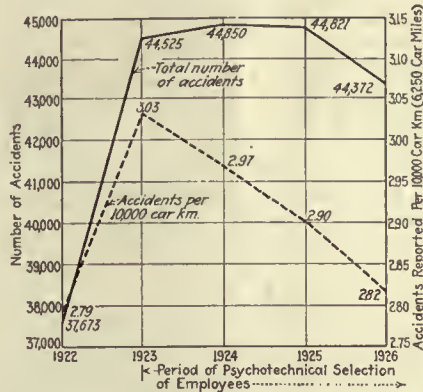
The ability of the candidate for concentrated attention was tested by means of a printed sheet, on which he was asked to cross off within a fixed time all marks having a definite form. The quickness of his reaction to sensory stimuli was tested by a vertical box containing various numbered slots inclined differently. Into these slots he was asked to slip correspondingly numbered small disks, a record being made of his errors and omissions. His ability to tell the denomination of coins by sense of touch was tested by a number of disks or chips of different sizes which were placed in the standard closed bag carried for change by Paris conductors. The candidate, after he had been blindfolded, was required to take these various sized disks out of the bag in a predetermined manner.

Of the tests mentioned for conductors, not all are being used at present. Those now employed are the regularity and rapidity of physical reaction test and the fatigue resistance test, which are individual tests, and the memory tests, the written intelligence test and the test for estimating the number of passengers on a platform, which are collective tests. The accompanying table shows the correspondence of records made in service of the first 50 conductors examined by these methods.

ANALYSIS OF 50 CANDIDATES FOR POSITION OF CONDUCTOR TESTED IN PARIS LABORATORY AND THEIR RECORDS OF SERVICE

Classification and Number in Service Record	Record in Test		Per Cent of Group	
	Good	Poor	Good	Poor
Good.....	24	2	91.7	8.3
Fair.....	15	6	60.0	40.0
Mediocre.....	4	4	0	100.0
Poor.....	7	1	14.3	85.7

As this method of examination has been in use only six months, it is not possible to give as definite figures as with the motormen, but it is believed that good results will be obtained.



Accident records in Paris show a reduction since the psycho-technical method of testing applicants for employment as motormen was adopted

The first psychological tests for shop men were made in 1926. They included tests for rapidity and regularity of physical reaction, fatigue resistance, concentration, memory, and intelligence, both written and practical, as already described. In addition several other tests were designed. Of these the principal were several tests to determine the manual dexterity of the candidate. They included the fitting of nuts to bolts, the threading of needles, the co-ordination of the movements of both hands on equipment designed for this test, the insertion by a blindfolded candidate of wooden plugs in the holes of a wooden plate, the sorting of beads of different colors, etc. In each of these tests, a record is made of the time taken by the candidate to fulfill the task.

Other tests devised were to gage the candidate's sense of proportion, his understanding of geometrical figures by asking him to complete figures partially drawn, his steadiness of hand, etc. In general, the standing obtained by candidates in these tests and that shown in their subsequent behavior as shop apprentices were quite close.

CONCLUSIONS

At the present time all applicants for employment on the S.T.C.R.P. who have passed the medical test and are otherwise acceptable, are tested at the psycho-technical laboratory. Here, all receive the written intelligence test which, after all, is considered the most important.

As a result of these tests the company is often able to reassign those accepted for employment, sending to one department a man who had originally applied for another, because the applicant himself often does not know the work for which he is best suited. As the weeding out process takes place at the beginning of employment, the company is able to devote its attention to teaching the new men the duties of the particular jobs to which they have been assigned with a fair assurance that they will be able to perform their tasks satisfactorily in the future.

L'Industrie des Voies Ferreées et des Transports Automobiles, whose January, 1928, issue contains the full paper, publishes also data of the tests of other railway companies in Europe.

COMING MEETINGS

OF

Electric Railway and Allied Associations

May 6-12—Union Internationale de Tramways, de Chemins de fer d'Interet Local et de Transports Publics Automobiles, Rome, Italy.

May 7-10—National Conference on City Planning, Dallas and Fort Worth, Texas.

May 8-11—United States Chamber of Commerce, Washington, D. C.

May 9—A.E.R.A. Executive Committee, Washington, D. C., 3 p.m.

May 9-10—Central Electric Railway Master Mechanics' Association, Lawrence Hotel, Erie, Pa.

May 9-12—American Institute of Electrical Engineers, regional meeting, Northeastern District, Hotel Taft, New Haven, Conn.

May 16-17—Central Electric Traffic Association, Tuller Hotel, Detroit, Mich.

May 24—New England Street Railway Club, annual meeting, Boston, Mass.

May 28-31—National Association Purchasing Agents, annual convention and exhibit, American Royal Building, Kansas City, Mo.

June 4-6—Midwest Electric Railway Association, Hotel Baltimore, Kansas City, Mo.

June 4-8—National Electric Light Association, Atlantic City, N. J.

June 6-8—Canadian Electric Railway Association, annual convention and exhibit, Toronto, Canada.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

C.E.R.A. Issues Year Book

MANY facts regarding the Central Electric Railway Association and the affiliated Central Traffic, Accountant and Master Mechanics' Associations are contained in the Year Book of the association just issued. The Year Book gives a revised list of member companies with their mileage, the membership of all principal committees, the annual report of the secretary, and the various amendments to the constitution which have been adopted from time to time. The principal rules of the Central Electric Traffic Association are also included.

Canadian Convention Program Announced

PLANS are virtually completed for the 24th annual convention of the Canadian Electric Railway Association, which will be held in Toronto on June 6-8 next. It is expected that there will be the largest exhibition of electric railway supplies and materials in the history of the association. Provision has been made for 23,000 sq. ft. of floor space.

Following is the program of the principal events scheduled:

WEDNESDAY, JUNE 6, 1928

Royal Coliseum, Canadian National Exhibition Grounds

9 a.m. Registration.

10 a.m. Minutes of 1927 annual meeting, president's address, treasurer's report, secretary's report.

11 a.m. Reports of committees:

(a) Rail corrugation.

(b) Motor bus and truck committee. Discussion led by J. L. Smith, superintendent motor coach department Toronto Transportation Commission.

(c) Publicity and merchandising of transportation.

(d) Safety and accident prevention.

12:30 p.m. Discussion of timely topics: "Snow Removal Practice." Discussion led by William C. Smith, superintendent of training school Montreal Tramways, and J. M. Ahearn, assistant manager and purchasing agent Ottawa Electric Railway.

1 p.m. Luncheon—Royal Coliseum.

Official welcome to Toronto by P. W. Ellis, chairman Toronto Transportation Commission.

Address—Lucius S. Storrs, managing director American Electric Railway Association.

2:30 to 5 p.m. Inspection of exhibits.

9 p.m. Supper Dance—"Crystal Ball Room," King Edward Hotel.

THURSDAY, JUNE 7, 1928

Royal Coliseum

9 a.m. Paper—"The Importance of Public Transportation in Traffic Control Regulations," by E. J. McIlraith, staff engineer Chicago Surface Lines.

11:30 a.m. Discussion of timely topics: "Mercury Arc Rectifiers and Their Advantages." Discussion led by M. L. de Angelis, assistant electrical engineer Montreal Tramways, and R. A. Brown, general manager and chief engineer Calgary Municipal Railway.

"Electric Track Switches, Their Place and Maintenance." Discussion led by L. H.

McAdam, electrical department Toronto Transportation Commission, and Elmer S. Olmsted, vice-president and electrical engineer Cheatham Electric Switching Device Company.

1 p.m. Luncheon—Royal Coliseum.

2:30 to 5 p.m. Inspection of exhibits.

7:30 p.m. Cabaret Dinner, "Pompeian Room," followed by Dance in the "Crystal Ball Room," King Edward Hotel.

FRIDAY, JUNE 8, 1928

Royal Coliseum

9 a.m. C.E.R.A. Meeting Hall, Royal Coliseum.

Paper—"General Overhead Line Practice," by M. C. O'Donnell, electrical engineer Ottawa Electric Railway. Discussion led by J. F. Neild, electrical engineer Toronto Transportation Commission.

11:45 a.m. Discussion of timely topics: "Treadle Cars—Should All Passengers Leave by Rear Door?" Discussion led by J. Metcalf, assistant traffic superintendent Toronto Transportation Commission, and A. Frank Paul, assistant to general sales manager National Pneumatic Company.

"Improving Revenue by Publicity." Discussion led by George E. Waller, manager of railways Dominion Power & Transmission Company, Ltd., Hamilton, Ont., and J. Lightbody, publicity agent British Columbia Electric Railway, Ltd., Vancouver, B. C.

12:30 p.m. Election of officers and general business.

1 p.m. Luncheon—Royal Coliseum.

2:30 to 5 p.m. Inspection of exhibits.

American Welding Society Holds Spring Meeting

ESTABLISHING preliminary standards for qualifying welders and supervising their work, advancement of test programs for welding parts and structures, and the perfecting of technique featured the reports and discussions of the annual spring meeting of the American Welding Society held at the Engineering Societies Building, New York City, on April 25, 26 and 27.

At a meeting of the pressure vessel committee, it was pointed out that the support of tank manufacturers and manufacturers of electric welding equipment is needed to insure an early start on the extensive test program to be carried out jointly by the American Welding Society and the American Society of Mechanical Engineers. The tests are intended to supply data sought by the A.S.M.E. boiler code committee as a basis for proposed modifications in the code for unfired pressure vessels.

A preliminary progress report on qualifications of welders, inspection and supervision was presented by H. H. Moss and A. M. Candy. This covered the fields of structural steel and industrial piping, and was followed by prepared discussions covering structural steel, piping and pressure vessels. Merrill Turner of the Electric Rail Weld Service Corporation, Chicago, Ill., presented a paper on the building up of battered rail ends. No new data to the practice universally used by electric railways was presented.

The following officers were elected for the ensuing year: President, F. T. Llewellyn; senior vice-president, A. E.

Gaynor; divisional vice-presidents, Ernest Lunn, J. W. Meadowcroft, H. P. Peabody; directors-at-large, A. M. Candy, J. H. Deppler, E. H. Ewertz, S. W. Miller. Social affairs of the meeting included a luncheon and a stag dinner.

A.E.S.C. Changes Procedure

REVISION of its rules of procedure to speed industrial standardization work on a national basis is announced by the American Engineering Standards Committee. The chief object has been to make it more flexible so that it may fit the varied conditions to be met in the wide range of industrial subjects covered by the committee's work.

Three changes are made in the procedure. Heretofore each sectional committee has acted under the administrative support and direction of one or more of the interested bodies, who are termed sponsors. A sectional committee may now operate autonomously, reporting directly to the A.E.S.C., or it may act under sponsors as before. The second change recognizes "proprietary" standards and makes possible the revision of such standards within a single organization on condition that it be shown that a standard is acceptable to the groups concerned. This method is particularly applicable to highly specialized fields in which the standard of an organization has already achieved a position of recognized eminence. The third change provides for very simple cases. The approval of standards under such cases is based upon the action of a conference followed by written acceptances of the interested groups.

Missouri Utility Association Annual Meeting

MODIFICATION of school curricula to permit the study of public utilities was advocated by Governor Sam A. Baker of Missouri in his opening address delivered before the Missouri Association of Public Utilities at the 22d annual convention held in Jefferson City, Mo., April 26-28. Motor bus competition was discussed by Edwin S. Austin, supervisor of the motor bus division of the Missouri Public Service Commission, and application of power and light ideas to ride salesmanship was discussed by Walter Jackson, fare consultant, Mount Vernon, N. Y. Thomas J. Brown, chairman of the Missouri Public Service Commission, spoke on state regulation and the workings of the state commission in an address delivered at the annual banquet on April 27.

The following officers were elected for the coming year:

A. E. Reynolds, vice-president and general manager Springfield Traction Company, president; F. D. Beardslee, St. Louis, Mo., secretary and treasurer; T. J. Stricker, Kansas City Gas Company, first vice-president; E. D. V. Dickey, Citizens Gas Company, Hannibal, second vice-president; and Samuel W. Greenland, St. Louis Public Service Company third vice-president.

News of the Industry

Guaranteed Return on Shaker Heights Line in Cleveland

A cost plus 10 per cent contract under which the Cleveland Railway, Cleveland, Ohio, will operate the Van Sweringens' Shaker Heights rapid transit lines was recently approved by the City Council. Although the rapid transit is operated for the most part on a private right-of-way, the downtown end of the line connects with city railway lines. The new contract is effective as of Jan. 1. It will expire on Jan. 1, 1930, by which time it is expected the Shaker rapid transit line, along with other rapid transit lines projected by the Van Sweringens, will be operating over a private right-of-way the entire length of the route into the Van Sweringens' new union terminal.

Heretofore the Cleveland Railway has been collecting a city fare for every passenger carried in rapid transit cars over city tracks. As a result the rapid transit cars for several years have been leading the Cleveland Railway system in earnings per car-mile. This was an expensive arrangement for the Van Sweringens, because it left something less than 4 cents out of each 10-cent fare to pay the cost of operating the two divisions of the Shaker line along a 7-mile private right-of-way. Under the old arrangement, there was always a deficit to be made up by the Cleveland Interurban Railway, which owns the rapid transit lines, but this was not unexpected, since the rapid transit was built for the purpose of increasing the sales of Shaker Heights property owned by the Van Sweringens. The population of Shaker Heights has increased to such an extent, however, and the line is so popular that it is expected to pay its own way under the new contract which has been negotiated.

The Cleveland Railway is expected to cite the cost plus 10 per cent agreement in its efforts to secure from the suburban communities which it serves fares sufficient to meet the cost of operation to those communities.

Transfer Privilege Broadened in St. Louis

The St. Louis Public Service Company, St. Louis, Mo., has agreed tentatively to permit passengers to transfer from street cars to all of its buses for a single fare of $7\frac{1}{2}$ cents. At present 10 cents is charged on the buses, which transfer to street cars, while to obtain a transfer from a street car to a bus of the railway one must pay the conductor 3 cents above the regular car fare.

Fulfillment of the company's promise,

however, is dependent upon the board's granting it permission to operate a new bus line on Meramec Avenue from Grand Boulevard to Carondelet Park. About 150 residents of the vicinity were present who appeared to be unanimously in favor of the new line. President Kinsey said the People's Motorbus Company, which is opposing the granting of the permit, has asked to be heard. The bus company, which operates over this route, will be given an opportunity to present its arguments in the case before the board passes on the application.

Economies Through Consolidation of Illinois Traction Subsidiaries

The Illinois Terminal Company has received permission from the Interstate Commerce Commission to lease and operate as a single unit the railroad properties of the St. Louis, Troy & Eastern Railroad, the St. Louis & Illinois Belt Railway, the St. Louis Electric Terminal Railway and the main division of the Illinois Traction System. It is believed, this consolidation will bring about more economic and efficient operation.

Seven-Cent Plea of I. R. T. Approved

Decision finds federal courts have jurisdiction and that company is entitled to 2-cent increase, pending master's investigation of exact amount needed. Supreme Court to hear plea

A DECISION in the Interborough Rapid Transit fare case in New York was handed down on May 2 in the Federal Statutory Court, made up of one circuit and two district judges in the Southern District of New York. The original bill was a plea for injunction restraining the three transit commissioners and the chairman of the Department of Public Service of the State of New York from enforcing various rate limitations on the Interborough Rapid Transit Company and its lessee, the Manhattan Railway, for the transportation of passengers in New York City. The case has been before the court since Feb. 14. The decision favored the contention of the company.

FARE PROVISION SUBJECT TO REGULATORY ACTION

After pointing out why public service corporations subject to confiscatory limitations in their rates can appeal to the federal courts, the decision summarizes the history of rapid transit legislation in New York State as well as that relating to the appointment of public service commissions. The New York public service commission law giving authority over rates, it points out, was passed in 1907, while the final contract (No. 3) of the city with the Interborough Rapid Transit Company was not entered into until 1913. Its fare provision of "5 cents and no more" was therefore subject to regulatory revision by the commission in the manner prescribed in the public service commission law.

Numerous cases were cited on this point, particularly *People vs. Nixon*, 229 N. Y., 356, from which quotations were made. It was thus the duty of the Public Service Commission "to make the fare sufficient to yield reasonable compensation for the services rendered and

no more." In the rapid transit act of 1912 there is no evidence that the Legislature intended to burden the city with an exorbitant fare or the company with a non-compensatory rate. In fact, Section 8 of this act provides that all terms and conditions as to rates of fare and service shall be subject to supervision by the commission.

The court also held that where a state legislature intends to transfer its power over rates to a municipality or regulatory body, the intention must be clear and unmistakable. The renunciation of a sovereign right to control rates, it says, must be unequivocal, as shown in *Milwaukee Electric Railway & Light Company vs. Railroad Commission of Wisconsin* (238 U.S. 174, 180). This was not the case in New York.

The court differentiated the case from some earlier ones where it was held that equity cannot relieve a company from a bad bargain. In the *Columbus rate case*, 249 U.S. 399, the Legislature of Ohio had not established a regulatory commission by which franchise and contract rates might be regulated upward and downward. In the *Atlanta-Decatur fare case*, 262 U.S. 432, the state had not exercised its police powers over the subject of rates and was not seeking to. Other cases mentioned as differing in principle from the one under consideration were *Southern Utilities Company vs. Palatka*, 268 U.S., 232; *Henderson Water Company vs. Corporation Commission*, 269 U.S. 278, *City of Cleveland vs. Cleveland Railway*, 194 U.S. 517, and *Tampa Water Works vs. Tampa*, 199 U.S. 241.

The decision had already pointed out that no provision of the law compelled a lower rate on the leased Manhattan Railway.

On the basis of the company's com-

puted valuation of its property and the commission's figure of the value of the city-owned property used on the I.R.T. system, the rate of return in 1926 was 2.65 per cent and in 1927 was 2.52 per cent. If the return on the value as computed had been 8 per cent, (as in *McCardle vs. Indianapolis Company*, 272 U.S. 419; *Bluefield vs. Galveston*, 262 U.S. 692, etc.), the court declares that \$49,280,731 would be required to make up the difference in 1925.

On the propriety of including the city-owned property to determine the necessary return, the court took the ground that the property for which the Constitution requires consideration is "that devoted to the public use." Many cases are cited where leased property was included. The court concludes this portion of its decision with the words:

The city's property is earning the return as well as the plaintiff's and the plaintiff's leased railway. All must be considered in calculating the capital making the return and rendering the service.

BONDS TO BE FILED

The court held that it would grant an injunction allowing the company to charge a 7-cent fare until the report of a master to be appointed to take more evidence on the value of the property and the exact fare necessary to prevent confiscation. In the meantime, the company would be required to issue rebates to passengers and file a bond to repay them in excess of 5 cents collected per passenger to the extent that the court should later direct. If the city preferred, however, the court said it would grant a stay in this order if the city would file a bond to indemnify the company from further daily confiscation of its property.

PLEA FOR STAY TO BE HEARD MAY 14

Notice was served on the Interborough Rapid Transit Company on May 3 by Associate Justice Stone of the United States Supreme Court that he will at once entertain "an application for a temporary stay," if it attempts to collect a 7-cent fare on its subway and elevated lines in New York, in accordance with the authority granted by the Federal Statutory Court before the Supreme Court has had an opportunity to pass on a motion for a stay to be made in behalf of the city.

In his communication to counsel for the railway Justice Stone stated that he had been informed an application would be made to the Supreme Court in behalf of New York City for a stay, pending formal appeal to the Supreme Court. He said further that consideration of the request for a stay would be entertained by the full bench of the Supreme Court in open session on May 14.

The Mayor said that "every resource of the city, legal and financial, will be employed to retain the nickel fare." At the same time, he announced that he would be a candidate for re-election and would run on a 5-cent fare platform.

Former Mayor Hylan gave out an interview intimating that if he had been retained in office, he would have kept the 5-cent fare in force. He said he

was a candidate for Mayor at the fall election.

William H. Ransom, special counsel to the Interborough points out that to earn an 8 per cent return on both the city's and company's investment in rapid transit, a 9-cent fare would probably be necessary.

In its original application to the Transit Commission the Interborough asked for permission to change its rate from "5 cents per passenger to 7 cents . . . without prejudice to its right to adjust such fares upward or downward as conditions and costs of operation may require under actual experience with such rates."

Unified Bus and Railway Service in Effect in Indianapolis

An important step in unification of the Indianapolis Street Railway and the Peoples Motor Coach Company both of Indianapolis, took place recently when transfers between buses and street cars were interchanged. Some feeder buses in the city were discontinued and through service to the business district was started. Simultaneously a new bus fare for school students became available. A strip ticket of ten fares is placed on sale each week, the average trip price being 6½ cents. Transfers are free from bus to bus and from bus to car and the payment of 4 cents in cash, or a token having a value of 3½ cents, known as an equalizing fare, entitles the passenger on a car to transfer to a bus.

Union Contract in St. Louis Cancelled

The St. Louis Public Service Company, St. Louis, Mo., served written notice May 3 on the Amalgamated Association that the existing contract with the union would be terminated June 2. This move followed action taken at the regular meeting of the board of directors on May 1 when a resolution was unanimously adopted to cancel the contract. The management had previously suggested a cut in wages of the 4,800 members of the union amounting to about 9 per cent. This action was in the nature of a counter proposal to the demands made on the management on March 5 for an increase in wages for motormen and conductors of 5 cents an hour and improved working conditions. These demands were rejected by the management on the ground that they would increase the company's annual payroll, if applied to all employees, \$4,000,000.

Wage negotiations have not yet been broken off with the union, whose committee expects to have further conferences on the controversy. Stanley Clarke, executive vice-president of the company, reported to the directors that the union had rejected the company's demand for a wage cut, and asked for authority to terminate the contract, whereupon the directors unanimously adopted the resolution.

New Agitation Over Piedmont & Northern Connection

Business men of York, Union, Laurens, and other places along the way are uniting in a movement to induce the Piedmont & Northern Railroad to build its connecting line between North and South Carolina from Belmont, N. C., to Honea Path, S. C. This movement was started as soon as the Interstate Commerce Commission denied the application to make the connection between Gastonia, N. C., and Spartanburg, S. C. The proposed line from Belmont to Honea Path would not parallel any existing railway and would traverse a rich agricultural region. For a number of miles in York County south of Belmont the road would traverse land owned by the Duke interests, purchased in connection with the building of dams across the Catawba.

Many of the towns along the proposed route are manufacturing centers.

Extension of Franchise in Chicago

Another 30-day extension of the franchises of the Chicago Surface Lines has been approved by the City Council. The new permit became effective May 1 and allows the companies to continue operations from day to day until June 1. That a special session of the Illinois General Assembly will be called this month to consider Chicago traction legislation was again seen as a possibility by members of the City Council in a statement made recently by Governor Small. In spite of his defeat at the primaries on April 10, the Governor said that he felt that his promise to call a special session is as binding upon him as it would have been had he been re-nominated. Several of the Aldermen expressed the opinion that the city is no nearer an agreement with the transportation companies regarding a legislative program than it was a year ago and that in the light of this situation it would be futile to call a legislative session.

Invitation to Pass Ideas Along in Cincinnati

For the best suggestion on how a conductor can sell more rides for the company, a \$10 prize is offered by the Cincinnati Street Railway, Cincinnati, Ohio. Prizes of \$5 each are being offered for the three next best. Suggestions, solicited by the editor of *The News*, the official paper of the company, were required to be in the editor's hands by April 21.

One-Man Cars on Kansas Line

One-man cars are now being operated by the Kansas City Public Service Company on the Holmes-Quindaro line in Kansas City, Kan. They operate on three and eight-minute schedules and thus increase the volume of service to patrons. From 9 o'clock to 2 o'clock on the first day the new service was installed, passengers were allowed to ride free.

Color Suggestions Total 3,451 in Jacksonville

The people of Jacksonville and Duval County have been thanked and congratulated in a recent newspaper advertisement by the Jacksonville Traction Company, Jacksonville, Fla., for the 3,451 valuable suggestions for colors for the company's cars. The company offered a first prize of \$25, two second prizes of \$15 each, three third prizes of \$10, and 100 fourth prizes of \$1 each for the best color suggestion for repainting its cars. The sketches submitted were judged according to their practical color value, artistic value and neatness. Many of the winning exhibits were on display in a window of Cohen Brothers big store. The names of the winners were published in newspaper advertisements.

sum considerably less than the figure which we have found as a rate base. The testimony as to these items discloses wide variation in the several estimates, and in our opinion, not more than \$36,350,000 could fairly be said to represent the basic figure of reproduction cost new, less depreciation.

"New Business" Contest in East St. Louis

A "new business" contest in East St. Louis, Ill., has been under way since April 1 among the employees of the East St. Louis Railway and affiliated companies. The contest offers cash prizes of \$100, \$50 and \$25 and three bonuses. According to the contest rules, employees are appointed as agents of the companies in the solicitation of chartered trips on the Blue Goose Motor Coach lines and on the street car. Traffic tip cards giving information of possible sources of new business have been distributed in connection with the contest. These cards are to be filled out by the employee and sent to the traffic solicitor, who, in turn, will follow up the tip and endeavor to secure the business. The cash commissions are paid to those employees securing business over a stipulated amount and, in addition, the total amount of business secured is placed to their credit toward the three bonuses to be awarded at the end of the contest.

\$20,000,000 for Initial Reading Electrification

ELECTRIFICATION for the Reading Railroad out of Philadelphia, Pa., was foreshadowed in the purchase on April 30 by that company of a 12-acre tract at Nineteenth and Rockland Streets, Philadelphia, Pa., for the erection of an electric train storage yard. Agnew T. Dice, president, said that electrification of the line would embrace one of the most important sectors of the road, namely, from the Reading Terminal to Wayne Junction. Other improvements were predicated upon the completion of this work, and when the Chestnut Hill branch was in operation the company anticipated making extensions of electric service to Lansdale on the Bethlehem branch and from Glenside to Willow Grove. The next step would be a continuation to the New York branch, with the first projection of service being from Jenkintown to Langhorne.

The electrification program will be carried out at a cost of \$20,000,000. It provides for the transformation of lines from the Reading Terminal, Philadelphia, to Chestnut Hill as the first step. Seven grade crossings in the Germantown section will be removed and seven bridges will be rebuilt under existing plans. Also a large terminal yard will be constructed at Chestnut Hill.

Improvements for Columbus Approved

The proposal of the Columbus Railway, Power & Light Company, Columbus, Ohio, to make all streets with car tracks main thoroughfares and to speed up service from 20 to 25 m.p.h., has been approved by the Columbus Traffic Commission in answer to the request of the City Council for a recommendation. Establishment of the skip-stop system was also approved. Objection to the clause making all track streets main thoroughfares, regardless of the amount of traffic on them, has been expressed by the Columbus Automobile Club, Mayor Thomas and police officials, as well as several Councilmen. A survey of the situation is to be conducted before the Council acts.

Commission to Pass On One-Man Cars for Hartford

The Connecticut Company, Hartford, Conn., has taken its plea to be allowed to operate one-man cars in Hartford before the Public Utilities Commission. The original Tucker grant, over which there has been much controversy, required that the railway operate all trolleys with two-man crews. The city of Hartford has allowed about 22 per cent one-man operation and it is the plan of the Connecticut Company to increase this to 90 per cent.

A recent hearing was held at which Connecticut Company officials presented one-man car statistics to the commission. The city was not represented at the meeting. President J. K. Punderford stated that if permission were granted the company planned to rebuild its present cars as one-man models. It was brought out that revenues of the company had dropped \$250,000 in one year. Figures were presented to show the steadily increased operation of one-man cars in other cities. Accidents, it was maintained, were no higher with one-man than with two-man cars. One-man cars are also more economical.

Rehearing on Los Angeles Railway Fares Denied

Finding no merit in the contention of the Los Angeles Railway, Los Angeles, Cal., that the commission had erred in denying its application for a fare increase from 5 cents to 7 cents, the Railroad Commission has denied the petition of that company for a rehearing. In its order denying the rehearing the commission emphasized that the rate base of \$42,000,000 fixed for that utility in the commission's order was extremely liberal, and that the commission had carefully considered all of the evidence and claims of value which were before it in the rate hearing. In passing on this point the commission said in part:

It is significant that, on this record, a fair allowance for reproduction cost new, less depreciation, would, with fair allowance for all intangible items, amount to a

Franchise Plans in Kansas City Advanced

Formal approval was given the proposed new bus franchise plans by the board of directors of the Kansas City Public Service Company on April 26. The company will ask a new franchise of the city.

Powell C. Groner, president of the company, announced it was planned to have the ordinance ready for the next meeting of the City Council. A 15-cent fare for the downtown buses, and new routings were covered in suggestions filed with the city clerk.

The new bus ordinance will retain the Warwick bus line on Grand Avenue and will send the Armour-Paseo bus line down Baltimore Avenue. It had been announced previously that these bus lines would go into the downtown district on other streets. Officials of the company in submitting the ordinance to the City Council will suggest that the shift in bus routes be made May 31.

Nahant-Lynn Fare Increase Stands

The Public Utilities Commission has allowed the fare increase of the Nahant & Lynn Street Railway of Massachusetts and dismissed the petition of the Selectment of Nahant asking for the increase to be set aside. The fare increase goes into effect at once and provides for a 2-cent increase from 13 to 15 cents between Nahant and Lynn and also a slight increase in the price of strip tickets.

In its opinion the commission stated that for the year 1927 the operating revenue of the company did not meet the actual operating expenses by approximately \$11,000 and that in 1925 and 1926 the difference was even greater. In spite of the several suggestions made the commission felt it ought not to set up judgment against the management of the company, faced as it was with an annual deficit. It was obvious that the management should take such steps as were possible to maintain its patronage and increase revenues.

Special Services on South Shore Line

Half-hour service during week-ends between Chicago and Michigan City, and eight new trains, including several operating on extra fast time, are among the features of the new summer service schedules of the South Shore Line, which became effective April 29 on central standard time, but adapted in convenience to daylight time. Time folders were distributed detailing the changes.

Of particular interest to theatergoers along the South Shore Line is the new 10:15 p.m. South Bend limited out of Randolph Street, Chicago, 11:15 p.m., Chicago time, which is late enough to allow most theater patrons in Chicago to see the last act before leaving for their train. This train will make faster time than the usual schedule, arriving in South Bend at 12:30 a.m.

calculated to stimulate traffic and increase its earnings. Governor Young was appealed to by the City Council to take action against the new fares.

No Relief from Parking in Cleveland

The Cleveland, Ohio, City Council has definitely refused to provide relief for operation by the Cleveland Railway by prohibiting all auto parking on downtown streets. It has proposed to allow automobiles to drive through unoccupied safety zones outside the congested areas, thus increasing the probabilities of delaying and tying up railway service at intersections marked by traffic lights. The traffic ordinance is about to be revised, but in all the discussions over parking, the protests of the Cleveland Railway have gone unheeded.

Recently Colonel Joseph H. Alex-

Hearings on Pass Abolition in Chicago Resumed

Public hearings on the petition of the Chicago Rapid Transit Company, Chicago, Ill., to abolish weekly passes and establish a flat 10-cent fare in the city of Chicago was continued on April 26 until May 15 by the Illinois Commerce Commission. The delay in the hearings was the second requested and obtained by the city since the petition was filed by the company last February. Patrick J. Moynihan, as acting chairman of the commission, presided over the recent hearing, taking the place of David H. Jackson, who resigned at the request of Governor Small.

When Summer Comes, Mid-West Parlor Service Will Follow

Temporary discontinuance of parlor car service between Chicago and cities in the Fox River Valley, was announced by the Chicago, Aurora & Elgin Railroad to go in effect April 1. The service, which was discontinued on account of light patronage, will probably be resumed in about two months, when the heavy summer travel begins, according to an official of the company.

W. D. Mahon on Co-operation with the Mitten Management

IT IS a new step in the industrial undertakings of America, but I feel that we understand one another thoroughly and that the spirit of co-operation will be developed fully, fairly and honestly, and that, if that is done, it is bound to bring the results that we are striving for. It will take time and patience to work it out, but both sides thoroughly understand one another, and I have great hopes for this plan for the future. It brings, as it were, a new day to this great army of industrial workers that follow this occupation and have struggled for so many years to bring about a better and happier day, and I feel assured that, if our plans work out as we have outlined them, it is the beginning of a happier and brighter hour for the street and electric railway workers of America.—*"The Motorman, Conductor and Motor Coach Operator," official organ of the Amalgamated Association.*

Rehearing Fare Petitions in Los Angeles Denied

The California Railroad Commission has denied the petitions for re-hearing filed by the City of Los Angeles, and the Venice Branch of the Los Angeles Chamber of Commerce, in the matter of the revision of the rates of Pacific Electric Railway. In announcing its decision the commission made sweeping changes in the rate structure of that utility, with radical reductions in one-way and round-trip fares, and established a basic 5-cent zone fare, with a shortening of the zone, in the city of Los Angeles. The petition for re-hearing filed by the City of Los Angeles related to the local fares in the City of Los Angeles only. The petition filed by the Venice Chamber of Commerce Branch related to the fares between Los Angeles and Venice only.

Rates fixed by the commission are intended as experimental fares only, and the commission will hold itself open to make such revision in its order as developments, during the actual operation of the fares, may appear to warrant. In its original order the commission found the financial condition of the utility warranted action

ander, president of the Cleveland Railway, figured that the company would be in money (and the fare that much nearer a reduction) if it paid for parking space in downtown garages for all the automobiles that can be parked on Euclid Avenue between the Public Square and East 22d Street during the ten business hours of the day, provided also that no parking was allowed between these limits. Due to fire plugs, safety zones, bus stops and regular no parking spaces, there is room for only 170 automobiles to park on Euclid between the Square and East 22d Street he discovered. The parking limit is one hour, consequently the company would be willing to pay for the storage of 1,700 automobiles for one hour each. If this plan should be put into effect, Mr. Alexander estimated that six minutes would be cut off the schedule of each Euclid Avenue car and the money saved from accidents and delays would pay the parking costs five times over.

When one of the Councilmen proposed to take all daytime parking off the downtown streets, the protests of the merchants had the effect of killing the proposal in one day. Since then the merchants have succeeded in preventing any changes whatsoever in downtown parking regulations.

Sunday Passes Popular in Gary

Sales of the 25-cent Sunday pass, recently offered to patrons of the Gary Railways, Gary, Ind., totaled 1,500 on April 15, the first day of the sale, and more than 1,700 on April 22. The pass entitles the bearer to travel anywhere on the company's system for as many trips as he likes, on the day of issue. As a result of the popularity of the new form of ticket, headway on the 27-mile Gary-Valparaiso interurban division has been increased on Sundays from every two hours each way to hourly service.

For an Institute of Traffic Research

Formation of a national institute for street and highway traffic research will be discussed at a conference in St. Louis, Mo., on May 23, sponsored by *Nation's Traffic*, devoted to street and highway traffic problems.

In this connection formation of a traffic institute to centralize all efforts in research for safety and other phases of the problem is made in the same publication by H. M. Gould. The Gould plan calls for a group of workers sponsored by every interest affected who would conduct field research under actual conditions in a large city which would permit the use of its streets as a laboratory. Reports rendered on the tests would be universally disseminated. The public would be given the necessary information through paid advertisements in the press. The plan is to "get the facts and then broadcast them."

Recent Bus Developments

New Route in South Bend

The Chicago, South Bend & Northern Indiana Railway was granted permission on April 21 by the Indiana Public Service Commission to operate buses on a new route in the west portion of South Bend, Ind. This line will be an extension of the local railway service, connecting the Washington Avenue, Lincoln Way and Portage Avenue car lines. Transfers will be given from street cars to the bus line upon payment of an additional 2 cents, while bus passengers will pay a 10-cent fare and have free transfer privileges to the street cars.

Project in Berkeley Carries

The new 5-cent privately operated bus line project in Berkeley, Cal., was approved by a vote of 13,466 to 9,328 at the election which was held there May 1. It provided for operation of buses from the center of Berkeley to the Golden Gate Ferry Pier, local service to cost 5 cents and trans-bay service 18 cents as opposed to 7-cent local fares and 21-cent ferry fares now charged on the Key System Transit Company lines and on the Southern Pacific. Recently the Key System was authorized to substitute bus service on certain railway routes in Berkeley.

The bus proposition was presented as an ordinance ten months ago, but the Berkeley City Council refused to pass it. In a hot campaign the initiative was bitterly assailed by the two rival railroad companies. Supporters of the new bus line declared that the Key System and the Southern Pacific are rendering unsatisfactory service because of costly duplication.

Postmaster Heywood of Berkeley is the sponsor of the bus initiative. President A. O. Stewart of the Golden Gate Ferry Company said that he would be ready to run buses on the new route within 60 days after the necessary permission had been granted by the State Railroad Commission.

Would Carry Out Former Bus Railway Proposal for Buffalo

Plans for a city-wide co-ordinated bus and railway system for Buffalo, N. Y., suggested two years ago by the International Railway and the International Bus Corporation, but rejected by the City Council under the former commission form of municipal government, have been revived by the Chamber of Commerce and representative business organizations of the city in co-operation with the new Buffalo city government. Mayor Frank X. Schwab, in sending out invitations to business organizations of the city to co-operate in carrying out the proposals, said that he was anxious to have this system

started as soon as possible in the interests of better transportation; that if the International wanted to establish a co-ordinated bus-trolley system and treated the city fairly he would be glad to make a recommendation to the Council. He said he was in favor of a universal transfer between trolley and bus lines and that consideration would be given to permits for operation on Bailey Avenue.

Will Substitute for Cars on San Diego Line

Permission has been granted by the California Railroad Commission to the San Diego Electric Railway to abandon service along First Street, between B and Laurel Streets in San Diego. The order calls for bus service under a 10-minute headway.

All-Bus Operation in White Plains and Harrison

The Public Service Commission on April 23 authorized the Westchester Street Transportation Company, Inc., to substitute buses for street cars on its Silver Lake Line. This substitution will be the final step in the policy of the company to substitute buses for street cars in the city of White Plains and the town of Harrison. Both the city and town have given their consent to the substitution.

Bus Business in Newport Sold

The Newport Electric Corporation, Newport, R. I., sold its bus properties to the Newport & Providence Railway on March 1, 1928.

Substitution in Massachusetts Cities

The Norton, Attleboro & Taunton Street Railway, controlled by the three Massachusetts cities named, plans to abandon service and to substitute bus transportation. Both the physical and financial condition of the company, it is said, make the move imperative. City governments of the towns involved have been asked to study the situation and provide the names of bus companies that may desire to furnish service

Five-Cent Fare on Roanoke Line Refused

The Roanoke Railway & Electric Company has refused to grant the citizens of the Williamson Road section a 5-cent bus fare. The railway buses operate from 5:45 a.m., until 10:15 p.m., but the citizens are urging that they be operated until at least 11:20 p.m.

Tulsa Gives Convention Visitors a Sight-Seeing Trip

The Oklahoma Union Railway and the Union Transportation Company, a subsidiary, have adopted the sight-seeing bus idea and give visitors to the more important conventions a two-hour trip over Tulsa in their large parlor buses. An employee of the company points out the places of interest in the city.

Commission Approves Additional Bus Routes for Public Service

Approval of municipal consents to the Public Service Co-ordinated Transport, Newark, N. J., for the operation of ten de luxe buses between Paterson and Hackensack was granted on April 21 by the Board of Public Utility Commissioners. The rates of fare for the service are:

Within Paterson, 10 cents; Paterson to East Paterson, 15 cents; Paterson to the Maywood-Hackensack line, 20 cents, and Paterson to Hackensack, 25 cents.

The board also approved municipal consents granted the company for an extension of the Elizabeth-Roselle Park route to Westfield and for the operation of fourteen buses. The extension would have four zones each at a 5-cent fare.

Additional Bus Routes Sought for Buffalo Suburban Run

Application was made on May 1 by John T. Burke, as received of the Hamburg Railway, to the New York Public Service Commission for a certificate for the operation of an additional bus route in Ridge Road to make a loop or circuit in the existing bus lines operated between Lackawanna and Blasdell, N. Y.

The Buffalo City Council has rejected the application of the receivers for permission to operate buses in Buffalo as part of the proposed Buffalo-Perrysburg bus route. The company sought permission to use certain streets in Buffalo to the Buffalo-Lackawanna city line. Opposition to the proposed bus line was voiced by representatives of the Buffalo & Lackawanna Traction Company and the Buffalo & Erie Railway. Buffalo retail interests favored the project.

Bus Preparations in Keokuk

The Keokuk Motor Coach Company, Keokuk, Iowa, has been organized to establish and operate motor coach lines in Keokuk, Iowa, to supplant the local railway service, scheduled for suspension on May 15. Five buses will be put into service at the opening of its new schedule and others will be added.

Paul O. Dittmar, representing a Chicago accounting firm; G. E. Eldridge, Reo Motor Company, Lansing, Mich.; Roy E. Green, First Trust & Saving Bank, Whiting, Ind., and Henry S. Walker, Keokuk, are the incorporators. Mr. Dittmar is president, Mr. Walker vice-president, and Mr. Green secretary.

Financial and Corporate

City Companies Do Well

Despite unfavorable economic factors, statistics covering 1927 operations show traffic in large cities practically a constant. Other groups not doing so well. Results from bus operation greatly improved

FROM reports for 1927 made to the American Electric Railway Association it is apparent that the city railway systems are about holding their own but that the interurban and suburban companies are finding it more and more difficult to maintain themselves. The private automobile and the inter-city bus are taking a heavy toll from the traffic of the latter groups. The results on the city lines, on the contrary, are quite encouraging. A loss of only 1.26 per cent in revenue passengers in a year of sub-normal industrial activity suggests that with the recovery of business activity the electric railways in cities may look for improvement in their business. The operating ratio of 70.91 per cent for the city lines is a healthy one. The stability of operating expenses is also a source of encouragement and the ability of this group of companies to increase its net income substantially in an unfavorable year is regarded as significant.

As Edmund J. Murphy, chief statistician of the association, writing in *Aera* for May sees it, results of operations of electric railways in 1927 indicate that by efficient management and careful economies the companies were able to offset to a large degree the effects of rather unfavorable traffic conditions. Not all of the companies, of course, were able to do this equally well. The city companies were most successful in this respect, but they make up so large a portion of the industry that their inclusion in any statement, particularly the inclusion of the companies operating in the large metropolitan cities, makes such a statement reflect principally con-

ditions prevailing on city lines which are generally much more satisfactory than on other lines.

NET INCOME CONSERVED

In 1927 industrial conditions were uneven and in some industries there was actual depression. The resulting de-

crease in the number of people employed affected electric railway traffic adversely, as it always does. In spite of these conditions, however, the industry was able to conserve very nearly all of its

net income. Although there was a decrease of 1.68 per cent in railway operating revenues in 1927 compared with 1926, the gross income remaining after the payment of operating expenses and taxes but before the payment of fixed charges was only 0.31 per cent less than in 1926. The railways were aided in their efforts to offset the effects of decreasing traffic by a higher average rate of fare resulting from the numerous increases in fares granted during both 1926 and 1927. Thus, while the number of revenue passengers carried decreased 2.49 per cent the amount of passenger revenue collected from these passengers decreased only 1.94 per cent. Operating expenses decreased 1.77 per cent. This was partly due to curtailed service and partly to the lower cost of materials in 1927. The curtailment of service was, of course, a natural consequence of the

Statistics Compiled by American Electric Railway Association

COMBINED OPERATIONS OF 322 COMPANIES

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$794,074,168	\$804,443,915	(D) \$10,369,747	(D) 1.29
Railway operating expense.....	584,392,950	592,911,000	(D) 8,518,050	(D) 1.44
Net operating revenue.....	\$209,681,218	\$211,532,915	(D) \$1,851,697	(D) 0.88
Operating ratio (per cent).....	73.59	73.70	(D) 0.11	(D) 0.15
Miles of track and bus route.....	32,106	32,181	(D) 75	(D) 0.23
Revenue passengers.....	10,505,747,511	10,720,056,130	(D) 214,308,619	(D) 2.00
Total passengers.....	13,363,554,346	13,653,643,345	(D) 270,088,999	(D) 1.98
Car miles (revenue).....	1,890,886,569	1,902,308,748	(D) 11,422,179	(D) 0.60

COMBINED OPERATIONS OF 322 RAILWAY COMPANIES AND 153 CONTROLLED BUS UNDERTAKINGS

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Operating revenue.....	\$832,404,720	\$835,453,968	(D) \$3,049,248	(D) 0.36
Operating expense.....	619,932,322	623,935,892	(D) 4,003,570	(D) 0.64
Net operating revenue.....	\$212,472,398	\$211,518,076	\$954,322	0.45
Operating ratio (per cent).....	74.47	74.68	(D) 0.21	(D) 0.28
Miles of track and bus route.....	38,208	37,091	1,117	3.01
Revenue passengers.....	10,982,306,589	11,093,354,850	(D) 111,048,261	(D) 1.00
Total passengers.....	13,908,729,695	14,046,471,096	(D) 137,741,401	(D) 0.99
Car and bus-miles.....	2,032,128,843	2,016,886,829	15,242,014	0.76

crease in the number of people employed affected electric railway traffic adversely, as it always does. In spite of these conditions, however, the industry was able to conserve very nearly all of its

decreased traffic and indicates that the managements were watching their traffic demands closely and were quick to adapt their service to the reduced riding.

There was a decrease of 1.24 per cent

Statistics Compiled by American Electric Railway Association

Part I—Combined Operating Reports of 206 Electric Railways for the Calendar Year 1927 Compared With 1926

TABLE I—COMBINED INCOME STATEMENT

	1927		1926		Increase or (D) Decrease		Cents per Car-Mile		
	Total	Per Cent	Total	Per Cent	Total	Per Cent	1927	1926	(D)
Railway operating revenue.....	\$596,557,500		\$606,709,768		(D) \$10,152,268	(D) 1.68	42.68	42.91	(D) 0.54
Railway operating expenses.....	439,117,138		446,989,954		(D) 7,872,816	(D) 1.77	31.41	31.61	(D) 0.63
Net operating revenue.....	\$157,440,362		\$159,719,814		(D) \$2,279,452	(D) 1.43	11.27	11.30	(D) 0.27
Net revenue: Auxiliary operations.....	2,791,263		2,498,219		293,044	11.73	0.20	0.18	11.11
Taxes.....	37,408,745		38,111,905		(D) 703,160	(D) 1.85	8.79	2.70	(D) 0.74
Operating income.....	\$122,822,880		\$124,106,128		(D) \$1,283,248	(D) 1.04	2.68	8.78	0.11
Non-operating income.....	11,009,196		10,132,196		877,000	8.65	0.79	0.71	11.27
Gross income.....	\$133,832,076		\$134,238,324		(D) \$406,248	(D) 0.31	9.58	9.49	0.95
Deductions from gross income.....	112,089,985		111,606,083		483,902	0.43	8.02	7.89	1.65
Net income.....	\$21,742,091		\$22,632,241		(D) \$890,150	(D) 3.94	1.56	1.60	(D) 2.50
Dividends.....	(a) \$15,628,165	(b) \$15,150,954			\$477,211	3.14	.....	.....	.....
Operating ratio (per cent).....	73.61	73.67	(D)	0.06	(D) 0.09	.....	.....	.....	.....
Ratio: Net income to operating revenue.....	3.64	3.73	(D)	0.09	2.42	.....	.....	.....	.....

(a) Reported by 46 companies (b) Reported by 44 companies.

complete reports of 206 electric railways for the calendar years 1927 and 1926. The total operating revenues of these companies was \$596,557,500 in 1927 compared with \$606,709,768 in 1926. These revenues represent approximately 65 per cent of the total revenues of all the electric railways in the United States.

In addition to these 206 companies reports were also received from 116 other companies. Due to the fact that they carry on a joint railway, power and light business and that it was impossible for them to segregate their taxes and fixed charges between their railway

operations and these other operations, they could not be included in the tables showing a complete income statement. They are, however, included in the table of combined operations and are shown again with the operations of 153 affiliated motor bus lines included.

The companies referred to in the combined statement represent approximately 76 per cent of the entire industry. The trends shown by this larger group, however, do not differ materially from those of the group of 206 companies, indicating that the latter are fairly typical of the industry as a whole. The table of combined operations therefore, is inter-

esting only for the magnitude of the operations shown and for the testimony it gives as to the accuracy and representativeness of the group of 206 companies. The table, including the bus operations of electric railways, is of special interest because it shows that with the results of bus operations added in the net revenue of the industry is increased. This is the first year that this has occurred and it reflects the encouraging progress being made by the electric railways in their bus operations.

While the addition of the buses in 1926 reduced the net operating revenue of the whole group, the inclusion of the

Part III—Interurban Lines—Combined Reports of 50 Companies Operating Interurban Lines Exclusively

TABLE VIII—INCOME STATEMENT

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.	\$19,379,502	\$20,017,059	(D) \$637,557	(D) 3.19
Railway operating expense.	16,710,117	16,867,780	(D) 157,663	(D) 0.94
Net operating revenue...	\$2,669,385	\$3,149,279	(D) \$479,894	(D) 15.24
Net revenue: Auxiliary operations.....	158,634	173,479	(D) 14,845	(D) 8.56
Taxes.....	1,015,533	1,073,176	(D) 57,643	(D) 5.38
Operating income.....	\$1,812,486	\$2,249,582	(D) \$437,096	(D) 19.44
Non-operating income....	526,734	493,157	33,577	6.81
Gross income.....	\$2,339,220	\$2,742,739	(D) \$403,519	(D) 14.72
Deductions from gross income.....	4,033,483	4,093,382	(D) 59,899	(D) 1.47
Net income.....	*\$1,694,263	*\$1,350,643	(D) \$343,620	.....
Dividends.....	(a)\$350,951	(a)\$366,290	(D) \$15,339	(D) 4.19
Operating ratio (per cent)...	86.22	84.26	1.96	2.32
Ratio: Net income to operating revenue.....				

*Deficit. (a) Reported by seven companies.

TABLE IX—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures.	\$3,208,776	\$3,131,788	\$76,988	2.45
Equipment.....	1,948,419	1,945,988	2,431	0.12
Power.....	2,845,843	3,030,514	(D) 184,671	(D) 6.10
Conducting transportation.....	5,203,130	5,262,344	(D) 59,214	(D) 1.13
Traffic.....	350,654	323,081	27,573	8.53
General and miscellaneous.....	3,130,719	3,158,689	(D) 27,970	(D) 0.89
Transportation for investment—Cr..	—724	—3,200	(D) —2,476	(D) 77.38
Total operating expense.....	(a)\$16,710,117	(b)\$16,867,780	(D) \$157,663	(D) 0.94

(a) Includes \$23,300 undistributed expense. (b) Includes \$18,576 undistributed expense.

TABLE X—OPERATING STATISTICS

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles....	32,726,281	33,706,326	(D) 980,045	(D) 2.91
Total revenue car-miles	44,285,258	44,480,585	(D) 195,327	(D) 0.44
Revenue passengers (1)	34,801,282	36,819,171	(D) 2,017,889	(D) 5.49
Transfer passengers (2)	739,951	776,852	(D) 26,901	(D) 4.76
Total passengers (3)	37,047,065	39,104,334	(D) 2,057,269	(D) 5.27
Passenger revenue.....	\$10,824,181	\$11,565,912	(D) \$741,731	(D) 6.42
Revenue car-hours (4)	1,554,344	1,588,246	(D) 33,902	(D) 2.14
Passenger car-hours (5)	1,170,676	1,198,070	(D) 27,394	(D) 2.29
Miles of single track....	2,912	2,902	10	0.34
Passenger cars operated (1) (a).....	534	528	6	1.14

(a) Average maximum number of passenger cars in service daily.
 (1) Reported by 46 companies.
 (2) Reported by 11 companies.
 (3) Reported by 39 companies.

Part IV—City and Interurban Lines—Combined Reports of 77 Companies Operating Combined City and Interurban Lines

TABLE XI—INCOME STATEMENT

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue.....	\$153,890,575	\$159,800,918	(D) \$5,910,343	(D) 3.70
Railway operating expense.....	122,225,768	124,964,926	(D) 2,739,158	(D) 2.20
Net operating revenue.....	\$31,664,807	\$34,835,992	(D) \$3,171,185	(D) 9.11
Net revenue: Auxiliary operations.....	1,868,718	1,753,254	115,464	6.58
Taxes.....	9,163,833	9,738,983	(D) 575,150	(D) 5.91
Operating income.....	\$24,369,692	\$26,850,263	(D) \$2,480,571	(D) 9.24
Non-operating income.....	3,740,905	3,523,465	217,440	6.17
Gross income.....	\$28,110,597	\$30,373,728	(D) \$2,263,131	(D) 7.46
Deductions from gross income.....	28,036,494	28,104,047	(D) 67,553	(D) 0.25
Net income.....	\$74,103	\$2,269,681	(D) \$2,195,578	(D) 96.74
Dividends.....	(a)\$3,048,426	(b)\$2,550,042	\$498,384	19.54
Operating ratio, per cent	79.42	78.20	1.22	1.56
Ratio: Net income to operating revenue....	0.04	1.42 (D)	1.38 (D)	97.19

(a) Reported by 11 companies. (b) Reported by 12 companies.

TABLE XII—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures....	\$20,111,605	\$20,449,151	(D) \$337,546	(D) 1.66
Equipment.....	16,591,390	16,276,415	314,975	1.93
Power.....	17,370,894	18,156,042	(D) 785,148	(D) 4.33
Conducting transportation.....	46,328,422	48,191,308	(D) 1,862,886	(D) 3.87
Traffic.....	1,094,162	1,053,356	40,806	3.87
General and miscellaneous.....	20,757,658	21,149,383	(D) 391,725	(D) .86
Transportation for investment—Credit....	—128,064	—389,762	(D)—261,698	(D) 67.15
Total operating expense.....	(a)\$122,225,768	(b)\$124,964,926	(D)\$3,739,158	(D) 2.19

(a) Includes \$99,701 undistributed expense. (b) Includes \$79,033 undistributed expense.

TABLE XIII—OPERATING STATISTICS

	1927	1926	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles....	326,031,235	335,861,190	(D) 9,829,955	(D) 2.93
Total revenue car-miles.....	353,394,096	362,123,524	(D) 8,729,428	(D) 2.42
Revenue passengers (1)	1,473,094,984	1,588,545,585	(D) 115,450,601	(D) 7.23
Transfer passengers (2)	202,311,222	216,243,724	(D) 13,932,502	(D) 6.45
Total passengers (3)	1,701,705,656	1,832,886,471	(D) 131,180,815	(D) 7.16
Passenger revenue.....	\$132,174,475	\$138,568,183	(D) \$6,393,708	(D) 4.62
Revenue car-hours (4)	29,884,814	30,978,777	(D) 1,093,963	(D) 3.54
Passenger car-hours (5)	29,136,397	30,169,287	(D) 1,032,890	(D) 3.43
Miles of single track....	10,619	10,674	(D) 55	(D) 0.52
Passenger cars operated (1) (a).....	6,918	7,315 (D)	397 (D)	5.43

(a) Average maximum number of passenger cars in service daily.
 (1) Reported by 74 companies.
 (2) Reported by 60 companies.
 (3) Reported by 71 companies.
 (4) Reported by 62 companies.

Part V—Combined Statements of All Three Types of Companies on a Car-Mile Basis

TABLE XIV—INCOME STATEMENT OF 79 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 77 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease
	1927	1926	(D) 0.12	1927	1926	(D) 2.76	1927	1926	(D) 1.32
Railway operating revenue	42.33	42.38	(D) 0.12	43.76	45.00	(D) 2.76	43.55	44.13	(D) 1.32
Railway operating expense	30.02	30.30	(D) 0.92	37.73	37.92	(D) 0.50	34.59	34.51	0.23
Net operating revenue	12.31	12.08	1.90	6.03	7.08	(D) 14.83	8.96	9.62	(D) 6.86
Net revenue: Auxiliary operations	0.08	0.06	33.33	0.35	0.39	(D) 10.26	0.53	0.48	10.42
Taxes	2.72	2.71	0.37	2.29	2.41	(D) 4.98	2.59	2.69	(D) 3.72
Operating income	9.67	9.43	2.55	4.09	5.06	(D) 19.17	6.90	7.41	(D) 6.88
Non-operating income	0.67	0.61	9.84	1.19	1.11	7.21	1.05	0.97	8.25
Gross income	10.34	10.04	2.99	5.28	6.17	(D) 4.43	7.95	8.38	(D) 5.13
Deduction from gross income	8.00	7.88	1.52	9.11	9.20	(D) 0.98	7.93	7.76	2.19
Net income	2.34	2.16	8.33	*3.83	*3.03	(D) 26.40	0.02	0.62	(D) 96.78

*Deficit.

bus figures in 1927 increased the net revenue of the group. In other words, the buses operated at a deficit in 1926 but at a substantial margin above operating expenses in 1927. The decrease of \$1,851,697 in net operating revenue, shown in the table is changed to an increase of \$954,322 in the table in which bus and railway operations are combined.

In the case of the 206 companies for which complete operating data were obtained, the net operating revenue of the whole group of 206 companies was \$157,440,360 in 1927 and \$159,719,814 in 1926, a decrease of \$2,279,454 or 1.43 per cent, which should be compared with the decrease of \$10,152,268 in operating revenues. The difference is due to a decrease of \$7,872,816 in operating expenses. The operating ratio—that is, the ratio of operating expenses to operating revenues—was reduced from 73.67 per cent in 1926 to 73.61 per cent in 1927.

From auxiliary operations this group obtained a net revenue of \$2,791,263 in 1927, an increase of \$293,044 or 11.73 per cent over 1926. Taxes were reduced from \$38,111,905 in 1926 to \$37,408,745 in 1927, or 1.85 per cent, a decrease which also helped to keep the reduction in net income down to a minimum. The decrease in taxes is principally due to the reduction in gross revenues and not to any special relief from taxes.

Non-operating income, or income from investments, increased from \$10,132,196 in 1926 to \$11,009,196 in 1927, or 8.65 per cent. This produced a gross income before fixed charges of \$133,382,076, or only 0.31 per cent less than in 1926.

Deductions from gross income were \$112,089,985 in 1927. This compared with \$111,606,083 in 1926, the increase being 0.43 per cent. This left a net income of \$21,742,091 in 1927, which was \$890,150 less than the net income in 1926, the percentage of decrease being 3.94.

INCOME OF CITY COMPANIES INCREASED

When the statement is broken down into groups according to the types of companies, it is seen that the city companies made a very remarkable showing. There are 79 of these companies and their net corporate income was increased from \$21,713,203 in 1926 and \$23,362,251 in 1927—an increase of \$1,649,048, or 7.59 per cent. This is in spite of the fact that they carried 120,936,384 fewer passengers in 1927, or 1.56 per cent of the 1926 traffic. The companies operating in the large metropolitan cities, of course, contributed heavily to the production of this result. Higher fares held the decrease in passenger revenue resulting from the decreased traffic to 0.91 per cent, which operating economies and reduced costs changed into an increased net operating revenue.

The interurban lines and the companies doing a combination city and interurban service were not as successful as the city companies in contending with adverse conditions. The problems of the interurban lines are, of course, much more acute and difficult of solution than are those of the city systems.

The group of 50 companies operating interurban service exclusive carried 2,017,889 fewer revenue passengers in 1927 than they did in 1926, the decrease amounting to 5.49 per cent. Not all of this loss is due to the private automobile, of course. Part of it can be attributed to semi-depressed industrial conditions and slowing up of business activities in 1927 compared with 1926.

The interurban lines did not enjoy

As the Author Sees It

THE private automobile has become practically a necessity in the rural sections served by the interurban lines and its use in those sections is almost universal. The trips that formerly could be taken only by an interurban or steam railroad can now be taken in the family car without a moment's notice and with no reference to the schedules or the time-tables.

No action can be taken against such competition except the improvement of the service to a point where it will be more convenient and more appreciated than the automobile.

rates any higher in 1927 than they did in 1926; in fact, there seems to have been a slight reduction in the average rate obtained, so that the passenger revenue of the interurban lines decreasing even more than their revenue passengers, the figure being 6.42 per cent for passenger revenue and 5.49 per cent for revenue passengers.

Due to improvement in other than passenger revenue, however, to total

railway operating revenue of the interurban group decreased only 3.19 per cent, the amount being \$19,379,502 in 1927 compared with \$20,017,059 in 1926. Operating expenses were reduced from \$16,867,780 in 1926 to \$16,710,117 in 1927, or 0.94 per cent. The operating ratio thus increased, rising from 84.26 per cent in 1926 to 86.22 per cent in 1927. Net operating revenue was reduced from \$3,147,279 in 1926 to \$2,669,385 in 1927, or 15.24 per cent. Taxes decreased slightly but not enough to have any material effect upon the statement. The same may be said of non-operating income, which was increased by \$33,577. The decrease in net operating revenue, however, was carried through almost unchanged into gross income before charges, which amounted to \$2,339,220 in 1927 compared with \$2,742,739 in 1926, the decrease being 14.72 per cent.

This was not enough to meet the fixed charges of the group, which amounted to \$4,033,483 in 1927 and \$4,093,382 in 1926, a decrease of 1.47 per cent. As a result there was a deficit from operations of \$1,694,263 in 1927 compared with a similar deficit of \$1,350,643 in 1926.

The returns of the group of 77 companies operating combined city and interurban service follow very closely the same trends as the exclusively interurban group, as might be expected from the fact that it is made up principally of interurban, semi-interurban and suburban companies with some city operation included. Their net corpo-

TABLE XV—OPERATING EXPENSES OF 79 CITY COMPANIES, 50 INTERURBAN COMPANIES AND 77 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease	Cents per Car-Mile		Per Cent Increase or (D) Decrease
	1927	1926	(D) 0.12	1927	1926	(D) 2.76	1927	1926	(D) 1.32
Way and structures	3.96	4.13	(D) 4.12	7.24	7.04	2.84	5.69	5.65	0.70
Equipment	4.03	4.06	(D) 0.74	4.40	4.37	0.69	4.69	4.49	4.45
Power	3.93	3.98	(D) 1.26	6.45	6.81	(D) 5.58	4.92	5.02	(D) 1.99
Conducting transportation	13.79	13.94	(D) 1.08	11.75	11.83	(D) 0.68	13.11	13.31	(D) 1.50
Traffic	0.07	0.10	(D) 30.00	0.79	0.73	8.23	0.31	0.29	6.89
General and miscellaneous	4.07	3.93	3.56	7.07	7.10	(D) 0.42	5.88	5.84	0.68
Transportation for invest. Cr.	-9.01	-0.01	.....	.....	.....	.....	-0.04	-0.11	(D) 63.64
*Total operating expenses	30.02	30.30	(D) 0.92	37.73	37.92	(D) 0.50	34.59	34.51	0.23
*Undistributed expenses included in total	0.18	0.17	5.88	0.05	0.04	25.00	0.03	0.02	50.00

rate income was reduced from \$2,269,681 in 1926 to \$74,103 in 1927, a decline of \$2,195,578, or 96.74 per cent.

The number of revenue passengers carried by this group of companies decreased 115,450,601, or 7.27 per cent, compared with a decrease of 1.26 per cent for the city lines and 5.49 per cent for the interurban lines.

Net operating revenue dropped from \$34,835,992 to \$31,664,807, or 9.11 per cent. This represented a decrease of \$3,171,185. As against this there was a decrease in taxes of \$575,150 and increases of \$115,464 in net revenue from auxiliary operations and \$217,440 in non-operating income. The gross income before charges, therefore, decreased \$2,263,131 or 7.46 per cent, the actual amounts being \$30,373,728 in 1926 and \$28,110,597 in 1927. The deductions from gross income were reduced from \$28,104,047 in 1926 to \$28,036,494 in 1927, the difference being \$67,553 representing a decrease of one-quarter of 1 per cent.

The cost of conducting transportation, which is the heaviest item of expenditure, decreased 3.87 per cent in the combination group as against a decrease of 1.13 per cent in the interurban group and a decrease of 1.86 per cent in the city group.

Further analysis of these reports is promised in an article in *Aera* for June in an attempt to locate a little more definitely the sources of the industry's weaknesses and strength. The figures which have been compiled for each of the groups will be further broken down into smaller groups, according to their size, with the idea of showing how the smaller companies are doing in comparison with the larger companies.

Reorganization of Detroit United Ahead

New company will include only main line and Detroit, Monroe & Toledo Short Line. Common stock in voting trust for five years. A. L. Drum new president

ANNOUNCEMENT is made of the completion of the plan of reorganization of the Detroit United Railway, Detroit, Mich., which went into receivership on March 10, 1925. It embraces only the Detroit United Railway and the Detroit, Monroe & Toledo Short Line, together with all the bus companies owned by the former but not including the rail properties of Jackson & Chicago Railway, Detroit & Port Huron Short Line and Detroit, Almont & Northern Railroad, the stocks of which were owned by the Detroit United Railway. The Detroit United consists of interurban railways extending from the boundary of Detroit to various points in Michigan, the lines in Detroit having been sold to the city.

FINANCIAL SET-UP OF NEW COMPANY

The plan of reorganization involves formation of a new company capitalized as follows: \$3,350,000 first mortgage 7 per cent bonds due July 1, 1958; \$4,915,000 adjustment mortgage 6 per cent bonds due July 1, 1958, and 200,000 shares of common stock of no-par value.

Holder of Detroit United Railway first and collateral trust five-year 6 per cent bonds due 1929, may participate in the reorganization by depositing their bonds with the Central Union Trust Company, New York, on or before May 31. At the time of the receivership these bonds were outstanding to

the amount of \$8,275,000. Since the receivership, instalments of \$2,500,000 of the purchase price of the city lines sold to Detroit and pledged under the mortgage of these bonds have been collected and 31 per cent of the \$8,275,000 bonds has been paid and distributed pro rata among the bondholders, reducing the original \$1,000 bond outstanding at receivership to \$690. Holders of these bonds who agree to the reorganization will receive for each bond \$50 cash, \$550 principal amount of adjustment mortgage 6 per cent bonds and four shares of common stock.

SUBSCRIPTION RIGHTS TO BONDHOLDERS

In addition, depositing bondholders are entitled to subscribe to the underwriting syndicate to a maximum sum of \$500 for each original \$1,000 bond. According to the plan the syndicate will receive in securities of the new company for each \$900 cash subscribed: \$1,000 principal amount of first mortgage 7 per cent bonds, \$108 principal amount of adjustment 6 per cent bonds and 39.37 shares, approximately, of common stock.

The senior issue of bonds of the new company will be known as first mortgage and collateral trust bonds; they will be secured by a mortgage embracing all or substantially all of the lines of railroad, franchises and equipment owned by the new company; there shall also be pledged all shares of stock and securities vested

Part VI—Derived Ratios

TABLE XVI—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES

	—79 City Companies—			—50 Interurban Companies—			—77 Companies Operating Both City and Interurban Lines—		
	1927	1926	Per Cent Increase or (D) Decrease	1927	1926	Per Cent Increase or (D) Decrease	1927	1926	Per Cent Increase or (D) Decrease
Railway operating revenue...	\$423,287,423	\$426,891,791	(D) 0.84	\$19,379,502	\$20,017,059	(D) 3.19	\$153,890,575	\$159,800,918	(D) 3.70
Per mile of single track....	\$42,800	\$43,138	(D) 0.78	\$6,655	\$6,898	(D) 3.52	\$14,492	\$14,971	(D) 3.20
Gross income.....	\$103,382,259	\$101,121,857	2.24	\$2,339,220	\$2,742,739	(D) 14.71	\$28,110,597	\$30,373,728	(D) 7.45
Per mile of single track.....	\$10,453	\$10,218	2.30	\$803	\$945	(D) 15.03	\$2,647	\$2,864	(D) 6.99
Passenger revenue.....	\$408,712,840	\$412,445,636	(D) 0.91	\$10,824,181	\$11,565,912	(D) 6.41	\$132,174,475	\$138,568,183	(D) 4.61
Per revenue passenger..... (1)	6.5c. (1)	6.5c. (1)	(2)	27.6c. (2)	27.9c. (D) 1.08 (2)	8.4c. (2)	8.2c. (2)	7.1c. (2)	2.44
Per total passenger..... (1)	5.3c. (1)	5.3c. (1)	(2)	26.0c. (2)	26.3c. (D) 1.14 (2)	7.3c. (2)	7.1c. (2)	7.1c. (2)	2.82
Per mile of single track..... (1)	\$41,326	\$41,678	(D) 0.84 (10)	\$3,717 (10)	\$3,985	(D) 6.73 (10)	\$12,447	\$12,982	(D) 4.12
Per passenger car-mile..... (1)	41.2c. (1)	41.4c. (D) 0.48 (10)	(11)	33.1c. (10)	34.3c. (D) 3.50 (11)	40.5c. (11)	41.3c. (D) 1.94 (11)	\$16,010	(D) 1.15
Per car operated..... (1)	\$15,266 (1)	\$15,254 (D) 0.08 (11)	(12)	\$15,419 (11)	\$16,656 (D) 7.43 (12)	\$16,194 (12)	\$16,010 (D) 1.15 (12)	\$3.96	(D) 1.77
Per passenger car-hour..... (1)	\$4.21 (1)	\$4.18 (D) 0.72 (12)	(13)	\$5.55 (12)	\$5.80 (D) 4.31 (13)	\$3.89 (13)	\$3.96 (D) 1.77 (13)	1,473,094,984 (2)	1,588,545,585 (D) 7.27
Revenue passengers..... (1)	6,202,325,617 (1)	6,281,044,386 (D) 1.25 (13)	(14)	34,801,282 (13)	36,819,171 (D) 5.48 (14)	148,094 (14)	158,866 (D) 6.79 (14)	158,866 (D) 6.79	
Per mile of single track..... (1)	633,796 (1)	641,578 (D) 1.21 (14)	(15)	13,108 (15)	13,926 (D) 5.87 (15)	4.8 (15)	5.0 (D) 4.00 (15)	180,735 (D) 1.83	
Per passenger car-mile..... (1)	6.3 (1)	6.4 (D) 1.56 (15)	(16)	1.2 (16)	1.2 (D) 0.00 (16)	47 (16)	49 (D) 4.08 (16)	177,435 (15)	
Per car operated..... (1)	230,005 (1)	230,832 (D) 0.36 (16)	(17)	56,674 (17)	60,800 (D) 6.79 (17)	25.1 (17)	25.1 (D) 2.39 (17)	183,325 (D) 6.68	
Per passenger car-hour..... (1)	65 (1)	65 (D) 0.00 (17)	(18)	24.5 (18)	25.1 (D) 2.39 (18)	5.5 (18)	5.8 (D) 5.17 (18)	1,701,705,656 (2)	1,832,886,471 (D) 7.16
Total passengers..... (1)	7,637,754,069 (1)	7,758,690,453 (D) 1.56 (18)	(19)	37,047,065 (19)	39,104,334 (D) 5.26 (19)	171,077 (19)	183,325 (D) 6.68 (19)	171,077 (19)	183,325 (D) 6.68
Per mile of single track..... (1)	780,478 (1)	792,512 (D) 1.52 (19)	(20)	13,954 (20)	14,790 (D) 5.65 (20)	1.3 (20)	1.3 (D) 0.00 (20)	171,077 (19)	183,325 (D) 6.68
Per passenger car-mile..... (1)	7.8 (1)	7.8 (D) 0.00 (20)	(21)	1.3 (21)	1.3 (D) 0.00 (21)	5.5 (21)	5.8 (D) 5.17 (21)	171,077 (19)	183,325 (D) 6.68
Ratio: Transfer passengers to revenue passengers (per cent).....	22.6%	23.0% (D) 1.74	(22)	2.1%	2.1% (D) 0.00 (22)	13.7%	13.6% (D) 0.74	13.7%	13.6% (D) 0.74
Revenue: Car-miles.....	1,000,017,800	1,007,181,217 (D) 0.71	(23)	44,285,258	44,480,585 (D) 0.44	353,394,096	362,123,524 (D) 2.41	353,394,096	362,123,524 (D) 2.41
Per mile of single track.....	101,114	101,777 (D) 0.65	(24)	15,208	15,328 (D) 0.78	33,279	33,926 (D) 1.91	33,279	33,926 (D) 1.91
Per car operated..... (1)	37,783 (1)	37,700 (D) 0.22 (15)	(25)	62,233 (15)	62,501 (D) 0.43 (15)	43,958 (15)	42,641 (D) 3.09	43,958 (15)	42,641 (D) 3.09
Per car-hour..... (1)	10.2 (1)	10.1 (D) 0.99 (16)	(26)	11.7 (16)	11.6 (D) 0.86 (16)	9.9 (16)	9.9 (D) 0.00 (16)	9.9 (16)	9.9 (D) 0.00 (16)
Car-hours..... (1)	88,298,298 (1)	90,063,223 (D) 1.96 (16)	(27)	1,554,344 (16)	1,588,246 (D) 2.13 (17)	29,884,814 (17)	30,978,777 (D) 3.53	29,884,814 (17)	30,978,777 (D) 3.53
Per car operated..... (1)	3,494 (1)	3,699 (D) 5.54 (16)	(28)	3,573 (16)	3,715 (D) 3.82 (17)	4,374 (17)	4,331 (D) 0.99	4,374 (17)	4,331 (D) 0.99

(1) Reported by 77 companies (2) Reported by 39 companies. (10) Reported by 50 companies. (14) Reported by 36 companies.
 (2) Reported by 74 companies. (11) Reported by 70 companies. (11) Reported by 40 companies. (15) Reported by 41 companies.
 (3) Reported by 73 companies. (12) Reported by 62 companies. (12) Reported by 33 companies.
 (4) Reported by 71 companies. (13) Reported by 64 companies. (13) Reported by 38 companies. (17) Reported by 58 companies.
 (5) Reported by 46 companies.

in the new company in accordance with the plan. These bonds are limited to \$5,000,000 at any one time outstanding. They are to be redeemable on any interest date, in whole or in part, on 30 days' notice at 107 to July 1, 1932, and at declining premiums to 1 per cent from July 1, 1952 to 1956.

Adjustment mortgage bonds are to be limited to \$4,915,000 outstanding at any one time and are, in effect, a second mortgage on the properties of the company taken into the reorganization. Interest on these bonds is a contingent charge, being payable if earned as defined under its mortgage, and is cumulative. The adjustments are convertible between Jan. 1, 1930, and July 1, 1938, into common stock at rate of four shares for each \$100 principal amount of bonds. The adjustments are callable on any interest date on 30 days' notice at par and accrued interest.

The authorized amount of stock will be 400,000 shares, of which only 200,000 shares are to be issued in reorganization and the balance only for conversion of adjustment bonds until expiration of the conversion period. Shares issued in reorganization are to go to Theodore G. Smith, A. L. Drum and George T. Bishop, as voting trustees, for a period expiring not later than July 1, 1933.

INCOME OF REORGANIZED COMPANY ESTIMATED

Holders of the \$3,000,000 Detroit, Monroe & Toledo Short Line first mortgage 5 per cent bonds may become parties to the reorganization of that property by depositing their bonds on or before May 31. All common stock of the reorganized Toledo line will be owned by the new Detroit United company and will be pledged under the latter's first mortgage. The new Toledo company will authorize not exceeding \$2,000,000 of first mortgage bonds, to bear not more than 7 per cent interest, which may be issued only against acquisitions of property after Jan. 1, 1929.

It will issue in reorganization \$1,800,000 general mortgage bonds, all of which will go to depositing holders of the old company's first mortgage 5 per cent bonds in ratio of \$600 general mortgage bonds for each \$1,000 first mortgage 5 per cent bond, a 60 per cent basis. The new general mortgage bonds will mature July 1, 1958; interest will not become due until Jan. 1, 1930, and during that year 1 per cent will become due with increasing amount in subsequent years to Jan. 1, 1935, when interest shall become fixed at 5½ per cent annually.

A. L. Drum will be president of the new company. He has estimated earnings of the new company (other than the reorganized Detroit, Monroe & Toledo Railway) for the first year after reorganization, after depreciation and taxes, other than federal income taxes, and payment of interest on certain bonds covering lines sold to the city of Detroit, but before other interest charges, at \$804,769. If realized, that sum will be sufficient to meet interest charges of the new company, other than the Toledo line, aggregating not more than \$608,791, including full 6 per cent interest

on the adjustment bonds. According to Mr. Drum the depreciation fund will be ample to provide for payment of maturing car and equipment trust obligations. The properties and equipment are in satisfactory condition and the new company will commence business with ample working capital.

Under the reorganization plan three new companies will be formed. They will be the Eastern Michigan Railways, the parent company, with two subsidiary companies, the Highway Motor Bus Company to own and operate the bus lines, and the Detroit, Monroe & Toledo Company to own the present electric railway line between Detroit and Toledo, Ohio.

Indianapolis & Cincinnati Traction Sold at Foreclosure

The property of the Indianapolis & Cincinnati Traction Company, Rushville, Ind., was bought on April 30 by Charles T. De Hore, Cincinnati, and Leroy E. Eastman, Toledo, Ohio, for \$500,000. Will M. Frazee, receiver, sold the road in an attempt to satisfy mortgages aggregating \$2,600,000. The sale was approved the following day by the Rush County Circuit Court at Rushville, Ind. The interurban service will be continued, but it is understood that Mr. De Hore and his associates made the purchase primarily to develop the company's electric power and light business. A. M. Miller, Bryan, Ohio, also will be connected financially with the new owners of the Indianapolis & Cincinnati. The road was started by the late Charles L. Henry in 1903 and divisions were built to Connersville and Greensburg, Ind. The company went into the hands of Mr. Henry as receiver in 1925.

Recommendations Advanced for San Francisco Municipal Railway

Valuation of the San Francisco Municipal Railways, San Francisco, Cal., was set at \$8,636,839 in a special report filed with the Board of Public Works by Fred Boeken, superintendent of the railways. The municipal lines were built with the proceeds of an issue of \$5,000,000 of municipal bonds. These bonds are being retired at the rate of \$200,000 a year and in another six years the entire issue will have been taken up.

Superintendent Boeken advocated that the railways be divorced from politics, declaring it should be plain to everyone that in order to remove the city roads as well as all public utilities from political influence and retain public confidence a public utilities commission should be created. Further he said that no more unprofitable extensions should be undertaken, that transfers between buses and cars should be discontinued and that the Marina bus route should be abolished. Elimination of bus-car transfers will save \$45,668 yearly and elimination of the Marina line will save \$9,750 yearly.

Four lines are reported as losing money. Increased service on the Geary Street line is recommended.

Traffic, Fare and Wage Figures

The number of revenue passengers, including bus passengers, reported by 211 companies to the American Electric Railway Association for February, 1928, compared with February, 1927, is as follows:

February, 1928.....	799,993,415
February, 1927.....	786,058,606
Increase, per cent.....	1.77

The increase shown is due to the fact that there was an extra day in February, 1928. When the figures are placed on a daily average basis the result is as follows:

DAILY AVERAGE TRAFFIC	
February, 1928.....	27,586,980
February, 1927.....	28,073,522
Decrease, per cent.....	1.23

The decrease registered by the daily average figures is the smallest since May, 1927, and indicates that a very slow improvement is taking place in traffic conditions. Part of the improvement is due to improved business conditions in the North West, Far West and in the New England states. The failure to show a greater average improvement is due to the semi-depressed condition of business in the great industrial region north of the Ohio and east of the Mississippi Rivers.

Average cash fares in cities of 25,000 population and over:

Month	Cents
March 1, 1928.....	8.1186
Feb., 1928.....	8.1070
March 1, 1927.....	7.9170

The increase in the average fare since Feb. 1, 1928, was caused by an increase in the cash fare in Baltimore, Md., from 8 cents to 9 cents, and in Madison, Wis., from 8 cents to 10 cents.

The average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track follow:

Month	Average Hourly Rate Cents	Index Number 1913=100 Per Cent
March 1, 1928.....	57.38	210.57
Feb., 1, 1928.....	57.37	210.53
March 1, 1927.....	56.97	209.06

Earnings in Kansas City Largest Since Property Taken Over

March earnings of the Kansas City Public Service Company, Kansas City, Mo., were the largest of any month since the property was taken over by the present owners in 1926. The report, coming in the face of a loss and decrease the first two months of the year, was considered very encouraging. The report shows March earnings were \$191,489, or \$11,226 more than the amount permitted under the franchise agreement. This increase in earnings reduces to \$98,521, the amount of the accumulated shortage for the year so far. The largest previous earnings were in December, 1926, when receipts totalled \$173,048. In 1927 the earnings of the company fell \$453,421 short of the earnings permitted by the city. During the period of January to April 15, railway receipts decreased 4.52 per cent, but bus receipts increased 3.57 per cent.

Legal Notes

CALIFORNIA—*Motorman of Interurban Train Need Not Stop When Pedestrians Leave Sidewalk and Approach Track*

The motorman of an interurban train operating over city streets is not obliged to stop each time he observes that a pedestrian leaves the sidewalk and approaches the track. Where such a train is proceeding in plain sight, unobstructed to the vision of the pedestrian, the motorman can assume that the latter will exercise care for his own protection. [Richardson vs. Southern Pacific Co., 263 P., 1039.]

CONNECTICUT—*Duty of Deaf Pedestrian When Walking Near Track*

A person afflicted with deafness such as would prevent him from hearing a trolley gong or bell should exercise that care for his own safety which a reasonably prudent man would exercise under like circumstances of deafness, and if he walks close to a trolley track, he must realize that a passing car might strike him. Hence, if he did not look back at intervals to learn of the possible approach of a car he was contributorily negligent, as a matter of law. [Kerr vs. Connecticut Co., 140 A., 751.]

DISTRICT OF COLUMBIA—*Passenger Was Injured While Car Was Being Braked For a Stop*

The request of a railway to the trial court of an instruction that a passenger was guilty of contributory negligence if he left his seat while the car was moving and failed to protect himself by grasping a strap or other means of support was held properly refused, since modern traffic conditions require that a street railway passenger desiring to leave at a certain point shall be prepared to alight when the car reaches that point. [Capital T. Co. vs. Lyon, 24 F. (2d), 262.]

FEDERAL CIRCUIT COURT—*Responsibility of Holding and Management Companies For Negligence of Operating Company*

A citizen of the United States brought suit to recover damages for personal injuries alleged to have been sustained through negligent operation of a street railway car in the Philippines. The defendants were four corporations, the Philippine operating corporation and three American corporations, one owning all of the capital stock of the operating company (except directors' shares), a management company and a company controlling the management company. The court dismissed the action as to the operating company for lack of jurisdiction, and non-suit was entered in the case of the management company and its controlling company, as the management company was held to be simply an agent. But the American company holding and controlling

the stock of the railway was held responsible because its contract provided that it should appoint the operating manager, who had full authority to supervise the operation of the railway, including the appointment of employees, purchase of supplies, etc. Hence it was responsible for any negligent acts of the operating company. [Coston vs. Manila E. Co., et al., 24 F. (2d), 383.]

FEDERAL SUPREME COURT—*Taxation of Interstate Commerce, Even if Different From That of Intrastate, Will be Upheld if Not Disproportionate*

Connecticut established a mileage tax on motor vehicles used in interstate commerce for the improvement of its highways, though no such mileage tax was imposed on intrastate motor vehicles. The constitutionality of this statute was upheld by the Federal Supreme Court in the absence of evidence that the tax was a substantially greater burden than the tax rate actually assessed on intrastate business. It also held a state could impose more than one form of tax on interstate commerce, provided the aggregate charge bears a reasonable relation to the privileges granted. The Supreme Court also refused to consider a clause of the statute excluding from the highways of the State motor carriers which refused to pay a charge for their use, as the court assumed that the plaintiff would not persist in its refusal to pay the tax, now that it has been declared to be constitutional. [Interstate Buses Corporation vs. Blodgett, 48 S.Ct., 230.]

KANSAS—*Railway Not Responsible When Pedestrian Walks From Behind Car Into Automobile and Is Injured*

A girl ten years old, while crossing a street, walked into the side of a passing automobile after she had emerged from behind a standing street car. An ordinance of the city forbade street cars to remain in the place where this car was standing at the time, and the company was sued for negligence because of this fact. The court held, however, that the ordinance was enacted to facilitate movement of traffic and not to provide pedestrians and automobile drivers with opportunity for observation. Hence, the company was not liable for the accident, as a matter of law. [Sheldon vs. Wichita R. & L. Co., 264 P., 732.]

MASSACHUSETTS—*Collision with Car on Right Hand Side of the Road*

An automobile driven on the right side of the road struck a standing trolley car whose headlight was facing so that it shone into the eyes of the automobile driver. The claim of the latter for damages on the ground of being dazzled by the light was refused. [Keefe vs. E.M.S.R. Co., 159 N.E., 528.]

NEW JERSEY—*Here Two Parties Cause Injury by Their Negligence, Each Should Pay Half of the Damages*

A person was injured by the joint negligence of a taxicab driver and a trolley car operator. After decision for the plaintiff, she collected from the railway 5/7 of the total damages awarded, under threat of execution on its property, and collected 2/7 from the taxicab company. In a later suit between the two defendants, the court held that the railway could collect from the taxicab company such part of the judgment as it had paid in excess of one-half of the total amount, as its payment was made under stress and not voluntarily. [P. S. Ry. vs. Matteucci, 140 A., 442.]

NEW YORK—*Appellate Division Has Power to Investigate Alleged Systematic "Ambulance Chasing"*

Three representative associations of lawyers in New York City petitioned the Appellate Division to investigate alleged practices in "ambulance chasing" in that city. The court held that it had power to do, even if there was no precedent for such action. [In re Association of Bar of City of New York, 227 N.Y.S.]

PENNSYLVANIA—*Passenger Steps on Partially Folded Car Step*

A passenger about to enter a car stepped on a partially folded step, which went down about 3 in. under her weight, causing her to fall to the ground and sustain injuries. There was no evidence that the mechanism of the step was at fault, and the court held that the passenger should have noted the partially folded position of the step and not attempted to use it. [Murray et ux. vs. P. R. T. Co., 140 A., 522.]

WEST VIRGINIA—*Company Must Be Careful Not to Injure Passengers or Licensees When Starting Cars*

A woman boarded a car to see that her child and a maid got on safely. After leaving the car she re-boarded it to give further instructions to the maid. While leaving the car the second time she was injured by the sudden starting of the car. The court held the railway company must use due care not to put a car in motion while persons are getting on and off, whether they are passengers or merely licensees. [Malone vs. M. V. Traction Co., 141 S.E., 440.]

TEXAS—*Power of State to Control Use of Highways*

The Legislature has power to forbid the use of highways to common carriers and it may place restrictions on this use by creating a commission to administer regulations for common carriers, provided the constitutional limitations of the legislative powers are not exceeded. The prohibition of the operation of motor buses as common carriers unless they first obtain from the Railroad Commission a certificate of public convenience and necessity, but permitting the issue of temporary certificates to existing motor bus carriers, was held valid. [Exparte Sparks, 2 S. W., (2d), 449.]

Personal Items

Adam Gschwindt to Manage Rockford's Utilities

The man chosen to manage the combined railway, gas and electric properties in Rockford, Ill., is Adam Gschwindt, whose energy, executive ability and general outlook played a part in his recent appointment as general manager. His service record with the American Gas & Electric Company covers a period of 30 years. In 1898 he entered the public utility field in Scranton, Pa., with the City Steam Company. Afterwards this company was merged with the Scranton Electric Company and two years later Mr. Gschwindt was transferred to the head offices of the American Gas & Electric Company, Hudson



Adam Gschwindt

Terminal Building, New York, as vice-president and director of purchases.

But by far his most important assignment with this company was in 1913 when he went to Rockford, Ill., as vice-president and general manager of the Rockford Electric Company. In February, 1926, he was appointed receiver for the Rockford City Traction Company and Rockford & Interurban Railway Lines by the Circuit Court of Winnebago County, Ill. It was during that year that the main portion of the system was practically reconstructed. It was sold in February, 1927, by court order. This company, together with other acquisitions by T. M. Ellis, the purchaser at that time, was recently acquired by the Rockford Electric Company. With this acquisition came the decision to combine the properties under one management.

A. V. Louer Goes to Albany— F. J. Keenan at Glens Falls

Abram V. Louer has been made general superintendent of the United Traction Company, Albany, N. Y. For the past eight years he has served as assistant general manager of the Hudson Valley Railway with headquarters in Glens Falls.

Early in his career Mr. Louer was employed at Buffalo and on Long Island. In 1905 he entered the employ of the Schenectady Railway and was assigned to the engineering department. Subsequently, he was transferred to the transportation department, and for nearly three seasons had charge of the company's recreation park. After Mr. Hamilton, then general manager of the Schenectady Railway, was appointed general superintendent of the United Traction Company in Albany, he had Mr. Louer appointed to the transportation department of that company. This was in 1911 and Mr. Louer remained in Albany until 1920 when he went to Glens Falls, taking an active interest not only in his railway duties but in civic and social activities of that city.

Frank J. Keenan, general freight and passenger agent, succeeds M. Louer at Glens Falls. He has been associated with the Hudson Valley Railway for twenty years.

Messrs. Morse, O'Brien, Burr and Burkhalter in Changes

Changes in the personnel of the Florida Motor Lines, Inc., Orlando, Fla., under the executive management of Stone & Webster, Inc., are as follows:

George G. Morse, formerly betterment engineer of Florida Motor Lines, Inc., in Orlando, Fla., in direct charge of maintenance, was appointed general manager on April 1, succeeding W. M. Bird and C. E. Bostwick, Jr., the latter now with the Savannah Electric & Power Company. He will have charge of all operations in the state, with headquarters at Orlando. Mr. Morse has had a long career with Stone & Webster interests. He served as superintendent of transportation, Jacksonville Traction Company, superintendent of railways, El Paso Electric Company, and general superintendent, Galveston-Houston Electric Railway. Mr. Morse has been associated with the Florida Motor Lines, Inc., since November, 1925.

E. T. O'Brien, formerly superintendent of Orange Belt Motor Line, Inc., and the Orlando Rapid Transit Company, has been transferred to Tampa as superintendent Florida Motor Lines, Inc.

R. G. Burr, formerly master mechanic, West Palm Beach, Fla., Florida Motor Lines, Inc., is now located at Orlando as superintendent Orlando Rapid Transit Company and Orange Belt Motor Line, Inc. He was formerly associated with Stone & Webster interests in Ponce, Porto Rico, and Houston, Tex.

E. R. Burkhalter, formerly general foreman, Orlando Shops, Florida Motor Lines, Inc., is now master mechanic at that point, succeeding H. A. Stockbridge, who has resigned.

Murray Sullivan—General Manager for Salt Lake Receivers

Murray Sullivan was appointed general manager for the receivers of the Salt Lake & Utah railroad, with headquarters at Salt Lake City, Utah, effective April 19, 1928. For more than four years Mr. Sullivan has been connected with this road, having served first as assistant to the president, and later as assistant to the receivers.

Prior to this connection Mr. Sullivan was affiliated with the American International Corporation's railway enterprise in China, first as senior engineer, and later succeeding G. A. Kyle as chief engineer, with headquarters at Peking. This enterprise was financed by the American International Corporation, and the Siems-Carey Railway & Canal Company was the contractor on this work, which comprised the building of some 1,600 miles of main lines of rail-



Murray Sullivan

ways. However, after making a great many surveys, chaotic conditions, resulting from the revolution, made it impossible to proceed, and work was suspended indefinitely pending the establishment of a stable government in China. During his stay in China, Mr. Sullivan was also appointed chief engineer of the Peking-Tientsin Highway Commission, and was in charge of the construction of a modern highway between these two cities. This work was carried on as a famine relief measure. In addition to and concurrently with the railway work, Mr. Sullivan was appointed by the Chinese Government a member of the Commission on Railway Technics, at the time of the organization of that Commission in 1917, and served on this commission until 1921. The work of this commission was in connection with the standardization of the railways of China. In his relief work he handled the purchasing and shipping of large quantities of clothing and food for the Czech army and for the destitute refugees in Siberia.

Before leaving China Mr. Sullivan was honored by election to a full membership in the Chinese Institute of Engineers. He was also general manager of the Chinese Engineering & Development Company with headquarters at Peking. Before going to China he

served as office engineer of the Oregon Short Line for about seven years, prior to which time he was engaged upon the location and construction of the El Paso and Northeastern Railway and the Kansas City, Mexico & Orient Railway.

Mr. Sullivan is a member of various engineering societies and associations, including the American Society of Civil Engineers and the Utah Society of Engineers.

H. B. Lingeman and A. E. Miller Advanced at Youngstown

H. B. Lingeman has been appointed purchasing agent of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, by vice-president and general manager MacCalla, to succeed the late R. J. Pike. Mr. Lingeman has been supervisor of stores of the system for ten years. In that position he was one of the chief assistants of Mr. Pike. In his new position he will have charge of purchasing, stores, invoice and traffic departments.

Although his early training included preparatory courses in law Mr. Lingeman did not pursue that profession but entered the field of public utilities in the employ of the Coney Island & Brooklyn Railroad in the claim department. Some time later he was promoted to the transportation department as assistant to the general superintendent. In 1909 he was again promoted, becoming purchasing agent of the Coney Island system, and continuing at that post until 1914 when the smaller system was merged with the Brooklyn Rapid Transit System. In the amalgamation Mr. Lingeman was made assistant general storekeeper, a position he resigned in 1917 to join the staff of the Underwriters' Laboratories of New York.

Mr. Lingeman joined the Pennsylvania-Ohio forces in March, 1918, upon appointment as supervisor of stores and invoice department. He has built up the stores department to the large and important branch of the Pennsylvania-Ohio service it is today.

Mr. Lingeman was born in Brooklyn, N. Y. He attended the grade and high schools there. He entered the Hefferly Institute, taking the preparatory course in law and reading law in the office of Stephen M. Hoye, New York.

Associated with him in his work will be Allen E. Miller, who went with the system in January, 1917, and who has been closely associated with Mr. Lingeman in charge of the traffic work of the department. Upon Mr. Lingeman's advancement, Mr. Miller was designated to succeed him as supervisor of stores and invoices in addition to his duties in the traffic department.

Mr. Miller resigned from the Pennsylvania-Ohio Electric in May, 1918, and saw fifteen months' service in France as railway transportation officer. Upon the close of the war he returned as traffic manager. His earlier education was received in the Girard high school supplemented by study of interstate commerce law.

D. J. Graham in Charge at Winnipeg

A. W. McLimont, president of Winnipeg Electric Company, Winnipeg, Man., Canada, recently announced the appointment of Dale J. Graham, as manager of the company's electric railway utility, reporting to C. H. Dahl, assistant general manager in charge of operation.

The new manager in Canadian territory comes from Youngstown, Ohio, where he has been assistant manager of a railway system of approximately the same size as that in Greater Winnipeg. He served in Youngstown for six years, becoming affiliated with the Youngstown Municipal Railway in 1922 as engineer of maintenance-of-way.

In recognition of his services, in 1926 Mr. Graham was made assistant manager of railways of the Pennsylvania-Ohio Electric Company, with especial charge, in addition to his general duties,



Dale J. Graham

of a new commercial department formed to sell more rides through the application of good salesmanship. Several aides were associated with him in this department, where was centered all matters that had to do with checking and developing the service of the various transportation lines and making them have a stronger appeal to the traveler and to the people of the community served. His work aimed at building up and developing both freight and passenger business.

Prior to his connection at Youngstown he had been engineer with the American Steel Wire Company, Worcester, Mass., and before that with the Railroad Administration and with the New York State Railways at Rochester. His career also includes service with the Pennsylvania and with the Santa Fé Railroads.

Mr. Graham, both a civil and electrical engineer, was graduated from the University of Pennsylvania in 1910.

W. J. Serrill Head of Standardization Movement

William J. Serrill of the United Gas Improvement Company, Philadelphia, Pa., was recently elected chairman of the American Engineering Standards

Committee. Mr. Serrill succeeds C. E. Skinner of the Westinghouse Electric & Manufacturing Company, who has been chairman of the Standards Committee for the past three years.

Illinois Commerce Commission Head Resigns

David H. Jackson, chairman of the Illinois Commerce Commission, resigned his post on April 25 at the request of Governor Len Small. He was appointed last year by the Governor to succeed Frank L. Smith, erstwhile U. S. senator-elect. The Governor had charged that there was dissension among commission members under the Jackson administration and delays in issuing orders. In reply Mr. Jackson stated that his resignation was being tendered only because the Governor has the right to remove him at will. He denied both charges and insisted that the Governor's "real reason" for demanding his resignation "is because he found I could not be handled."

Obituary

R. J. Pike

R. J. Pike, purchasing agent and head of the stores and traffic departments of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, died recently. Mr. Pike was with the Youngstown system fourteen years.

Early in his career he was employed in Scranton, Pa., with the Delaware & Hudson Coal Company, and then went to Syracuse, N. Y., where he first became associated, as secretary, with R. P. Stevens.

After serving two years with the Auburn & Syracuse Electric Railroad he went to Allentown with Mr. Stevens, who then became president of the Lehigh Valley Transit Company. In 1914 when Mr. Stevens went to Youngstown as president of what has developed into the present Penn-Ohio System, Mr. Pike again accompanied him as secretary and statistician, subsequently being promoted to general purchasing agent in charge of all purchases and stores.

Mr. Pike was born in Oneida, N. Y., 45 years ago. He attended the Oneida schools and in 1903 was graduated from the Utica School of Commerce. He was a member of many civic, business and fraternal bodies, including the Youngstown Chamber of Commerce, the Pittsburgh Association of Purchasing Agents, and many other civic enterprises.

CHARLES F. WOODWARD, active in the development of street railways 35 years ago, died recently in Wakefield, Mass. He was the founder and first president of the first street railway in the vicinity of Wakefield, and the first president of the Wakefield & Stoneham Street Railway.

Manufactures and the Markets

World Engineering Congress Program Outlined

With the opening date of the first World Engineering Congress set for Oct. 30, 1929, at Tokio, Maurice Holland, executive secretary of the American committee arranging for engineers of this country to participate, made public the program of the event as outlined by the Japanese authorities.

The congress will extend through the month of November, the official languages being English and Japanese. The first week of the meeting is to be devoted to technical papers and social meetings and the second week to inspection trips in Tokio and the vicinity. The next fortnight will be set apart for trips throughout Japan, arranged to give engineers attending the congress an opportunity to visit the great industrial centers of the country and to study Japanese engineering problems.

The World Engineering Congress aims to deal with many of the world's vital problems, particularly those relating to public works, communication and transportation, power, chemicals, textiles and aeronautical and automotive engineering. Almost every activity of daily life as touched upon by modern science and invention will be reflected in the deliberations of the Congress.

Washington Railway Receives Twelve Cars

Shipment of twelve new cars for the Washington Railway & Electric Company, Washington, D. C., has been completed by the J. G. Brill Company, Philadelphia, Pa. The cars are of the one-man, double end, city type having an over-all length of 42 ft. 3 in., weigh-

ing 40,200 lb., and seating 49 passengers.

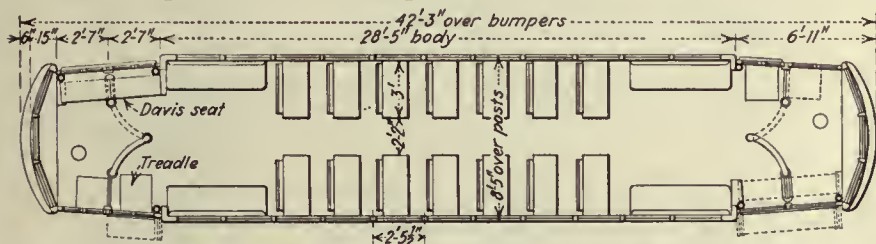
The bodies are of the semi-steel type with Monitor roofs. The exterior finish is cream and blue paint and the interior is cherry and grey enamel. The seats are upholstered in genuine leather. Each car is equipped with four outside-hung motors and air brakes with variable load feature. Complete specifications were published in the Jan. 21 issue of ELECTRIC RAILWAY JOURNAL.

920 Motors for London

An order recently placed by the London Underground Railways, London, England, with the General Electric Company, Ltd., has been very considerably increased and now comprises in all 920 railway motors each of 240 hp. capacity, and "automatic acceleration" control equipment for 63 motor coaches and 107 trailer cars. This is the largest single order ever placed in Britain for electric railway motors.

Ohio Railways to Improve

Several electric railways in Ohio are planning large improvements in 1928. Companies making improvements with the amount to be expended, are as follows: The Cleveland Railway, Cleveland, Ohio, \$410,000; Cincinnati Street Railway, Cincinnati, Ohio, \$2,500,000; Ohio Public Service Company, Cleveland, Ohio, \$2,000,000; Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, \$75,000; Columbus, Delaware & Marion Electric Company, Marion, Ohio, \$235,000; Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, \$200,000, and the Stark Electric Railroad, Alliance, Ohio, \$70,000.



Floor plan of the Washington cars built by the J. G. Brill Company



One of the double end, one-man cars recently delivered to the Washington Railway & Electric Company

Exhibitograph No. 7 MODERNIZATION

is the watchword for the 1928

A.E.R.A. Show

Space applications indicate an active campaign for

- BETTER TOOLS
- BETTER METHODS
- INCREASED EFFICIENCY
- IMPROVED PERFORMANCE

In previous years tool manufacturers have neglected a profitable market. Today aggressive competition is the order and manufacturers of all kinds of tools will show their products at

Cleveland next September

In less than three weeks 111 applications have been received requesting

63,444 sq. ft. of space.

New Cars and Buses for D.U.R. Reorganization

Under the plan for the reorganization of the Detroit United Railway, Detroit, Mich., ample provision will be made for working capital and financial credit to enable the new company to acquire new cars, track extensions and additional buses necessary to serve the traveling public in the greater metropolitan district. This includes the interurban rail and bus service to Toledo, Port Huron, Pontiac, Flint, Lansing and Grand Rapids, and the local railway and city bus systems of the cities of Pontiac and Flint.

Provision has been made for the purchase of 50 new modern light-weight city and interurban electric cars, and 30 additional buses and for the extension of tracks to serve the substantial growth of population in the cities of Flint and Pontiac.

A union motor-bus terminal located near Grand Circus Park in the center of Detroit has been arranged.

Roller Bearing Buys Mercer Plant

Roller Bearing Company of America, which has been engaged in Newark, N. J., since 1919 in the manufacture and sales of high-grade roller bearings, has just concluded the purchase of the large plant of the Mercer Motor Car Company, of Trenton, N. J. The company will install its present equipment in that plant and obtain a large amount of new equipment required to take care of its growing sales. The Mercer plant which the Roller Bearing Company has acquired occupies 11½ acres and the buildings have 175,000 sq. ft. of floor space. These buildings are of modern

mill construction of one story, with daylight and sawtooth roofs. Railroad sidings serve the plant on two sides, and the property is adjacent to the main line of the Pennsylvania Railroad.

\$114,000 for Pacific Electric Signals

Four extensive block-signal installations on the lines of the Pacific Electric, Los Angeles, Cal., involving a total expenditure of \$114,000, are scheduled for early construction. The Sawtelle line from Vineyard to Sherman Junction, a distance of 3 miles, soon will be equipped with automatic hooded signals.

A similar installation will soon be under way between Rivas and Glendora, a distance of almost 4 miles, over a section in which manual light circuits now are employed.

On the Redondo Beach line between Hermosillo and El Nido 4 miles of track will be protected similarly at an early date, and also the Van Nuys line, near Universal City, the Tujunga Wash and Los Angeles River district, will have this type of automatic signal safeguard for a distance of 2,400 ft.

SHOPS AND BUILDINGS

PHILADELPHIA RAPID TRANSIT COMPANY, Philadelphia, Pa., will convert to a bus repair shop the building at Hunting Park Avenue and American Street. It will be a one-story brick building on a site 406x282 ft. and will contain a machine shop, overhauling shop and locker room.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, New York, N. Y., plans an electrical inspection shop on Matthews Avenue at a cost of \$180,000.

PUGET SOUND POWER & LIGHT COMPANY, Seattle, Wash., will build a substation to cost \$35,000.

BALTIMORE & OHIO RAILROAD will make extensions in shops at New Castle, Pa., to cost approximately \$150,000.

WASHINGTON WATER POWER COMPANY, Spokane, Wash., plans a \$50,000 substation to be built on South Tacoma Street.

SOUTH CAROLINA POWER COMPANY, Charleston, S. C., is planning a \$75,000 addition to its recently-acquired Walterboro power plant.

TRACK AND LINE

KANSAS CITY PUBLIC SERVICE COMPANY, Kansas City, Mo., will rebuild 2,100 ft. of track to be completed within 30 days. The rebuilding is part of the \$6,000,000 rehabilitation program of the company.

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, Indianapolis, Ind., and the PENNSYLVANIA & EVANSVILLE RAILROAD have received the ap-

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

	May 1, 1928
Metals—New York	
Copper, electrolytic, cents per lb.....	14.025
Copper wire, cents per lb.....	16.00
Lead, cents per lb.....	6.075
Zinc, cents per lb.....	6.20
Tin, Straits, cents per lb.....	51.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	4.075
Somerset mine run, Boston, net tons.....	1.875
Pittsburgh mine run, Pittsburgh, net tons.....	1.95
Franklin, Ill., screenings, Chicago, net tons.....	1.875
Central, Ill., screenings, Chicago, net tons.....	1.675
Kansas screenings, Kansas City, net tons.....	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	5.40
Weatherproof wire base, N. Y., cents per lb.....	16.50
Cement, Chicago net prices, without bags.....	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.....	10.60
White lead in oil (100-lb. keg), N. Y., cents per lb.....	13.25
Turpentine (bbl. lots), N. Y., per gal....	30.60

proval of the Indiana Public Service Commission to install interlocking plants at the intersection of the two lines at Terre Haute, Ind.

CHICAGO RAPID TRANSIT COMPANY, Chicago, Ill., will resume the work of relocating elevated structure columns at downtown street intersections in Chicago next month. The plans call for moving ten columns from the center of the street to the curb lines.

TRADE NOTES

AMERICAN ELECTRIC SWITCH CORPORATION has added to its Minerva, Ohio, factory, a new building of brick construction, two stories and basement, giving an additional 26,000 sq.ft. of floor space.

CHESTER L. GAILOR, INC., announces the removal of its offices to 50 Church Street, New York, N. Y.

C. P. POTTER, engineer for the Wagner Electric Corporation, St. Louis, Mo., was elected chairman of the St. Louis section of the A.I.E.E.

ELECTRIC SERVICE SUPPLIES COMPANY, Philadelphia, Pa., has moved its Chicago office and warehouse to 111 North Canal Street, directly opposite the Chicago & Northwestern Depot.

WILLIAM E. KEMP has been appointed district sales manager, with headquarters in the General Motors Building, Detroit, Mich., for the Kingston Products Corporation, this being a consolidation of Byrne, Kingston & Company, Kokomo Electric Company, and Kokomo Brass Works. Mr. Kemp has been with these companies for the last eighteen years as manager, first at Chicago, and more recently at the New York and New England branches.

WAGNER ELECTRIC CORPORATION announces the removal of its New York City branch sales office from 50 Church Street to 30 Church Street. The New York City service station remains at 321 West 54th Street.

HEADLEY GOOD ROADS COMPANY, Philadelphia, Pa., has appointed as manager of its research and development

department, Edgar S. Ross, formerly with the Mellon Institute of Industrial Research, Pittsburgh, Pa.

COLUMBUS MCKINNON CHAIN COMPANY, Tonawanda, N. Y., has acquired control of the hoist division of the Chisholm Moore Manufacturing Company, Cleveland, Ohio. The general sales offices and factory will continue to operate in the same location, under the same name and personnel as in the past.

GUNITE CORPORATION, Rockford, Ill., has been incorporated to manufacture and market the product Gunite, a guniron alloy which has heretofore been made in the Gunite division of the Rockford Malleable Iron Works. Duncan P. Forbes is president, and John A. Forbes secretary and treasurer, of the new corporation.

W. R. VOORHEES & COMPANY, San Francisco, Cal., and Seattle, Wash., is now representing the Billings & Spencer Company, Hartford, Conn., in Montana, Colorado, Wyoming, Idaho, Utah, Nevada, Washington, Oregon, California, Arizona, New Mexico and El Paso, Texas.

ADVERTISING LITERATURE

CROUSE-HINDS COMPANY, Syracuse, N. Y., has recently issued an illustrated bulletin entitled "Airport Lighting Equipment."

OHIO BRASS COMPANY, Mansfield, Ohio, has issued a bulletin describing O-B cross wire and wire lock clamps.

COPPERWELD STEEL COMPANY, Glassport, Pa., has issued a bulletin descriptive of Copperweld ground rods.

ELECTRIC STORAGE BATTERY COMPANY, Philadelphia, Pa., has issued a booklet entitled "An Unusual Locomotive." It describes the 128-ton combination storage battery-oil-electric locomotive built for the New York Central Railroad.

ELECTRIC SERVICE SUPPLIES COMPANY, Philadelphia, Pa., has issued a new folder, No. 253, on Keystone portable lamp guards.

CROUSE-HINDS COMPANY has issued catalog No. 310 on floodlights and industrial lighting units.

INGERSOLL-RAND COMPANY, New York, N. Y., announces publication of a 44-page bulletin on ER and FR compressors and vacuum pumps. These are the small and intermediate size machines produced by the company.

ALEXANDER BROTHERS, Philadelphia, Pa., have issued a new booklet describing in detail the construction, horsepower capacity, and drive design data of Tentacular transmission belting.

IRVING IRON WORKS COMPANY, Long Island City, N. Y., has issued Bulletin K, descriptive of Irving continuous floor armoring.



Kiddies and Down Grade!

Then is the time you need

PEACOCK STAFFLESS BRAKES

Children with scooters, roller skates, balls, bicycles and express wagons make many serious situations for motormen—and hazards are increased on down grades.

Many a time you've heard the cry "Look out for that kid," when some youngster intent on his play dashed on the track in front of an oncoming car.

Suppose the power goes off—there is too much slack in the air brake rigging. Then is the time a Peacock Staffless Brake is worth its weight in gold, for it is absolutely trustworthy. It has a chain winding capacity of 144 inches—has three times the braking capacity of the ordinary hand brake.

Do you realize Peacock Staffless Brakes are standard on practically all modern cars? There are good reasons why. May we present some facts and figures why?



The
"Peacock"
Staffless

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representatives

Lyman Tube & Supply Company, Limited, Montreal, Canada



One of the 100% Goodyear-equipped fleet of the Portland Electric Power Company, Portland, Oregon



GOODYEAR . . . one hundred per cent!

The number of bus lines that are equipped exclusively with Goodyear Pneumatic Cord Bus Tires is growing steadily.

As one operator after another gets through with tests and trials and experiments, the records of dependable, low-cost tire performance point to Goodyear—100%.

A typical example of this complete reliance on Goodyear is supplied by the Portland Electric Power Company, of Portland, Oregon.

"We are pleased to state that we have used Goodyear Tires and service on our buses since October, 1924, with excellent results," writes Mr. Thomas Pumfrey, Chief Engineer of Railways, "and our fleet of 41 buses is now equipped 100% with Goodyear Tires.

"They all have dual tires on the rear wheels, and the buses average 120,000 miles per month, carrying 448,000 passengers. Our average between tire failures has been 25,026 miles.

"Goodyear Service has been very satisfactory, and we have found Goodyear Sales and Service organization very fair."

Goodyear Pneumatic Bus Tires deliver their superior grade of performance because of their special design and construction. They have the All-Weather tread for powerful traction and road-gripping safety in any going. They have the long-lasting strength provided by extra-elastic, extra-durable SUPERTWIST cord. For uninterrupted revenue mileage at low tire-mile cost, equip 100% with Goodyear.

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

GOODYEAR



Model 15 (Street-car type) by International Harvester

One of Three Popular Styles

THE coach operator of today lays his plans with an eye to maximum activity with conservative investment. He wants economy coaches for medium loads, designed inside and out to please the fastidious rider, and scheduled to run with the dependable frequency that establishes routes with the public.

He finds on investigation that the coach he prefers is such a coach as

International Harvester *builds* and *services*. International Harvester pioneered in the development of motor coaches and the popular Model 15 is the fruit of that experience. Furnished in three styles—the Street-Car type [shown above], the Club Coach, and the Sedan Coach. To carry 15 to 17 passengers—the ideal capacity. Write for the Motor Coach Catalog.

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

OF AMERICA
(Incorporated)

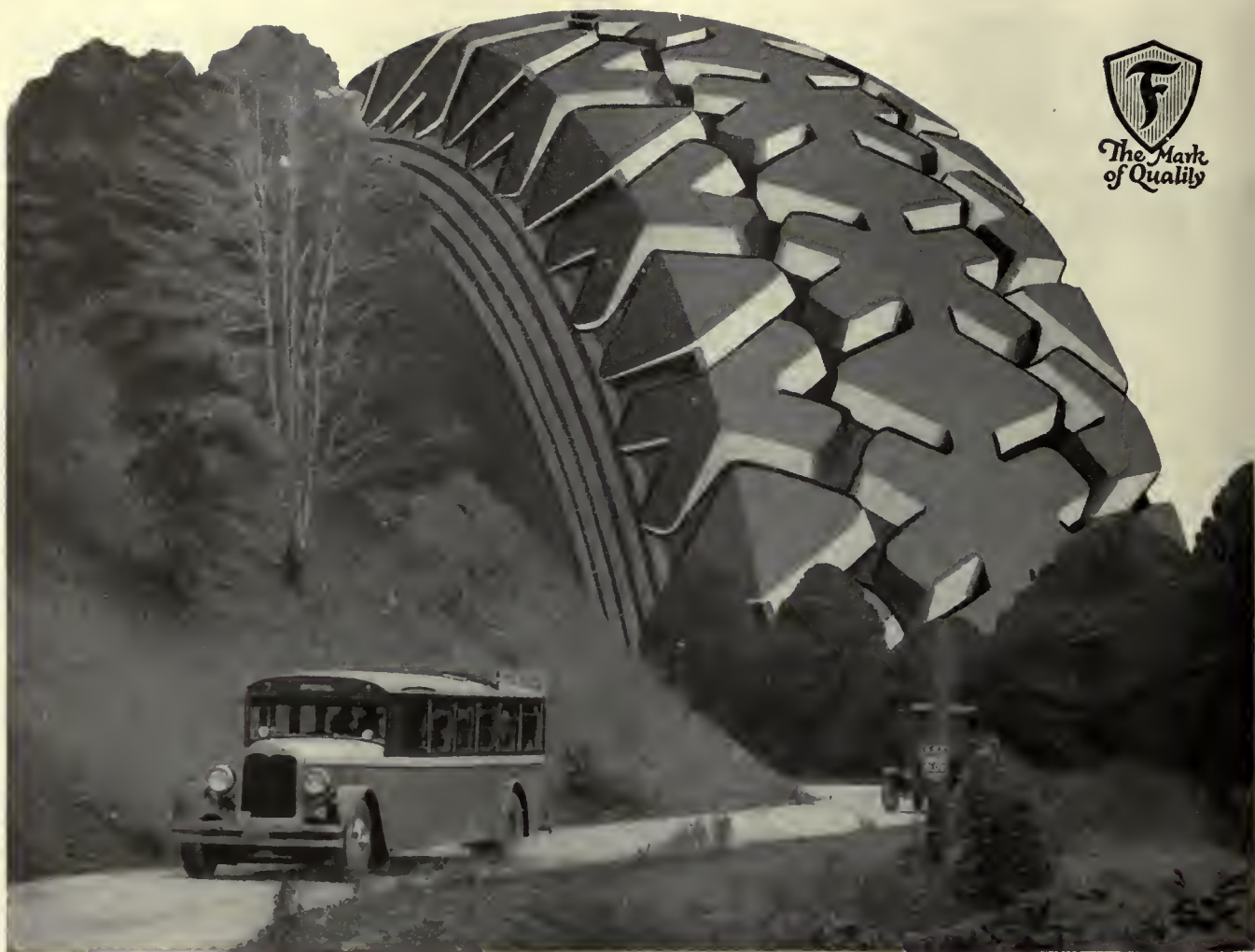
Chicago, Illinois

The International Harvester automotive line also includes Speed Trucks of 1/4, 1/2 and 2-ton, Heavy-Duty Trucks up to 5-ton, and McCormick-Deering Industrial Tractors.



Serviced through 160 Company-owned branches in the United States and Canada, and through many dealers. Service unexcelled—service always "around the corner."

INTERNATIONAL HARVESTER SIX-CYLINDER COACHES



The OUTSTANDING TIRES *for Buses and Trucks*

The most spectacular work in the truck and bus field, is being done by fleets and individual vehicles equipped with Firestone Gum-Dipped Tires.

The Firestone Gum-Dipped Tire requires no special consideration as to speed, type of road, climate or weather conditions. The only essential is to provide enough tire for the load plus sufficient air pressure—then let the results of

advanced tire engineering and Firestone Gum-Dipping show themselves. You can give your buses the advantage of Firestone Gum-Dipped Tires, and obtain the services of experienced Firestone Dealers—no matter where you are operating. Call your local Firestone Dealer—or get in touch with the nearest Firestone Branch and have an up-to-date tire program worked out for you.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . *Harvey S. Firestone*

WHO PAYS ?

When You Use *This*



The bus line operator who does not fit his busses to the loads most often carried, pays to haul empty seats.

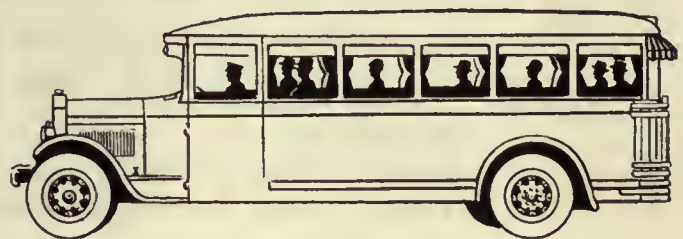
This year, established carriers have the added competition of 3,765,059 private automobiles built in 1927. Busses must share in this basic dilution. To maintain the imperiled volume, and to do it profitably, operators must observe the laws of frequency and of the average load.

Reo Busses—embodying the last word in chassis construction and design—are sized right to minimize the cost of empty seat hauling. They are not burdened with the unprofitable dead weight of slower, clumsier busses.

They handle peak-hour capacities by giving you greater *frequency* with their greater 6-cylinder agility. They have new power, new strength, new ease of handling, and the certain safety that comes from four-wheel internal expanding hydraulic brakes. Their maintenance cost—actual figures available on request—is amazingly low.

REO MOTOR CAR COMPANY
Lansing, Michigan

To Haul a Load that *This* will Carry



Let a Reo specialist demonstrate that Reo Busses will earn more money for you. Try out a Reo Bus today.

REO BUSES

12 AND 21 PASSENGER

NOV-3 011			
DO NOT DESTROY. TICKET			
25.35 -.55★ -02			
From	To	Fare	Oper.
Surrender ticket when leaving			
1 National Transit Co. Anywhere, U. S. A.			

Ticket issued by National Fare Register, actual size.



The new National Fare Register, product of The National Cash Register Company.

National Fare Registers

benefit Management, Passenger, Operator

The Management gets an absolute check on every fare taken in, and is assured of getting all the receipts.

Passengers are not delayed in loading by a slow method of registering fares and issuing tickets.

Operators save time in issuing tickets and collecting fares because of electric operation, fast action keyboard, repeat key and other important features.

Auditor has printed record of every fare collected, and total showing amount of all cash fares.

These are some of the advantages of the new National Fare Register to every person concerned in the operation of electric railways. Protection, speed of service, and durability are provided to a degree never before possible. This machine is being used by some of the most prominent lines in the country. We shall be glad to give you complete information.

252 offices and service stations in United States and Canada insure prompt service.

NATIONAL FARE REGISTERS

Product of

The National Cash Register Company
Dayton, Ohio

*Make your service
attractive—*



—a comfortable, uninterrupted ride is your best means of overcoming automobile competition

The electric railways today are facing a problem of competition with privately owned transportation. The motorist, however, is dissatisfied on account of the expense and difficulties of parking. Attractive street car service would quickly swing him back into line as a car rider.

Of utmost importance, then, is that your service be made as pleasing as possible. The ride you sell must be comfortable and uninterrupted.

The basis of a comfortable ride is a smooth, well-laid track. A rough track not only offsets the advantages of excellent rolling equipment, but hastens it to a premature discard.

Carnegie Steel Cross Ties, properly laid, insure a comfortable-riding, repair-free track. Interrupted service, due to track repairs, is eliminated. The unit cost of steel ties (cost per mile of track per year) is less than that for wood ties.

*Carnegie Products
for
Electric Railways*

Steel Cross Ties

Standard Rails
and Rail Joints

Wrought Steel Wheels

Forged Steel Axles

Steel Shapes, Plates
and Bars

CARNEGIE STEEL COMPANY

General Offices—Carnegie Building

PITTSBURGH, PENNA.

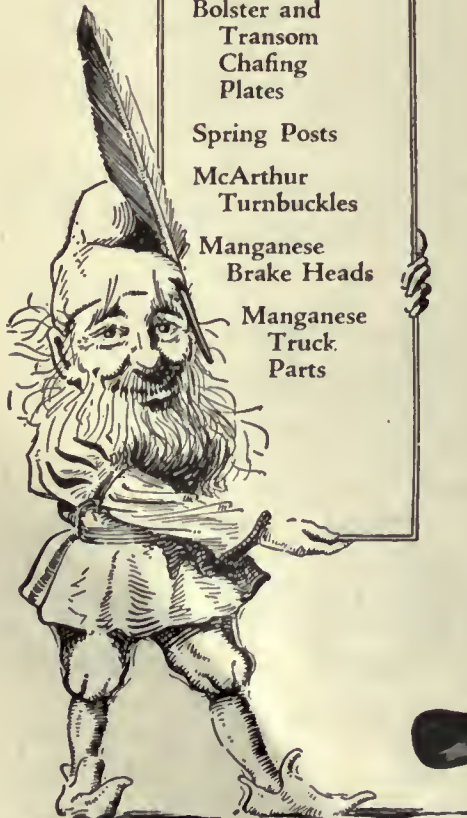
1918

**CARNEGIE
STEEL CROSS TIES**



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this test!

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
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Boyerize one or more of your cars. Put them in service under your most severe operating conditions. Keep accurate comparative records.

You will find that the Boyerized Car Parts outwear ordinary hardened steel parts three to four times; that they have an exceptional ability to stand up under the most severe service; that to Boyerize is to economize!

And Boyerized Car Parts cost no more than others!

Let us quote on your requirements.

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Electric Railway Supplies

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A. W. Arlin, 519 Delta Building, Los Angeles, Cal.



ONE



**Of these Photos
Shows Track**

Eleven Years Old

WHICH?



Which Is The 11 Year Old Track

Both the photos on the front of this sheet
are of Dayton Tie Track.

One stretch was laid in 1917 — is 11 years
old this summer.

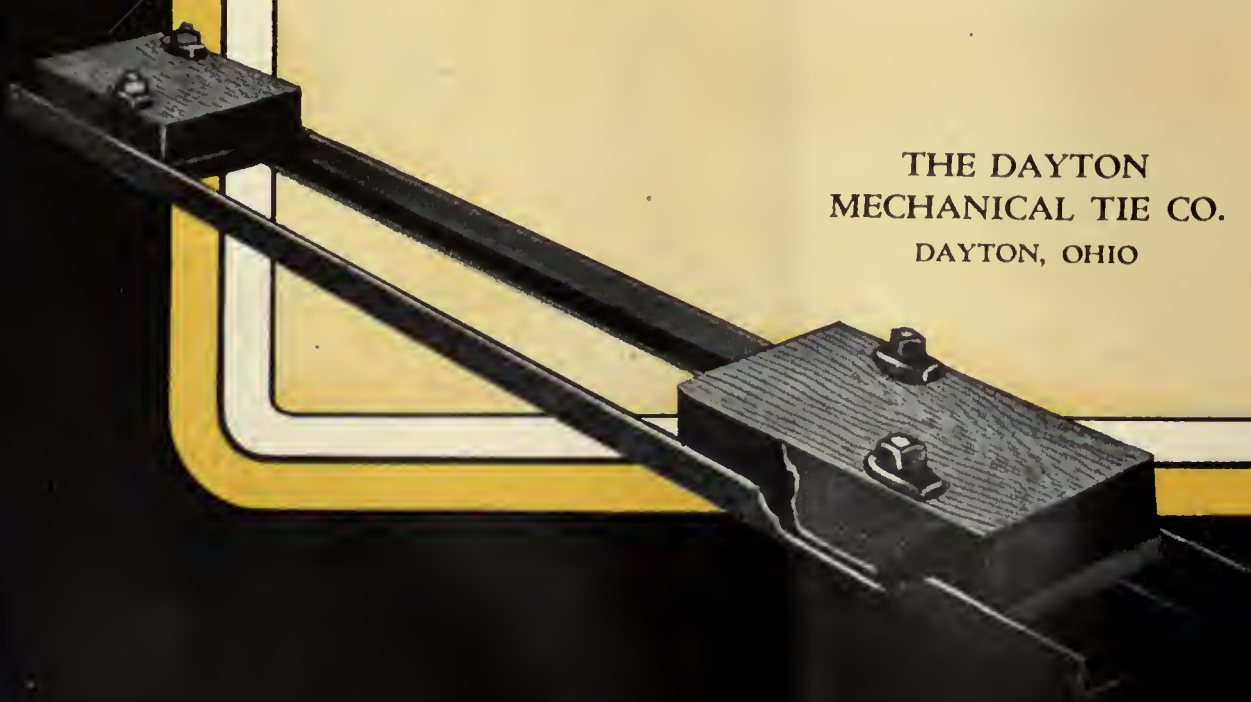
The other is two years old.

Which is which?

Not the easiest job to guess, is it?

If you are curious as to which is the 11
year old, write us and we'll tell you the
answer, and how you can accomplish the
same result.

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO



Passenger — inviting comfort



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Double Rotating Chairs
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Double Stationary Chairs
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—wherever
H & K Seats
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HALE & KILBURN CO.

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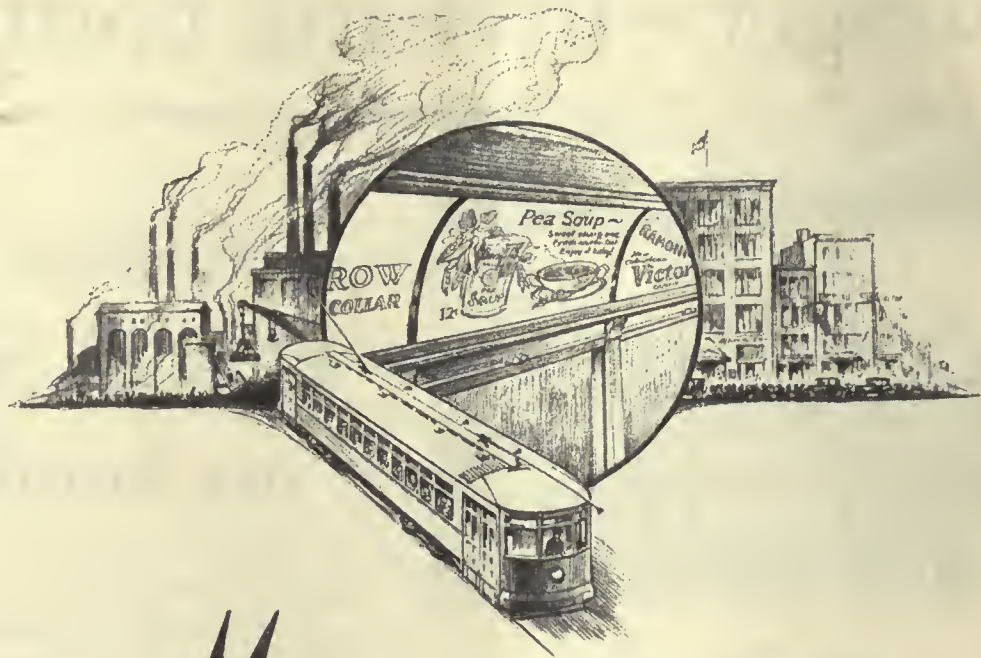
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TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

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“NATIONAL”
SHELBY
SEAMLESS STEEL
TROLLEY POLES

Reinforced where reinforcement is needed, without adding superfluous weight or sacrificing resiliency.



THE standard “NATIONAL SHELBY” Poles are made from 13-gage material, as years of practical experience have shown that a lighter gage may fail by local injuries, and a heavier gage simply adds to the weight of the pole without increasing its strength to a corresponding extent. The theoretical requirement for a pole of minimum weight points out a method for increasing the strength of the pole without a proportionate increase in the weight. This method consists of the use of a reinforcement at the base end, and on the inside of the 13-gage member,

These poles are made by improved methods of manufacture, particularly in the method of inserting the reinforcement. The reinforcement is integral with the body of the pole, which adds materially to its efficiency.

Ask for Booklet—The “SHELBY” Seamless Cold Drawn Steel Trolley Pole.

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PHILADELPHIA PA PITTSBURGH PA ST LOUIS MO SAN FRANCISCO CAL SALT LAKE CITY UTAH SEATTLE WASH SCRANTON PA UTKA TENN

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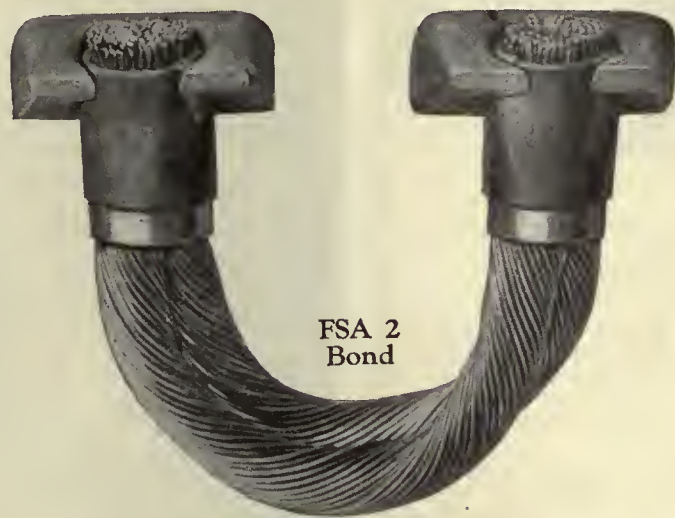
Highway Crossing Protective devices are a dependable insurance which soon pay off the investment.

Our specialists at your service without obligation.

Union Switch & Signal Co.
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American Steel and Wire Company



FSA 2 Bond



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Reliable Performance with Simplicity of Application

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Our engineers are ready at all times to assist you. Samples and literature gladly furnished on request.

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Greater Service Per Dollar Invested



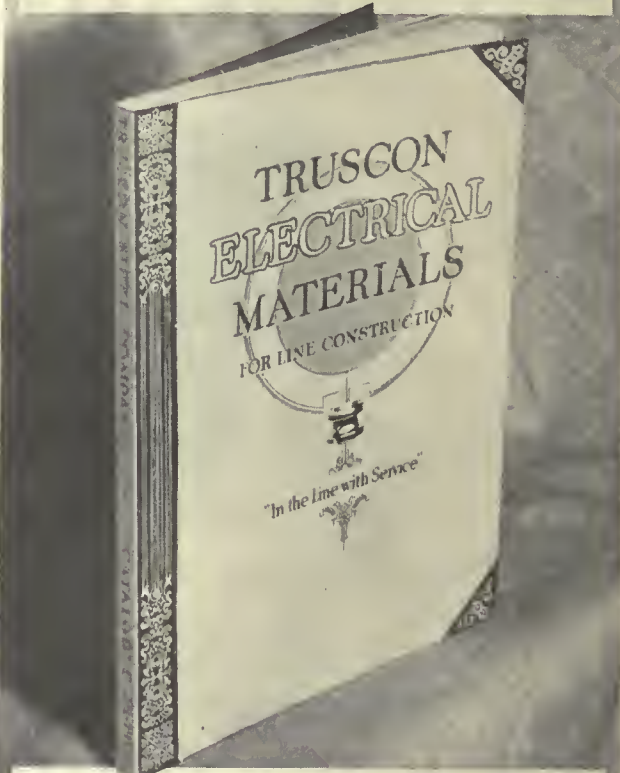
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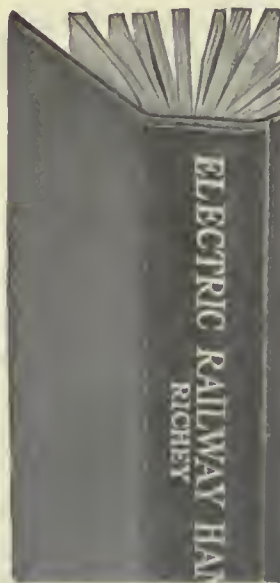
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Name of Company

E. 5-3-28

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INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

“SEARCHLIGHT”



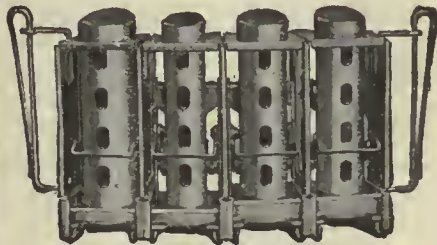
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—the only panel board made in one piece. It is
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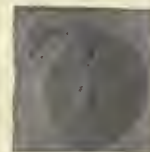
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The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



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

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

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

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Used Railway Equipment—cars, rails, poles, appliances, road building equipment, etc.—that you consider of no further value in your service, may just fit the need and purpose of some other organization in the field of electric railway operation.

There's always a market for used railway equipment somewhere. Don't make the mistake of junking equipment that you consider of no value, when there's a possibility of turning it into cash to be applied against the cost of replacements—that's not good business. Send us a list of the equipment you wish to dispose of to be advertised here. Over 6,000 executives and officials in the electric railway field watch the Searchlight Section for opportunities to purchase used equipment.

Advertise it in the—

SEARCHLIGHT SECTION

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EQUIPMENT superintendent, experienced and successful on maintenance of electric car and bus equipment, desires to change, can get you the desired results; references. PW-106, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

I CAN manage your street railway property regardless of location, size or local difficulties. PW-108, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT transportation, broad experience, proven successful record; street railways and bus transportation; available short notice; high grade references. PW-109, Electric Railway Journal, Tenth Ave. at 36th St., New York.

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WANTED—Position with a supply company by a man who has been introducing and selling railway devices for the past fifteen years; knows every railway official in the country; an interview solicited. Fred W. Roth, 225-03—137th Avenue, Laurelton, Long Island, New York.

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Commonwealth Bldg., Philadelphia, Pa.

EXCEPTIONAL OFFERING!

16 Modern, Light-Weight, Steel, Center Entrance, Trailer Cars. Virtually new!

FS-107, Electric Railway Journal
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help you sell it promptly

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue. This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

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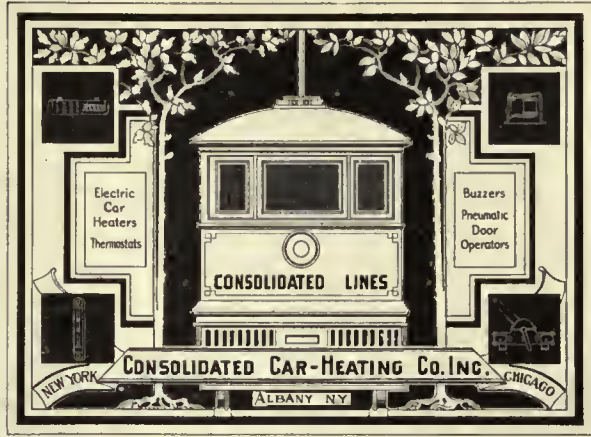
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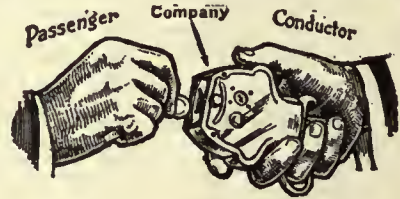
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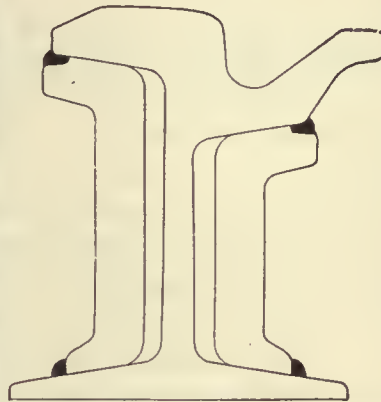


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EARLY summer is the open season for conventions. The JOURNAL's calendar of convention dates, run every week for the information of its readers, lists a long succession of meetings.

Sectional meetings are particularly valuable to those who attend. The discussion gets down to the intimate problems of everyday experience. It is more than worth the time and expense of attendance. Discussions at many sectional meetings develop ideas and experiences of national as well as local interest. Obviously, if the progressive operating man attends all of them, there would be time for little else. Nevertheless, all can profit from them, for the JOURNAL publishes prompt and full reports together with abstracts of the more important papers.

On page 777 of this issue is a report of the Southwestern Public Service Association meeting in Dallas last week. An address by President Stevens is on page 764. Don't fail to read both. Watch the JOURNAL during this open season for railway meetings. It brings you information and ideas that you can't afford to overlook.

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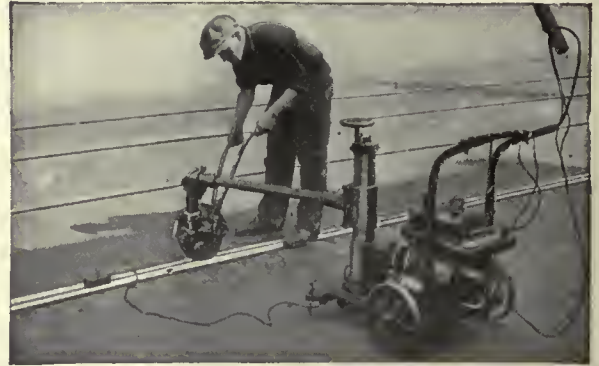
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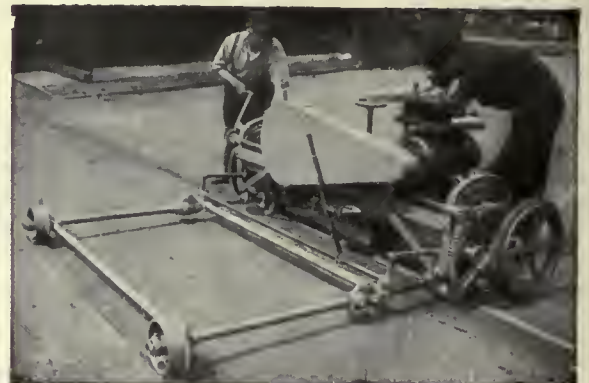
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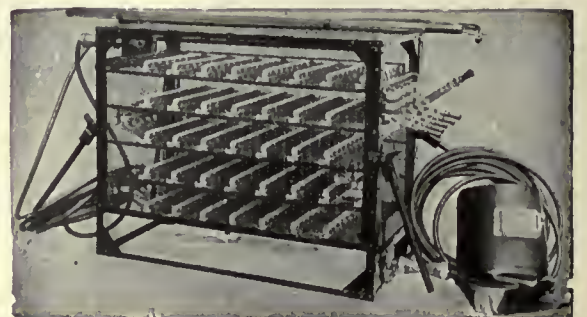
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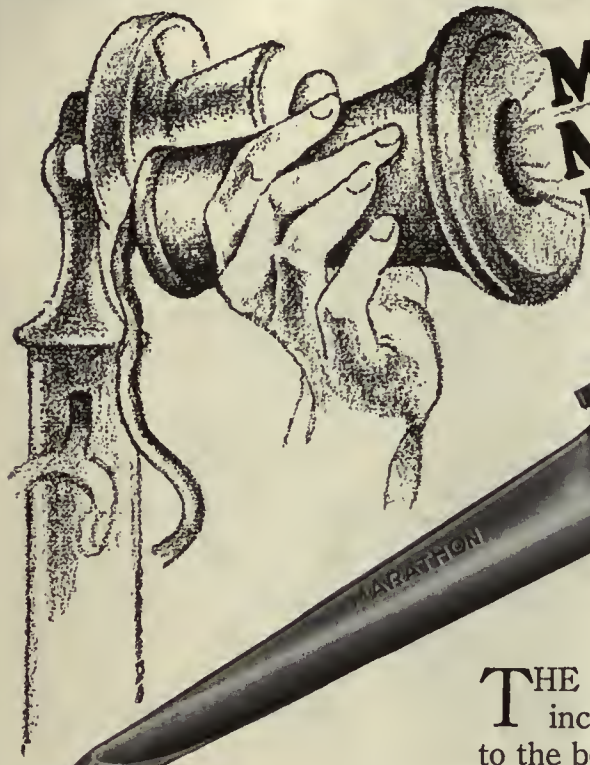
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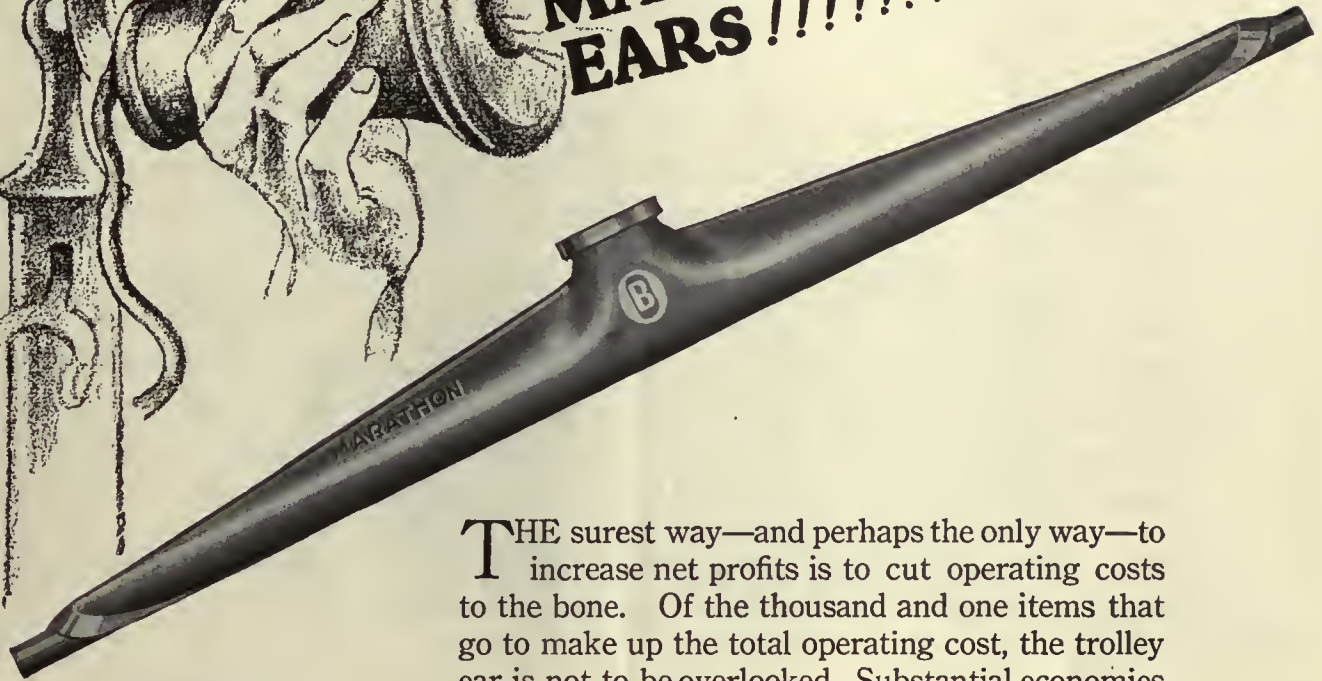
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THE surest way—and perhaps the only way—to increase net profits is to cut operating costs to the bone. Of the thousand and one items that go to make up the total operating cost, the trolley ear is not to be overlooked. Substantial economies can be had here by standardizing on long service Marathon Ears.

Competitive tests show that they last from two to three times as long as other types. If the use of these longer service ears doesn't mean economy, then nothing does.

Marathons save in trolley ear maintenance and replacement expense, and also by preventing traffic delays caused by wire breaks. Every Marathon on the wire means a substantial saving—and no saving these days is to be sneezed at. It is not unusual for them to stand 420,000 car passes per ear. Their long life has made them world famous.

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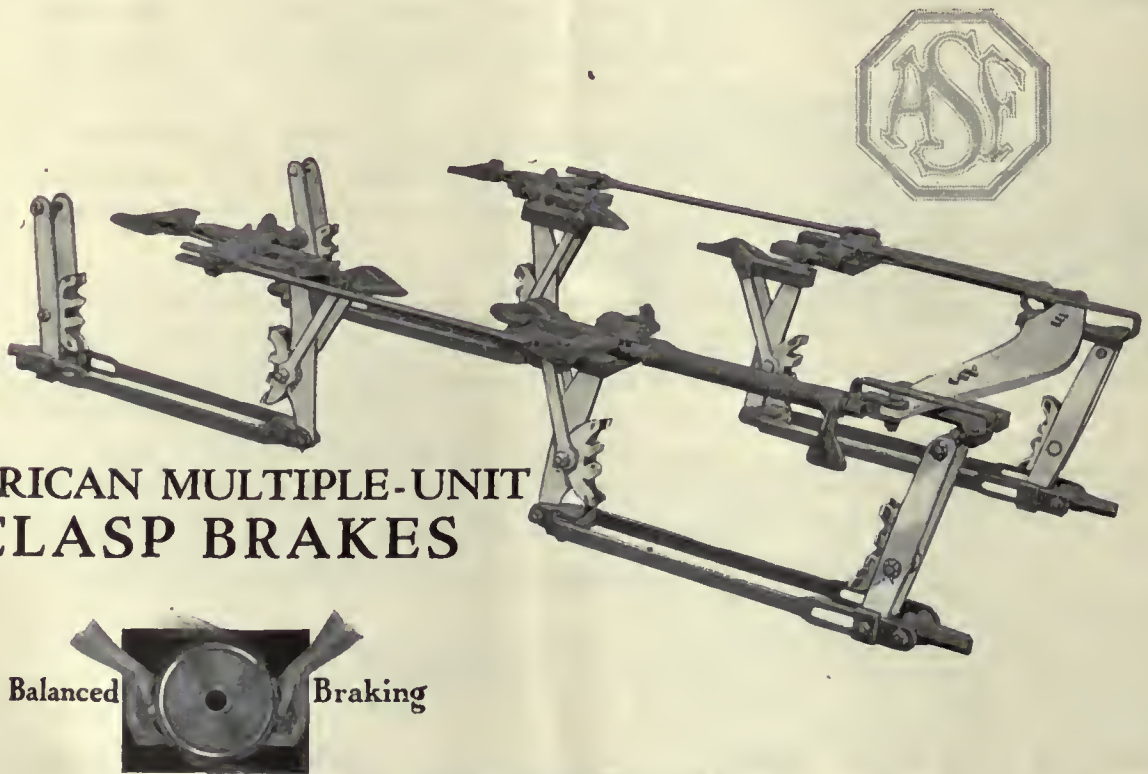
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In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes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

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



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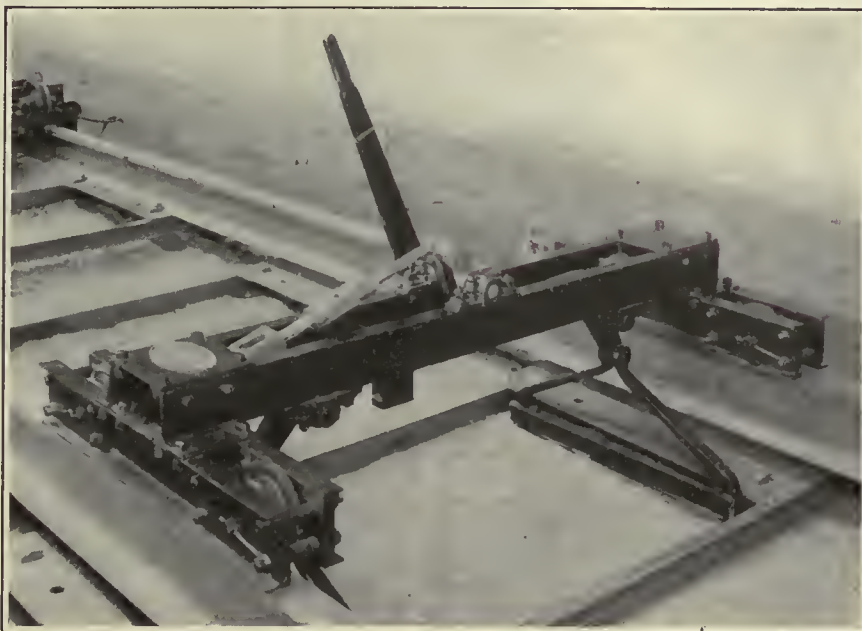
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THE NEW D-S-R TRACK LAYER

WITH the new D-S-R Track Layer, one man can now fasten Steel Twin Ties to the rail, applying any type of fasteners,

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Track which extends like unbroken ribbons of steel, smooth—
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A dream? No! Just another road which has eliminated
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(Built by the G. C. Kuhlman Car Co.)

PONTIAC'S NEW CARS

Keystone-Equipped

Wherever new cars of modern design go into service, there you will find Keystone specialties. There is a good reason for this because Keystone Car Equipment represents the last word in safety, comfort, convenience, attractiveness and efficiency.

The illustration shows the interior and exterior views of one of ten attractive double-truck single-end safety cars built by the G. C. Kuhlman Car Company and recently put in service by the Detroit United Railway.

These new cars are equipped with:

Hunter Destination Signs which clearly indicate routes and destinations by day and by night. They tell the Pontiac public where the cars are going.

Faraday Signal System, with push buttons within easy reach of every passenger—for convenience in signalling the operator.

Golden Glow Headlights which provide safety for passengers and equipment. Their greenish glass reflectors last indefinitely and project a golden light which is less blinding and more penetrating than brilliant white light.

These Keystone specialties will help to build up Pontiac's patronage and create good will.

Let us tell you how Keystone Car Equipment will help you sell your service.

Home office and plant at 17th & Cambria St., PHILADELPHIA; District office at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.



Type 35 Hunter Sign—side window



Type 129 Hunter Sign—mechanism built-in front



Faraday Buzzer

*"The Successful Six"
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Type RM-96, Golden Glow Headlight



Faraday Push

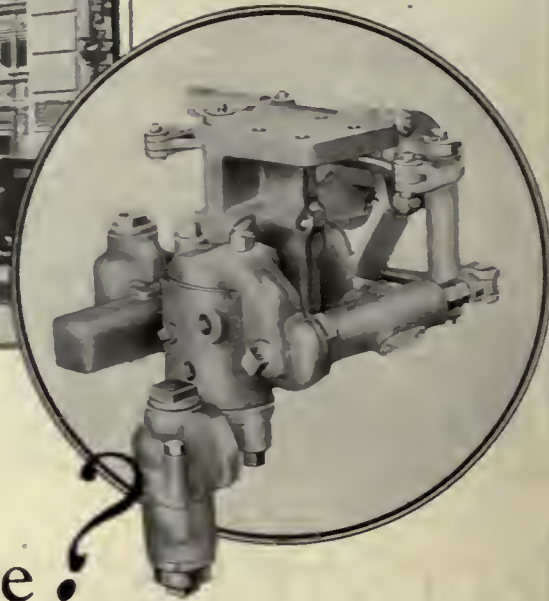


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ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL





Why is the Variable Load Brake . . . a Better Brake .

- 1** Greater Safety . . . same degree of retarding force on loaded and empty cars.
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The Westinghouse Variable Load Brake is an attachment for use with straight air or semi-automatic equipments by means of which the brake cylinder pressure is automatically adjusted as the car weight changes, to provide the same retarding effect throughout the range of passenger loading.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES



For extension
of Service

**GRAHAM
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COACHES**

fit-

fit
because of
size-performance-cost!

No greater outlay required to increase service with Graham Brothers 21-Passenger Street Car Type Motor Coaches —

On a given capital investment Graham Brothers Motor Coaches will return a maximum of passenger-hour-miles.

Whether extension of service calls for additional routes or increase of service on existing lines,

Graham Brothers coaches offer the low-cost means to your end. And in these time-tried coaches are all the advantages of low cost with none of its penalties.

Their medium capacity makes them far more elastic and

GRAHAM
MOTOR

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The 4-speed transmission puts smoothly to work the steady, dependable flow of power from the 6-cylinder engine.

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Their fine appearance attracts patrons.

And comfort holds them.

Graham Brothers 21-passenger coach, body and chassis complete, is exceptionally low in price, due to great volume production.

COMPLETE \$4060
(f.o.b. Detroit)



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~ Sold by Dodge Brothers Dealers Everywhere



Between Mass and Class — the De luxe Parlor Car

More and more Graham Brothers Parlor Coaches are being put in service to meet that growing public demand for a class of transportation somewhere between mass and individual.

For many operators the fine appearance, comfort, safety and speed of Graham coaches have been the means of developing this class of traffic.

Patrons willingly pay a higher fare for de luxe service—little short of private car comfort and convenience.

The field for these coaches is constantly expanding. The need for this class of service is increasing. The performance records of Grahams in this field account for an ever-increasing amount of this expansion.

16 passenger Parlor Car, complete, \$4290

12 passenger Club Car, complete, \$4045

(Prices f.o.b. Detroit)

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EVANSVILLE — DETROIT — STOCKTON

A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

300%
Greater Wear With
NUTTALL
Standard Helical Gears

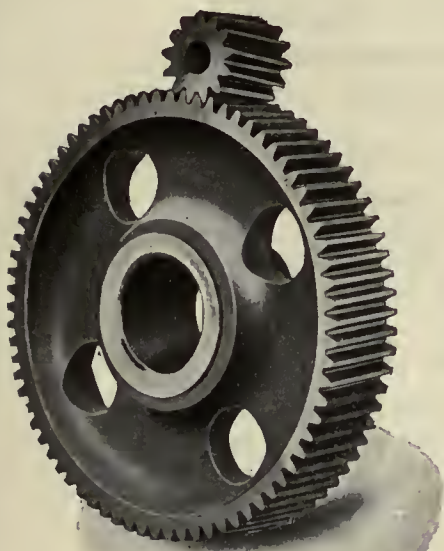


More and more traction companies are equipping their cars with Nuttall Standard Helical Gears, because of the decided advantages in the use of these superior generated and especially heat treated gears over standard untreated cast steel gears.

Over 70,000 Nuttall Helical Gears, used by the electric railways of this country, show the benefits in actual economy and performance by their use.

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Nuttall

American Brown Boveri—

announces

AMERICAN Brown Boveri Electric Corporation wishes to make known the fact that readjustment of its manufacturing facilities and reorganization of its engineering and operating personnel have been completed under the direction of a new administration, American-controlled.

Contractual relations covering patents, designs, manufacturing information, etc., have been revised and renewed with Brown, Boveri & Co., Ltd. of Baden, Switzerland.

This enables American Brown Boveri to continue to draw upon this great reservoir of seasoned engineering experience, manufacturing knowledge and research facilities in existence for more than a quarter century and to maintain its accessibility to American utilities, railroads and industries.

Brown Boveri has long been synonymous in the minds of well-informed American engineers with leadership in the field of power and electrical machinery. Principles of practice and many units of equipment attributable to this source have been put into operation in this country since the incorporation of American Brown Boveri and are confirming anticipated results in daily performance. The opportunity for



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actual demonstration under operating conditions is now afforded to interested engineers.

The main plant at Camden, N. J., has already completed delivery on several large contracts including electric locomotive equipments, steam turbo generators, high voltage oil circuit breakers, transformers, etc., all to exacting specifications and actual tests.

An experienced service and erection force, familiar with design, installation and operation of A-B-B equipment, is maintained.

We are now in a position to submit proposals promptly on any of the types of equipment or machinery listed above.

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6262

American Brown Boveri Electric Corporation

Camden, N. J

Graybar Bldg., New York

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Perfect

—after 11 years

It's Dayton Tie Track



Here's a piece of track laid on Dayton Ties in 1918—eleven years ago.

Can there be any better testimonial of the lasting qualities of Dayton Tie Track?

And think of the reduction in car maintenance this permanently smooth track affords.

Small wonder that sales of Dayton Ties grow almost beyond belief.

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DAYTON, OHIO



TREADLE-IZATION for buses, also!

The Twin Coach provides for the circulating load with a front door for entrance and a rear door for exit. When a Treadle is used with the rear door the circulating load is attained with economy and safety. N. P. Door Control is standard equipment on all types of Twin Coaches.

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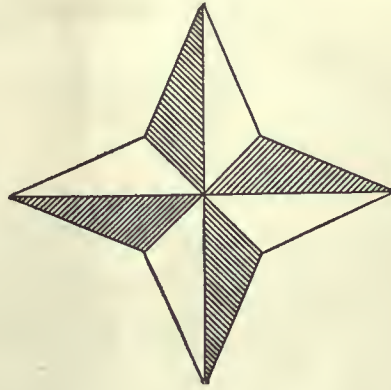
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“We would have



“—we would have hit him hard but the magnetic brakes stopped us before we reached the crossing.”



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Cincinnati BALANCED Lightweight Cars combine “Speed with Safety.” They combine, too, the ability to prevent costly accidents with faster schedules—more car miles and greater earnings.

We have ready for your study numerous instances where the Magnetic Brake—giving a deceleration advantage of from 2 to 6 seconds over average equipment—was an acknowledged factor in turning a suit for damages into a report of “what might have happened.”

When will you find it convenient to read these reports and while you are at it find out about the cost of Cincinnati BALANCED Lightweight Cars?

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI

BALANCED
LIGHTWEIGHT

CARS

—still a step ahead of the modern trend



27,491 miles of trucking with no road failures

This is the three months' record of eleven of the G-E equipped gas-electric trucks operated by the Philadelphia Rural Transit Company.

Used as snow fighters in the winter, these trucks have been remarkably successful in clearing the roads.

In the heaviest trucking service in other seasons, they must haul loads, including truck and trailer, of 16 tons, often over soft, yielding ground. Thus far, they have not been "stuck", nor have they had a single road failure.

If your service involves heavy loads or high speed, G-E electric drive on your trucks will prove of the highest value.



The name, "G-E equipped gas-electric", has come to be synonymous with reliability and economy of operation.

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Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
Street Railway Journal and
Electric Railway Review

CHARLES GORDON
Editor

Volume 71

New York, Saturday, May 12, 1928

Number 19

Tactics of the Ostrich Condemned by President Stevens

PRESIDENT STEVENS of the American Electric Railway Association strikes at the heart of the question, "What about the future of electric railways?" in an address made before the Southwestern Public Service Association at its Dallas meeting, and published elsewhere in this issue. All other questions regarding railways are secondary to this. The problems of financing, of modernization, of public relations, and the whole matter of management policy, are contingent upon satisfactory assurance that electric railway transportation is not to be supplanted.

There must, of course, be some form of speedy and convenient transportation in modern communities. Otherwise the conduct of ordinary business would be impossible. There are only two alternatives; there must be either a responsible public transportation agency or the streets must be abandoned to individual vehicles. Obviously it is physically and economically impossible for each traveller to "roll his own," despite the predictions of some automobile manufacturers with more enthusiasm than knowledge of transportation matters. The vast majority of people cannot afford to spend so large a part of their income merely to get about in their daily travel. Furthermore, no city can afford to provide the street space needed, even if the public were able to buy and operate enough automobiles. The whole proposition is so ridiculous that no one who even pretended to recognize the facts would seriously entertain it for a moment.

Since there is a continuing, and in fact an increasing, need for public transportation, there still remains the question of whether this will be provided by buses or by electric cars. Each vehicle has its advantages and disadvantages. The bus has flexibility and low investment cost in its favor. The car has long life, lower operating cost, high carrying capacity and service reliability. The so-called "rubber urge" as a factor in transportation has been proved an invention of the fancy. Unless the bus offers something more than merely rubber tires, it has no greater appeal to the public than has the street car. As has been reiterated time after time in these columns, the bus has an important place in public transportation, but that is in providing preferred forms of service at higher fare levels and not in the duplication or replacement of street car service.

Many railway managements are putting buses in place of street cars because of one primary consideration—the lower investment involved in the purchase of buses than in the rebuilding of track. In some instances of low traffic density this point of view is justified. But in many others the real explanation for the reluctance to spend money in rail rehabilitation and the replacement of obsolete cars lies in the lack of confidence on the part of the railway managements themselves regarding the future of street railways.

President Stevens calls upon the industry to look facts in the face. True, electric railway riding has been decreasing. But what have the railways done to change this condition? Are they meeting modern transportation standards? Modernization is imperative if the decline in passengers is to be checked. There is at present a vicious circle. Failure to provide up-to-date service results in falling patronage, and that in turn causes railway managers to question the future of their own business.

The public of today demands more than mere utility. Beauty has become an important factor in the lives of the American people. A street car that merely runs is no longer satisfactory, even though the fare is low and the service regular. The esthetic factors of appearance, appointments and comfort and the practical one of absence of noise are as important to attract patronage as are the utilitarian factors of reliability and economy. Frequency of service is all-important, and President Stevens rightly points out that the field is still wide open for the car manufacturer who will provide a really attractive and easy riding four-wheel car seating approximately 40 passengers.

A Clearing House of Business Philosophy

THAT the United States Chamber of Commerce is one of the country's great organizations for the promotion of constructive thought and action, not only within business itself, but in the relations between business and the general public, was apparent at the annual meeting held in Washington during this past week. To public utility men, schooled in the philosophy of public service, the declaration by leaders in general business of a similar doctrine of public accountability is indeed significant.

This new note in general business thinking was perhaps sounded most clearly by Judge Edwin B. Parker, chairman of the board of directors of the National Chamber, in an address at the close of the general session on Tuesday morning. Business has a responsibility above that of making a profit, according to Judge Parker. The method of the making is of importance not only to the general public but to business itself. Continued growth and development of business are dependent on the retention of its good name, and the road to avoiding restrictive public interference is through self-regulation. "The profession of business" is an expression used repeatedly by Judge Parker, which characterizes this new-day recognition of the importance of a professional code in trade and industry.

Utility men will find little difficulty in indorsing heartily this kind of thinking. Recognition of public accountability came to transportation men, particularly, out of the hard school of experience. How significant is it, therefore, that general business today voices its recognition of a similar responsibility to the public and that its spokesmen warn against the perils of a "public-

be-damned" attitude and advocate that business men and business associations condemn and cast out of their ranks those who put expediency and immediate profit ahead of fair dealing and a good name.

In the specific work of the Transportation and Communications Section there is much of direct interest to local transportation men. Under the able leadership of A. L. Humphrey a great public service is being performed. It is a credit to the vision of the local transportation industry that the American Electric Railway Association executive committee held its meeting in Washington during this past week, and that many railway executives from properties throughout the country attended and participated in the sessions of the National Chamber. Not only this national work, but also the activities of local chambers of commerce are deserving of active interest and participation by local transportation companies. "Teamwork in Business" was indeed a happy theme for this year's national meeting. It is exactly through that means—teamwork between electric railways and local business men—that the pressing problems of local transportation will be solved.

An Affiliation That Will Mean Much for the Industry

COMBINATION of the Stevens & Wood-Hodenpyl-Hardy interests in the Allied Power & Light Company, with R. P. Stevens as its president, has followed closely upon the recently announced merger of the Northern Ohio and Penn-Ohio systems. The financial details are still in the formative stage, but the facts so far made public indicate the extent of the holdings of the new company. These are recapitulated elsewhere in this issue. The magnitude of the railway properties is imposing. The achievements of Mr. Cobb, chairman of the Advisory Council of the A.E.R.A., in transportation are well known, just as are the achievements of Mr. Stevens, now president of the American Electric Railway Association, and Mr. Sawyer, president of the association last year, now president of Stevens & Wood. The Grand Rapids Railway, included in the Hodenpyl-Hardy group of properties, was last year's Coffin Prize winner, and the Penn-Ohio system, under the direction of Stevens & Wood, was the Coffin Prize winner of 1926. These roads, by their very capture of the Coffin Award, are properties which on their own account stood out at the top in many things well done in a competition that has been unusually keen. Moreover, as a phase of their activity, particularly in the case of the Penn-Ohio company, the place of the bus in city, suburban and interurban service has been most definitely fixed. It so happens that a speech about the electric railways made by Mr. Stevens before the Southwestern Association appears elsewhere in this issue. That, of course, is a mere coincidence, but it does serve to make plain, as reiterated in other editorial comment, the progressive and militant attitude of the directing head of the new Allied Power & Light Company toward the electric railways. Since the interests now brought together have been in the forefront of those who have striven intelligently and to good purpose in the past with the electric railways included in the systems with which they have been identified, it is certain that the new affiliation will mean much for the industry as a whole.

Alongside of the Model T in the Ford Museum at Dearborn

NO LESS primitive than his model T is the street car so graciously presented by President Porter of the Brooklyn City Railroad to Henry Ford. It will be placed in the Ford Museum in Dearborn. If a car ever has qualms then this one must have sensed its supersession when Van Depoele, the trolley pioneer, installed his line on Jamaica Avenue, Brooklyn, back in the eighties. The car is redolent of the period just after the Civil War, of carpet bags and bombazine. Since it made its first run in 1868 and its last in 1897, it would be interesting to know how it accredited itself during the blizzard of March 12, 1888, the token by which all storms in New York have since been measured. Many persons remember the car's immediate successors even if they do not remember the car itself or its counterparts, which came into general use soon after the first Brooklyn line was established.

The Brooklyn car was in service long before Deacon Richardson had begun to function as president of the Atlantic Avenue Railroad in Brooklyn. And those who think that customer ownership is something new may mark well that stock of the Brooklyn City Railroad of \$10 par was sold from door to door and is still of that par value. During the 75 years since the car was first run the Brooklyn City Railroad has never been in receivership or been reorganized. That is another record in street railway, railroad or general corporation finance. The car that now goes to Dearborn was a model in its day, just as are the cars in use on the Brooklyn City Railroad lines at present. It well deserves the place it has attained at Dearborn. It is not so ancient, but it is an antique and a relic.

Are We Treating the Employment Question Scientifically?

MOST American electric railway companies report a much lower labor turnover than formerly. At one time, an electric railway job was looked on by many employees as a sort of stop-gap, to be held until something better was available. With automatic equipment which reduces the physical labor of car operation and with the more congested streets of the present time which call for greater mental alertness, men of higher grade are seeking transportation employment. Comparatively high wages, group insurance paid for by the company, other benefits which add to the wages actually paid, together with reasonable guarantee of continuous employment—all are inducements which attract these men and keep them satisfied with their jobs.

With this difference in labor conditions, the present is a good time for railways to consider whether they are exercising as much care as they might to engage men who are especially adapted to electric railway work. When the labor turnover was high and only ordinary intelligence was needed on the car platform, no great precautions were necessary in this respect. With the time and money now spent by the average company to train a man as platform operator, a different condition prevails. If he later proves unable to perform the duties of his position, the time and money spent in this training are lost. It is almost, if not quite, as important to the applicant himself to be rejected early rather than after

spending a month or more trying to learn how to do something for which he is naturally unfitted.

The use of psychological tests of applicants for employment is the logical answer to this problem. Up to the time of the war, when tests of this kind were given to Army recruits, their value here was hardly understood. Even now, only few companies have psychological tests applied by their employment departments. European electric railway companies have done much more in this direction, and their efforts have brought prompt monetary return. Not only is there an increase in the proportion of men who remain permanently in service from among those accepted, but there has been a noticeable decrease in accidents and economies in other directions. As explained in an article in last week's issue, the tests have been applied to conductors and shop men, as well as to motormen.

Few companies do their purchasing of materials except by specification, checked by test, but many do not consider it necessary to adopt scientific methods in selecting employees. A casual talk and the "once over" by the employment agent are considered all that is necessary for applicants who pass the medical examination and have sufficient education to fill out an application blank. But there is nothing so deceptive as the idea that a man's qualifications for a particular job can be told from his appearance alone. Companies which have applied psychological principles to the selection of new employees report themselves satisfied that the method pays. This being so, it should be worth careful consideration.

Platitudes Put in Practice Pay Profits

SO MANY things contained in the report of the Cincinnati, Hamilton & Dayton Railway for 1927 deserve commendation that it is necessary to proceed cautiously lest comment become a mere reiteration of the contents of the report. It was the first full year of operation of the rehabilitated road. Business was bad in the Miami Valley last year, just how bad the report makes plain. Despite this, the passenger revenues of the interurban line in 1927 were 2.1 per cent in excess of those of the preceding year, while the total tons of freight handled were 26.2 per cent in excess of the 1926 tonnage, and freight revenues 23.2 per cent greater in 1927 than in 1926. Even the Dayton city lines responded to improved equipment with an increase in patronage. Costs per car-mile were cut, a saving was made in the bill for power, and maintenance expense was reduced.

These economies were incidental, however, to the larger program of intensive development. The record made was achieved by a dynamic attitude that appraised at its full worth the results likely to follow the provision of more frequent, comfortable, attractive and rapid service, by selling the service to the car rider and freight shipper through modern methods of publicity and solicitation and the development of new types of service to meet changed economic conditions. Reduced thus to their simplest terms, these sound like platitudes. Many people will dismiss them as such, because the imagination is lacking to translate them into boxes of freight, crowds attending a fair, theater parties and the mass of people at all times susceptible to exceptional service sold intensively. It is not to be expected that the achievements of the road in 1927 can be made cumulative, but it remains a fact that the Cincinnati, Hamilton & Dayton Railway was not con-

verted from a decrepit, obsolete broken-down property to one of the most modern of its kind in the country by the practice of legerdemain. That result was achieved by vision that correctly appraised the possibilities, followed by an immense amount of hard work and constant vigilance.

Make It Easy for the Passenger to Pay

NOT always have we had a buyer's market for local transportation service, such as exists today. Years ago it was a seller's market. Then people had no automobiles of their own and the public transportation agencies had a virtual monopoly. But those days are gone forever. Nowadays we must make it as easy as possible for the customer to buy our wares. One of the most important factors in successful merchandising is to make it easy for the customer to pay for his purchase. Merchants sometimes do this through encouraging buying by partial-payment plans and charge accounts. Obviously, these ideas are impracticable in selling transportation service. But every operating company can and should use a system of fares and fare collection that makes payment simple and easy for the passenger.

With the practical disappearance of the nickel as a unit of fare the situation has become worse. Although more than 200 cities now have a 10-cent cash fare, in all but seven of them there is also a reduced-rate ticket or token fare used by the great majority of passengers. Since the fare itself cannot be adjusted merely to facilitate payment, the transportation agencies must take advantage of every possible means of making it easy to pay the rate which has been fixed.

No general rule can be laid down concerning the best way to do this. Use of tickets or tokens, however, is undoubtedly easier than payment by cash when the latter involves several coins. When tickets or tokens are used, nothing should be left undone to make it easy for the passengers to buy them. A large railway which formerly sold four tokens for 30 cents but refused to sell two for 15 cents, furnishes a shining example of what not to do.

Real salesmanship does not place on the passenger the responsibility for having the correct fare, but rather tries energetically to help him to have it. In regard to methods of fare payment, the electric railways in this country can profit by the example of those abroad. In Europe, where zone fares are the rule, the problem is exceedingly complex as compared with that in the United States. Nevertheless the operating companies have gone far to overcome the handicap by developing methods of change-making, ticket-issuing and fare collection. These have been worked out so well that the exacting requirements are met without confusion or delay. Among the interesting developments of this kind are the automatic change-making and ticket-selling machines used in London, recently described in this paper. With certain modifications similar devices would undoubtedly prove useful on electric railways in the United States using stations or prepayment areas. Making change is a requirement on all systems, and selling tickets or tokens on many of them. Whatever can be done to facilitate or expedite the process will improve the service and please the patrons.

The Future of Electric Railways Is No Longer in Question

By R. P. Stevens

President American Electric Railway Association

IT SEEMS to me that no matter how many of the details of our business we discuss, there is one major question before us. It is in the minds of the men in the shops and on the cars; in the minds of the executives administering the companies' affairs; in the minds of those to whom we must turn for financing; and, to a lesser degree, in the minds of the car riders. The question is: "What is the future of the street railways?"

Are we what we have so vigorously proclaimed ourselves to be, an essential, vital, absolutely necessary and therefore a permanent, continuing industry? Or are we emulating the ostrich in its foolish habit of burying its head in the sand, and shutting off from our vision inevitable and unescapable facts bearing down upon us with overwhelming force? It is an important question, not only to us, but to the public.

First, why does the question arise? The answer to this is simple—it arises because some 20,000,000 private automobiles are being operated in the United States and because there will be an increase in this number for at least several years. These private automobiles have taken a considerable part of the traffic which otherwise would have been carried in street cars. The question of the future of electric railways is also kept before us by the heated argument going on within our ranks between the old stand-patters and the bus-acclaiming element. This is unfortunate—it reminds me of a young boy, who, hearing two cats in a terrible rumpus in the back yard, said to his father, "I guess those cats are tearing each other to pieces." "No, son," replied his father, "they're just getting better acquainted." So with the bus controversy. It has cost us millions of dollars to learn—and that only recently—the economic limitations as well as the advantages of the bus in handling public transportation business.

The question arises also because of the occasional abandonments of small street railway systems that never had any economic justification. For example, not long ago it was heralded all over the United States that "the last street railway company in Nevada" had ceased operating. The public could not be expected to know that there never had been more than one street railway in Nevada, and that that company never operated more than $7\frac{1}{2}$ miles of track or had more than six cars. Yet that inconsequential abandonment inspired many comments in the public press that added to the public's uncertainty as to the permanence of our industry. A large section of the public has acquired the notion that the street car has outlived its usefulness. There is a very difficult

PRESIDENT STEVENS here throws aside details and strikes at the fundamental question of the future of the electric railway industry. His views, presented at the recent meeting of the Southwestern Public Service Association in Dallas, Tex., express confidence in the industry's outlook. He holds that the outstanding problem of public transportation companies is that of keeping abreast of the times.

psychological problem to be met, but it is being met, and in due time the erroneous ideas which have gained currency will be eradicated and supplanted by the only thing that can supplant them—the truth. There has been too much jumping at conclusions with respect to the electric railway situation, and not enough analysis of the facts.

I remember a friend of mine who once said "My wife is a great athlete—in fact, she holds the world's record for jumping at conclusions." So with many of those who would relegate electric railways to the scrap heap. Let us survey the situation. Most of you attended the A.E.R.A. convention in Cleveland last October. You saw the largest exhibit of rolling stock ever displayed at an electric railway gathering. You saw new types of cars, new kinds of trucks, new kinds of seats, new designs, new methods of maintenance of equipment and tracks. You saw new types of buses, too, and many of you joined in singing what might be called the chorus of the convention—"The bus men are making the buses look like street cars and the street car men are making the cars look like buses."

And that is more or less true. The electric railway engineer has taken ideas from the automotive engineer, and the bus man has profited by the experience of the electric railway engineer. That the bus manufacturer is adopting ideas from the street car is not surprising to experienced electric railway operators. Nor is it difficult to understand why the car builder is making his vehicle look more like a bus. The reason is largely psychological. The automotive vehicle is new; it is sleek and speedy looking; it impresses the public as being "modern," while the street car has been a more or less standardized vehicle making no appeal to the unvoiced, but none the less real, desire of the public for "class" and "up-to-dateness" in public transportation as well as in clothing, home environment and entertainment. There are evidences every day of a great influence which beauty is exerting upon American industry and business, and in the lives of the

American people. We see this every day and must meet it as any other business man would. A shrewd merchant carries the goods his customers want. Our customers, the present-day Americans, want beauty in their transportation vehicles as well as in their homes and home furnishings.

Why do people turn in automobiles a year old for new ones with more artistic lines? Why are the symphonies and classical music becoming more popular every year? Why did Henry Ford spend a huge fortune in making "Lizzy" look more artistic, and why do they pay the General Motors designer more than they do the President? The growing influence of the appeal of beauty, as the artist knows it, is on every hand. One characteristic of the American people is that they want to skate in summer and swim in winter. They want something different—and they want it now. Let's give them what they want in transportation.

Hence the new designs of street cars, while incorporating electrical and mechanical innovations to give more efficient performance, also tend toward greater beauty of lines and appointments—toward more "class." It is the public's verdict. Not only must we have efficient vehicles, but we must make them look up to date. We are in the bobbed-hair, silk-stocking, short-skirt era. It will not do to continue offering the public street cars that remind it of bustles and dragging skirts, with shot sewn in the hems lest a vagrant breeze expose a cotton stocking and a petticoat. These things smack of antiquity, and the public refuses to be old-fashioned.

KEEPING IN STYLE

It may be true that the old cars and the old garments were sturdy, substantial, serviceable goods, but that does not dispel the fact that they are reminiscent of pre-flapper days. Being out of style, the public considers them as no longer useful. It will do us no good to regret this fact; we have to deal with conditions as we find them—not as we might like to have them. Therefore we are trying to build modern-looking cars, as well as cars equipped with modern mechanical devices that improve service. None of us wants to go back to the skin and bones type of single-truck safety car; but there is an opportunity for the car builder to develop a small car that can be as luxurious as the big fellows and that can be operated on a "car-in-sight" basis.

Where are we heading in buses? In January, 1921, sixteen electric railways were operating 23 buses on 35 miles of route. By October, 1927, *Aera* reported that 367 electric railways were operating 8,350 motor buses on 16,722 miles of route. During all these years of phenomenal expansion, the great majority of electric railways operating buses have reported that the bus routes failed to make money. The expansion of a losing business is rather paradoxical, but it can be explained on several grounds—some valid, some invalid. The most valid ground for these extensions is that many of them are "stop-loss" or, more accurately, "less-loss" operations. They were made to avoid the high capital investment and charges for new foundations, track and paving in districts with little present or prospective business. There are also many installations that were made because of the fear of competition. Such installations are regrettable because they suggest that the public was not properly informed as to the facts of transportation service.

Some bus installations resulted from a strong sense of obligation. It seemed so natural to run a route through this or that suburban area; and so easy to do

it. Unfortunately, however, it costs quite an "out of pocket" charge just to keep the buses going. Once started, they become part of an established city-wide transportation system and therefore cannot be withdrawn with the easy grace shown by the independent operator who was frequently responsible for creating the public demand for bus service.

"RUBBER URGE" HAS PROVED NONSENSE

The truth is that the industry was overwhelmed for a time by the so-called "rubber urge." Steel wheels, we were told, were out of date. The pleasure of the personal car was confused with the service that would be rendered by a public utility vehicle—the bus—running on rubber tires. Bus salesmen first made themselves believe, and then they made the bus buyer believe, that automobile owners who had deserted the trolley car would be drawn back by the bus. This has proved sheer nonsense. Ten minutes are ten minutes, whether one is waiting for a trolley car or for a motor bus; and if you don't want to wait ten minutes, you ride on neither. The present bus situation is not economically sound—it cannot endure—it will be sifted until the bus finds its proper level, and that is not, except in small measure, in the class of service offered by the street car. Think, for instance, of the many places in the country where the street railways—that don't use the pavement—pay for the cost of the paving, and the buses—that do use it—pay no such proportionate cost. Many of those who predict that buses are destined to replace street cars, overlook this ridiculous situation. Is it reasonable to believe that the public would remain blind to the facts if buses were to replace cars on any such scale as has been predicted by some enthusiasts?

One case is especially ironical—where they do make a pavement charge for buses. The irony of it is that those buses are operated by the street railway company. I have in mind the city of Baltimore, Md., where the company is paving for the cost of the paving three times: first, by bearing its proportion of the city taxes; second, by paying the cost of maintaining the paving; and, third, the paying tax of the bus. Can this situation continue? Why, of course not—and, as this unreasonable state of affairs becomes adjusted, the bus may be expected to assume its proper place as a high-fare, preferred type of service vehicle and not as a mass transportation agency.

That not all bus men have come to a realization of the full responsibilities of a public transportation purveyor is revealed by the recent remarks of one leader in that field. He criticized adversely the policy of running a bus route throughout the day when only two or four trips a day were self-supporting. Independent operators did not do things that way; that was why they prospered. It is quite true that the electric railway men's concept of transportation service is to keep something on the move all day long. One trip in the morning and one trip at night does not meet the responsibility of a mass transportation system.

The public expects steady service from the organization that it associates with steady service. Not many electric railways would be permitted to operate on the "now and then" basis maintained by the independent bus man who takes his bus home to lunch with him and snatches a nap on the parlor sofa until it is time to make another profitable run.

By this time we know that the public is more interested in frequency and speed than in whether it rides in a car or bus. If we profit from our own experience and

that of others, we will be able to turn many a present bus loss into a bus profit through nothing more startling than the use of smaller buses at proper rates of fares.

We are taking a saner, more realistic view of the bus question. We have stopped deluding ourselves about a mystic rubber urge, but are figuring closely what business we are likely to get and how much service we can give with the most economical vehicle. The bus no longer represents a serious problem. It has been adequately demonstrated that it must be intelligently coordinated with existing transportation agencies.

The private automobile constitutes our most serious problem, but the very number of automobiles that attempt to use the streets is forcing a more intelligent allotment of street space. Our large cities are abolishing parking in the congested districts. The use of the public streets for all-day storage of private vehicles cannot be permitted forever in any of our cities. For one thing, it is too costly—street space is worth \$10,000 a square foot in some of our cities. For another, it prevents the streets from serving their purpose, that is, from being avenues for the movement of traffic. For still another, medical authorities are beginning to express concern about the contamination of the atmosphere in city streets by the exhaust of innumerable automobiles.

Street congestion is causing the public to turn again to the street car. Witness the situation in Cincinnati, for instance, where street car traffic increased 7,500,000 passengers in 1927 as compared to 1926. Witness conditions in almost any medium-size city, where the newspapers a few years ago were declaring that the day of the street car was gone, but where they now are objecting to the discontinuance or curtailment of street car service and are declaring, quite properly, that the services rendered by the electric railways are necessary, essential, indispensable.

There is still another important indication that the private automobile has about reached its maximum as a destroyer of electric railway traffic, and that is the fact that the manufacturers admit that most of the vehicles they sell are for replacement of worn-out cars. Such a condition indicates the approach of the saturation point, which in the past was regarded as mythical. Another straw pointing the way of the wind is the price cutting which is going on in the private car industry. Price cutting means just one thing—that sales resistance is increasing, and it is increasing, in the opinion of many students of current conditions, chiefly because nearly everybody who can afford an automobile already has one.

So it seems to me there is good ground for optimism in this electric railway industry of ours. There is no ground for self-complacency, for unwise over-confidence, however. The automobile has taught the public that it is possible to move swiftly, comfortably and conveniently, and a public accustomed to that kind of transportation will not desert it for something less convenient and less

attractive. That is why the whole electric railway industry today is concentrating on modernization, not only modernization of equipment but also of attitude of mind toward the service.

There is a very definite and pronounced favorable trend on the part of the public toward electric railway transportation, but in all too many communities there is still the lack of realization that to grow and prosper every community must have public mass transportation facilities. It is up to us to bring this fact home to the people. It is our fault if they do not know it. I believe more effort should be made to bring home to communities an adequate realization of the predicament they would be in if they were deprived of electric railway transportation, as some surely will be unless authorities co-operate more fully. We can expect this co-operation only when it is backed by the people of the community.

I make this statement advisedly. Its truth has been taught by that sternest of teachers, experience. Phoenix, Ariz., with 26,000 people, found that electric railway transportation could not be dispensed with. The city, itself, was obliged to furnish it. Look at Ashtabula, Ohio; at Athol, Mass., with only 10,000 people; at Greenfield in the same state, with only 15,500; and a great many others. There are many in-

stances of cities, not only of medium size but small cities as well, that after trying to get along without street railway transportation found themselves compelled to provide these facilities at the city's expense and at a cost invariably greater than under private operation.

The trend toward higher fares has been definite, but this is only one of the many ways communities can co-operate to provide better transportation facilities. I refer to such measures as relief from indirect taxes on the car riders and unnecessary service requirements founded upon custom and practices of the past, which have no reason for existence now, if they ever had.

Not the least of the handicaps that the cities can remove are traffic rules which hinder electric car operation and cut down speed. Refusal or failure of city authorities to help provide faster schedules is a short-sighted policy most frequently encountered today, especially in the smaller and medium-sized cities. In congestion, a street car goes as fast as the traffic—that is all that the automobile can do—so why permit the automobile, carrying an average of 1.8 passengers, to slow down street traffic and cars carrying 50 or more passengers?

Much more could be said to prove that mass transportation will continue to be handled by the electric railways until some other form of transportation not now known is invented to take its place. Our problem is to keep abreast of the times. We have the brains, the will, the energy and the desire to keep our industry abreast of the exacting requirements of the public, and to do so at a profit. Let's go.

Our Problem

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—R. P. STEVENS.

Members of the Cleveland Railway chorus and officials en route to Pittsburgh to broadcast from radio station KDKA. The news of this was published in this paper for April 14



Cleveland Personnel Department Organized to Improve Employee Morale

Welfare, accident prevention and employment divisions of department are working toward merchandising of transportation through better trained employees. New retirement and benefit insurance plans reduce labor turnover

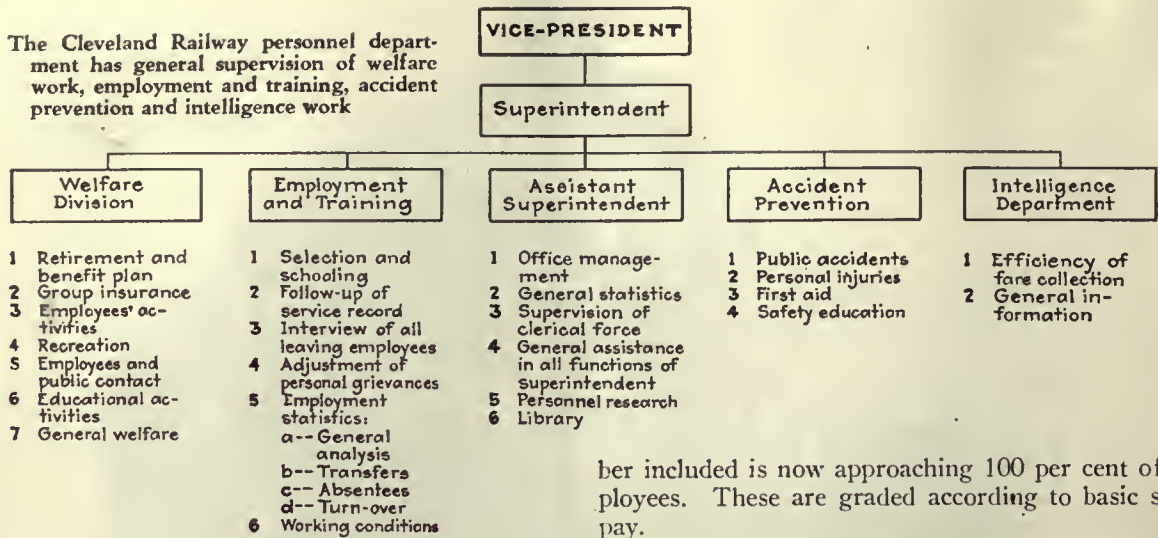
WITH the organization of a complete personnel department on July 1, 1927, the Cleveland Railway has carried forward its policy of perfecting its own organization in the interest of better public relations. This move was made at the same time a retirement and benefit insurance plan was announced to the employees of the company. It is believed that the closer contact between the management and the great body of its employees, through which the men in the ranks may be given a clear understanding of all the policies and ideals of the company, will in great measure bring improvement of public relations, success in safety work and general efficiency in conducting the affairs of the road.

The organization chart on page 768 indicates that all the activities of the personnel department bear a close relationship to one another and that employee relations and public relations are considered inseparable. Improvement of public relations through contact with employees is divided into two phases: (1) Giving the employee complete understanding of his task; (2) creation of company prestige as a background for the work of all employees.

A "contact club" has been organized and a code of regulations prepared. Those employees who are entitled to membership in a "25-year service club" have been listed. Several general office employees are attending a training course conducted by the Cleveland Recreational Council in order to receive instruction in the management of social games and activities. The organization of athletic teams at various division headquarters is being encouraged, and athletic equipment is provided at cost wherever possible. A chorus has been formed and is rehearsing an oratorio which will be sung publicly in the Cleveland Masonic Auditorium on May 31. An orchestra has been organized in the motor coach department and already has contributed to programs of social gatherings of the different divisions.

The Cleveland Railway is spending about 4 per cent of its payroll to provide a pension accrual for its employees. The company's employees have available now not only the recently adopted retirement and benefit plan which, for brevity, is referred to as the Metropolitan plan, but also receive the benefit of group life insurance placed with the Travelers' Insurance Company. Since

The Cleveland Railway personnel department has general supervision of welfare work, employment and training, accident prevention and intelligence work



July 1, 1927, further group insurance benefits have been made available. These include an additional \$500 in group life insurance, accidental death and dismemberment insurance, sick and accident benefits, and definite retirement benefits. All these are handled on a co-operative basis. The deposits of the employees go toward payment of premiums from Aug. 1, 1927. The benefits now available include group life, the Metropolitan benefits, and state compensation in the event of occupational death. They are shown in an accompanying tabulation. In this are listed the amounts that would be received by beneficiaries of employees in the event of death after various periods of service. The maximum group life insurance is paid after a minimum of eleven years of employment.

RETIREMENT AND BENEFIT PLAN POPULAR

The retirement and benefit plan, underwritten by the Metropolitan Life Insurance Company, was accepted by 90 per cent of the 5,000 employees 48 hours after its announcement. In less than one week more than 95 per cent had signed their application cards. The total num-

ber included is now approaching 100 per cent of all employees. These are graded according to basic salary or pay.

Class B employees constitute more than 80 per cent of the total, and hence are taken to illustrate the work-

TABLE I—INSURANCE PROTECTION OF EMPLOYEES OF CLEVELAND RAILWAY

Years of Service	Total Amounts Paid Beneficiaries—			Annual Cost to Employee (See Note)
	Natural Death	Non-Occupational Accidental Death	Occupational Accidental Death	
1	\$1,250	\$3,250	\$9,750	\$4.80
2	1,500	3,500	10,000	4.80
3	1,600	3,600	10,100	4.80
4	1,700	3,700	10,200	4.80
5	1,800	3,800	10,300	4.80
6	1,900	3,900	10,400	4.80
7	2,000	4,000	10,500	4.80
8	2,100	4,100	10,600	4.80
9	2,200	4,200	10,700	4.80
10	2,300	4,300	10,800	4.80
11 or more	2,400	4,400	10,900	4.80
	2,500	4,500	11,000	4.80

Note—The above figures apply for those listed in the Metropolitan plan as Class B employees, who pay \$2.50 per month. Of this amount only 40 cents purchases insurance for accidental death, while the balance of \$2.10 purchases health and accident insurance and pension accrual, which, at the age of 65, and for 25 years of service, amounts to interest at 6 per cent on \$10,000. The total insurance shown above includes the Travelers' group life and the state compensation, inasmuch as the employee will practically conceive that he is receiving all of the benefits for his contribution. Technically, the amounts shown are received for \$4.80 a year, or it may be said the benefits indicated, plus pension accruals and health and accident protection to the amount of \$20 a week, are received for a total cost of \$30 per year.



Fourteen Cleveland Railway employees who have a combined service of 667 years, an average of 47 years each

ings of the plan. All active Class B employees, for a monthly contribution of \$2.50, receive:

1. \$500 additional group life insurance (the Cleveland Railway paying the entire cost).
2. \$2,000 accidental death and dismemberment insurance.
3. \$20 weekly sick benefits.
4. \$20 weekly accident benefits (non-occupational).
5. Monthly retirement benefits for life, commencing at age of 65 after 25 years of service, in amount of \$2 per month for each year of service up to retirement.
6. Monthly disability retirement benefits, provided at least twenty years of service have been completed, in amount of \$2 per month for every year of service up to disability.

Approximately 100 employees of the Cleveland Rail-



The girl's basketball team is another of the organizations fostered by the company

way had attained an age of 65 on July 1, 1927, with 25 or more years of service to their credit and, therefore, were eligible for pension. A total of 85 of these men have since been pensioned. In the period between July 1, 1927, and Jan. 1, 1928, 266 employees received benefits on account of illness or accident.

EMPLOYEES PARTICIPATE IN ADMINISTRATION OF BENEFITS

While the administration of the group life insurance rests with the welfare division of the personnel department, the Metropolitan plan represents a co-operative effort between the trainmen and the Cleveland Railway. Therefore, it was found desirable to have a joint administration by the members and the company. This was done through the creation of a general committee and an advisory committee. The general committee is elected by ballot by the members within the six major departments. In determining the choice of individuals for this committee two elections are held, one primary and the other final. At the latter election votes are cast upon the two employees receiving the highest number of votes in the primaries.

The general committee attends to routine administrative matters, especially as they involve the different de-

TABLE II—SALARY BASES FOR DETERMINING DUES FOR PARTICIPATION IN BENEFIT PLANS OF CLEVELAND RAILWAY

Class	Annual Basic Rate of Salary or Pay	Amount of Monthly Dues
A	\$1,500 and under	\$1.50
B	1,501 to 2,100	2.50
C	2,100 to 2,700	3.50
D	2,701 to 4,500	4.50
E	4,501 and over	6.00

TABLE III—AGES OF EMPLOYEES MAKING HEALTH CLAIMS, OCT. 30-DEC. 3, 1927

Age, Years	Number of Claims	Age, Years	Number of Claims
20-25	5	50-55	9
25-30	10	55-60	10
30-35	18	60-65	9
35-40	15	65-70	3
40-45	11	70-75	1
45-50	10		
Total			101

TABLE IV—EMPLOYMENT STATISTICS, MONTH OF NOVEMBER, 1927

	Motormen		Conductors		Total Trainmen	Coach Operators
	City	Inter-urban	City	Inter-urban		
Applications received	0	0	1	0	1	25
Assigned to training school	0	0	0	0	0	29
Reinstated	1	0	0	0	1	0
Employees resigned	4	0	6	0	10	0
discharged	0	0	0	0	0	2
died	2	0	0	0	2	0
pensioned during month	2	0	0	0	2	0
failed to complete training	0	0	1	0	1	0
Total trainmen and coach operators leaving the service	8	0	7	0	15	2
	Motormen		Conductors		Total	Coach
	1926	1927	1926	1927	Trainmen	Operators
Total number of employees in service, month of November	1,538	1,397	1,428	1,376	2,966	2,773
					198	207

partments which the committeemen represent, and carries into effect the regulations prescribed by the advisory committee. The latter committee consists of the chairmen of the six major department committees and six members who are appointed by the president of the railway. The appointed members include the vice-president and general manager, the superintendent of personnel, the auditor and the chief surgeon. From this membership are elected a chairman and a secretary. The advisory committee members hold office for one year, or until their successors are chosen. This committee's duties are to supervise the working of the retirement and benefit plan and to assist and advise the general committee.

Membership in the retirement and benefit plan consists of five classes, which are determined in accordance with the yearly salary or wages. Any regular employee of the Cleveland Railway who has been continuously employed for six months or more is eligible. The dues are deducted monthly by the company from the pay of each member. In the event of death there is paid to the beneficiary the amount of group life insurance then in effect on the life of the insured. If death occurs accidentally, additional insurance is paid.

NOTABLE DECREASE IN LABOR TURNOVER

It is interesting to note what has been accomplished in the comparatively short time the personnel department has been functioning, not alone as regards the work of the welfare division, but also with respect to employment. There has been a notable decrease in labor turnover. The advantages of the retirement and benefit plan naturally were not felt until some time after the announcement of the plan, which was on July 18. Accord-

ingly the results for the latter months of the year are the better measures of its effect on labor turnover.

Accident prevention is another phase of the personnel department's work in Cleveland. The accident prevention division, which was actually functioning before the organization of the personnel department on July 1, was subsequently included as a division of that department. During the latter months of 1927 there was a notable reduction in accidents. The 1,081 accidents reported by the stations for November are 41 less than occurred in the previous month, and 266 less than in November of the year previous.

Throughout the Cleveland Railway organization there has been growing an appreciation of the value of the personnel department's work. Special effort is being made to keep employees advised of definite instances where the welfare division has been of general assistance to the company's men. All this is predicated upon the idea that the development of a contented and efficient body of employees is contingent on keeping them in the best of health and free from mental worries.

Novel Merchandising Method Employed by I. C. & E.

IN SOLVING the problem of how to present most effectively direct information to various traffic groups, civic organizations and large freight shippers of Dayton, Ohio, William R. Huffer, traffic manager Indiana, Columbus & Eastern Traction Company, developed a novel merchandising idea. His plan is to bring before the shippers a picture of the company's service, and for this purpose he has invented "A Sample Case of Electric Railways." The method of using the sample case to bring the information before the shipper is well organized and effective.

Having in mind the personal contact wherever possible in their sales activities, the I. C. & E. traffic men utilize the telephone for appointments with shippers. Conversa-

tion is brief and to the point, stressing the idea that within the short interval of seven minutes time the contents of an electric railway sample case may be displayed to the mutual advantage of both shipper and carrier.

Promptly at the appointed time, the I. C. & E. representative arrives, carrying a neat, compact case whose appearance harmonizes with the best of office equipment. Proceeding without unnecessary delay, he places the case on an office desk or chair. The plush-lined lid is opened downward, revealing a colored beaverboard map showing the electric railway service via the I. C. & E. lines to and from Dayton, Ohio. A total of 40 miniature electric lamps locate the cities on the map, indicating first, second and third morning service according to the colors of the electric lamps, which are red, green and orange, respectively. Dayton, Ohio, the point of orientation, is indicated by a white lamp. A small three-pole electric switch is located in the upper right-hand corner of the map. Placing himself convenient to this, and lighting the single white lamp indicating Dayton, Ohio, the representative begins his talk.

The sample case was built for use of traffic men at Dayton only. However, the maps, as may be constructed for use in other districts, are interchangeable. Thus with a series of the beaverboard maps, properly wired to illuminate the electric lamps, indicating first, second or third day delivery to and from other districts in the territory, the company would be in a position to use the sample case at any point for demonstration.

Dimensions of the case when closed are $41\frac{1}{2} \times 27 \times 7$ in. It is made of strong light-weight wood covered with Pantasote. It has brass fittings and a leather carrying handle. The map frame is of mahogany and the lid and inside are lined with green plush. A three-pole automatic switch control for the lamps is located in one of the upper corners, convenient for the operator. Electric railway lines on the beaverboard map are painted in red, stations are named in black, and lakes and rivers are in blue. The map is hinged at the bottom so that the wiring and battery compartments in the rear of the case can be easily reached. Dry cell batteries furnish current for illuminating the 41 small lamps.



At left—Closed case being carried into a business house for demonstration. Dimensions of the case thus closed are $41\frac{1}{2} \times 27 \times 7$ in. At right—Actual demonstration of the sample case. By lighting the three series of lamps, the demonstrator indicates the points of first, second and third morning service, respectively

Model Municipal Traffic Ordinance Proposed

Many provisions directly affecting the operation of street cars and buses are included in the tentative draft prepared by a committee of the National Conference on Street and Highway Safety

SUPPLEMENTING the uniform vehicle code approved by the National Conference on Street and Highway Safety at its meeting in 1926, a tentative draft of a model municipal traffic ordinance has now been prepared by a committee appointed for this purpose by Secretary of Commerce Hoover. This model ordinance covers such purely local matters as the authority of local police in the direction and control of traffic, the erection of necessary signs and signals, parking regulations, special rules for the protection of pedestrians and certain driving rules peculiarly necessary on city streets. Many of these provisions directly affect the operation of street cars and buses.

During the past summer and fall the committee carried on preliminary work, including an analysis of the traffic ordinances of 100 American cities together with the model ordinances existing in several states and a study of the subject matter appropriate for an ordinance adaptable to the needs of municipalities throughout the country. At a meeting in Washington Dec. 7-10 the committee developed this material into a preliminary draft. This has since been further revised by the committee and put into tentative form for criticism and comment.

It is recommended by the committee that the regulations be as simple and few in number as possible and that they be reasonably designed to increase safety and at the same time facilitate the movement of traffic. It is believed that reasonable regulations so designed will command respect and will, to a large extent, be self-enforcing. On the other hand, unreasonable or unduly restrictive measures arouse resentment and invite disobedience and cannot be enforced by an army of traffic officers.

OFFICIAL TRAFFIC SIGNS NEEDED

When a municipality adopts and proceeds to enforce even the simplest traffic ordinance, it is impossible for the public to bear in mind all of the regulations with reference to parking and other matters, and the necessity is apparent for the erection of signs and signals and the placing of markings to give immediate and constant notice of regulations. There is need for such indications as parking time limits, places where parking is prohibited, and through streets at the entrances to which stops are required—not merely for the benefit of residents of the locality but to give notice to visitors in the community.

It is highly desirable that all official traffic signs and signals erected under the ordinance be uniform as far as practicable for particular purposes throughout the city. It is also desirable that they be standardized and conform as far as possible with those of other municipalities.

When every municipality adopts the same general system of signs, markings and signals, the motor tourist as well as the pedestrian visitor will readily recognize and may be expected to observe the regulations in whatever municipality he may find himself. It is recommended, therefore, that the City Council or other local authority, when determining the character of official traffic signs and signals, give careful consideration to and if possible adopt the standard system of signs recently recommended by the American Engineering Council, which was prepared by a committee appointed by that body at the request of the National Conference on Street and Highway Safety.

TRAFFIC CONTROL SIGNALS DISCUSSED

The utility of traffic control signals depends primarily upon the judgment with which they are installed and operated. In considering traffic signals it should always be remembered that they stop as well as pass traffic, and municipalities may well proceed slowly and act only upon definite traffic analyses. Signals should be installed only at those intersections where there is a real need for them and where they will be of real benefit, for either or both of the following reasons: (1) Where the volume of traffic is so large as to prevent free movement, and traffic will be facilitated by such signals; (2) where they are needed to safeguard pedestrians. It should not be assumed, however, that every intersection where accidents occur necessarily requires a traffic signal; it may be that the hazard can be better removed by other means. Where not required for safety, signals should be installed only where it is reasonably certain that they will expedite rather than delay the traffic.

The report points out that the utility of a traffic signal depends upon the accuracy with which it is adjusted to traffic requirements. The progressive system is generally considered to be the most satisfactory. Its application to any particular street or district, however, requires careful engineering study of the amount and character of traffic and other conditions to insure proper location and timing of the signals. When so laid out the progressive system permits moving a greater volume of traffic, at a higher average speed, with greater safety, than any other.

At present the practice of cities and the opinion of traffic engineers are divided between the three-color and the two-color control systems, the former being subdivided into the "full amber," in which the amber is used at all changes, and the "split amber," in which the amber is used only following the green.

It is not now possible, the report states, to forecast which of these systems will eventually predominate. It is, however, very desirable and entirely practicable that

whichever system is used the color indications shall have standard meanings.

The total length of the cycle, as well as the division of the cycle between the two (or more) directions, should be determined by careful analysis of the traffic and other conditions. In general, a fairly short cycle is recommended—say 40 to 80 seconds for ordinary conditions. The use of cycles as long as three minutes, of which perhaps two minutes are devoted to one direction, encourages violation by both pedestrians and motorists and delays traffic. With a short cycle, the approaching motorist can so gage his speed, from a distance of one or two blocks, that he will reach the intersection on the "Go" signal and thus avoid having to stop at all.

The ordinance provides that all movements, including turning movements, shall ordinarily be made on the green light. In some cities right turns are permitted on the red as well as on the green light. Some of the ordinances permitting this require that before making the turn on the red light the driver shall first stop at the crosswalk, and shall make the turn with special regard for the safety of pedestrians and other vehicles. Others do not even require the preliminary stop. This practice is not recommended because it violates the standard significance of the red light.

PROTECTION OF PEDESTRIANS

One section of the ordinance authorizes the marking of crosswalks at intersections where there is particular danger to pedestrians crossing the roadway. Marked pedestrian crosswalks at intersections serve two purposes. They influence pedestrians to use such crosswalks and to avoid crossing roadways at other points. Also, a marked crosswalk serves to emphasize and to incite obedience on the part of drivers of vehicles to the recommended rule that vehicular travel shall yield the right of way to pedestrians crossing at intersections.

Although the ordinance advisedly makes no provision for pedestrian tunnels, it is recommended that every municipality having large vehicular movement upon its streets, with corresponding volume of pedestrian movement across streets, give consideration to the installation of pedestrian tunnels underneath roadways. Certain municipalities have constructed such tunnels adjacent to schools. The financial outlay has been returned many times in increased safety to school children and in facilitating vehicular travel on roadways. The routing of vehicular and pedestrian movement on different levels avoids conflict between such respective movements and is obviously more effective than any possible means of control of the two kinds of movement on the same level within the same area.

SAFETY ZONES RECOMMENDED

The placing of safety zones at street car stops has proved of the utmost value in the protection of persons boarding or alighting from street cars, and in speeding up street car loading. The movement of vehicular traffic past a standing street car is also facilitated. Safety zones, or isles of safety, placed in the centers of wide thoroughfares, have also been advantageous to pedestrians crossing such thoroughfares.

Safety zones in crosswalks are also desirable in or near the centers of wide roadways where there is heavy movement of both vehicles and pedestrians, to afford a place of refuge for pedestrians unable to get entirely across the street before the signal changes, and also for pedestrians at uncontrolled intersections.

One of the most dangerous conflicts between street cars and motor vehicles is to be found where vehicles pass street cars loading or unloading passengers. To permit this without regulation would create a great hazard for pedestrians. On the other hand, to entirely prohibit vehicles from passing any standing street car would unreasonably and unnecessarily hamper traffic flow. It is desirable that an effort be made to adjust these unwise extremes. The committee submits two alternative sections on this subject, the first taken verbatim from the uniform vehicle code, and a revised section which it recommends as tending to expedite traffic without increasing the hazard to street car passengers. The alternate section requires motorists to stop behind the nearest running board or door of a standing street car until passengers have boarded or reached a place of safety, except that where a safety zone has been established vehicles may proceed past a street car at a speed not greater than is reasonable or proper and with due caution for the safety of pedestrians.

STREET CAR OPERATION IN RELATION TO OTHER TRAFFIC

It is desirable that proper regulation prevent, so far as possible, conflict between street car and other vehicular traffic. Street car movement is, of course, limited to rails located in the street. This is one of the most important factors to be considered in adjusting the relationship between such cars and other vehicles. While it is recognized that street railway companies are not granted exclusive right to the use of a portion of a public street, nevertheless, motor vehicle operation should not be permitted to unduly interfere with the free use of the track area by street cars. The ordinance declares it unlawful for the operator of a vehicle proceeding immediately in front of a street car to fail to turn off the tracks as soon as practicable after signal from the operator of the street car.

STREET CARS AT INTERSECTIONS

In view of the difficulty in promptly stopping a street car, the ordinance declares that

"When a street car has started to cross an intersection, no operator shall drive upon the car tracks in front of the street car."

It is recommended that street cars be required to obey the "Stop" rule at through streets and traffic control signals at intersections. Numerous accidents have occurred by reason of fast movement of street cars proceeding in opposite directions and passing each other within street intersections. Operators of other vehicles observe and await the passage of a street car from one direction and upon proceeding across the intersection are struck by a rapidly approaching street car from the opposite direction.

Many street railway companies have regulations requiring motormen to exercise special caution on passing other street cars within intersections, and such regulations are highly desirable. Slowing down and ringing of a bell should be the minimum of precaution to be exercised under such circumstances.

DRIVING THROUGH SAFETY ZONES

The ordinance declares it unlawful for the operator of a vehicle at any time to drive the same over or through a safety zone. In some cities vehicles are permitted to drive through safety zones indicated only by markings when they are not occupied by pedestrians. The committee believes, however, that this practice is fraught with danger to pedestrians about to enter the zone, and

that it is unsafe to leave the matter to the discretion of the motorist.

The committee believes that municipal authorities and street railway companies should determine the location of street car stops in such places as to afford convenience to patrons and at the same time the least obstruction to other traffic. Particularly, street cars, whether operated singly or in trains, should not stop for the boarding or alighting of passengers at places where any part of the street car remains or extends into any street intersection.

BUS LINES AND TAXICABS INCLUDED

The proposed model traffic ordinance is by its terms applicable to all motor traffic, including public buses, taxicabs and hackneys operated on the public streets and highways. It is thought that all of the usual rules and regulations designed to facilitate the movement of traffic and to increase safety should apply to buses, taxicabs and hackneys.

STOPPING, STANDING AND PARKING

Present city traffic ordinances disclose a multitude of regulations with reference to stopping, standing and parking on city streets. Perhaps no phase of traffic regulation has occasioned more heated debate, irritation and violation of regulations than those pertaining to parking.

Public highways are required and dedicated primarily for purposes of public travel. However, the stopping and standing of a vehicle when the owner has reached his destination is a necessary incident to this proper use of the vehicle. In so far as the parking or stopping of vehicles adjacent to curbs does not seriously interfere with other uses of the roadway, such parking or stopping is advantageous. When it seriously interferes with the necessary use of street areas for moving vehicles it must give way to the primary use. Likewise, unlimited parking or dead storage of vehicles adjacent to curbs should not be allowed when this interferes with a greater need of the use of such area by a larger number of operators of vehicles desirous of stopping temporarily for purposes of loading or unloading. Also, parking or even stopping should be prohibited in certain areas where the mere presence of a standing vehicle occasions danger to users of the highway, or causes unreasonable interference with traffic movement.

STREET TERMINALS CONDEMNED

The subject of the use of streets by public carriers for terminal or switching purposes has received careful consideration by the committee, but because it was found that conditions were so radically different throughout the country it was thought inadvisable to incorporate in the ordinance a provision prohibiting such use. The committee believes, however, that the use by steam and interurban electric railways of portions of the streets in some municipalities for terminal or switching purposes has

become a serious interference with traffic and, therefore, recommends to all municipalities that the use of the streets in congested areas by rail carriers for terminal or switching purposes be otherwise provided for as rapidly as practicable.

Many other subjects also are treated in the proposed ordinance. These include the authority of the police, rules for the operation of vehicles, penalties and procedure on arrest. It is recommended that municipal ordinances in the main be supplemental to state law provisions, and that the latter be repeated only where constitutional provisions require such repetition in order to obtain local enforcement.

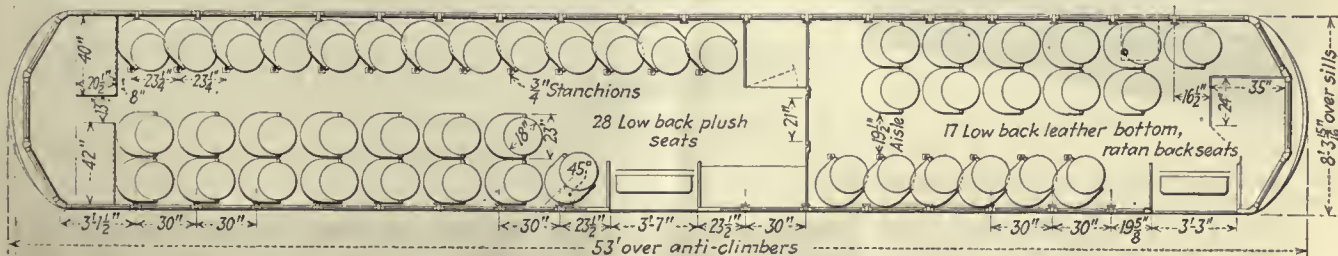
New Seating Arrangement for Pittsburgh Interurban



Seats in the parlor compartment are upholstered in green plush, with leather arm rests, as shown. The seats in the smoking compartment are upholstered in green leather

ONE of the interurban cars of the Pittsburgh Railways, in service on the Washington line, has been equipped with individual bucket type seats, arranged differently from any previous type. After a two weeks trial the decision was made to equip in a similar manner the remaining fifteen interurban cars of the 3700 series. They will be used on both the Washington and Charleroi lines.

The seats are arranged in a single row along one side of the car and in pairs along the other side. Those in the single row are placed at an angle of 45 deg. with the side of the car, while the pairs of seats are transverse. In the parlor or rear portion of the car the single row is on the right-hand side, while in the smoker or front portion the single row is on the left.



The seats are arranged in a single row at an angle of 45 deg. on one side, and in pairs, transversely, on the other side

Of the 54 seats in the interurban car, 45 are of the individual bucket type. Those in the parlor compartment have green plush cushions, plush backs and green leather on the arm rests and the seat back edges. Those in the smoking compartment have green leather cushions, cane backs and green leather arm rests and back trim.

In the Sept. 24, 1927, issue of the JOURNAL, a chair car of the Pittsburgh Railways was described, which also uses the bucket type of seat but the seating arrangement of which differs in some respects. This car has two rows of single seats arranged in "sawtooth" manner, as

the single row in the latest type. The seats themselves are somewhat different in that they have leather cushions, cane back seats, wooden arm rests and a statuary bronze binding along the edges of the seat backs. The company received a considerable number of commendatory letters from patrons concerning this car. Fourteen additional cars are being equipped with the same seating arrangement and some others with various combinations of the individual seat and the present cross-seat. Both leather and green plush cushions are being furnished, to determine the combination best liked by the patrons.

Using the Billboard to Prevent Accidents

Signboards erected by the Lehigh Valley Transit Company at hazardous points along the system have proved effective in warning motorists and children of attendant dangers

FATAL accidents practically have been eliminated and minor accidents reduced surprisingly on the lines of the Lehigh Valley Transit Company, Allentown, Pa., by erecting billboards with safety messages and pursuing a rigid safety policy. The billboards have proved a wise investment since claims and subsequent lawsuits have been avoided, and the cost of repairing damaged rolling stock reduced. In addition, the move has created much favorable comment on the outside and is serving as an effective public relations measure.

On the extensive system of the Lehigh Valley there are many dangerous points at which trolley crews had been warned to exercise extreme caution. Because of the recklessness and lack of consideration of the other party, the warnings proved of no avail. The company, therefore, decided to bring its message before the public. Billboards were advocated as the best medium and were erected at all the critical points. The billboards are very large, are brightly colored and bear forceful messages.

One of the boards was constructed in a heavily popu-

lated district at a point where children were accustomed to play in the streets and where once a little boy was decapitated by a passing car. The poster pictures two boys skating dangerously close to an approaching street car and bears the message, "Streets are not playgrounds."

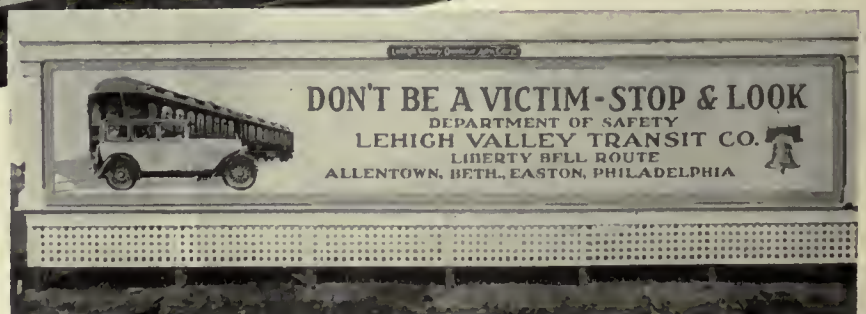
Another was erected at a place between Allentown and Bethlehem, where automobile traffic is very large and where several people have been hit in passing behind trolleys. "Auto drivers—watch the kiddies" is the warning this board gives. It depicts a mother and her two children passing around the rear of a trolley and about to step into the path of a moving automobile.

There are several grade crossings on the Liberty Bell Route to Philadelphia that are now protected by the signboards. One of these cautions "Don't be a victim—stop and look." It shows an automobile just escaping being hit by a two-car Philadelphia limited. Another, showing a similar escape, reads "Some time you will lose."

The big reduction in accidents effected by these signboards has caused much comment by safety officials of eastern Pennsylvania. Children playing along the route are being guarded more closely by police, and motorists are exercising more care. The thoughtfulness of the company in guarding the public is being appreciated. The department of safety of the company is headed by Edwin C. Spring.



The messages carried on these signboards of the Lehigh Valley Transit Company warn motorists to be careful. They are erected at points where accidents are imminent



Maintenance Methods *and* Devices

General Utility Line Truck*

By R. T. CHILES

Master Mechanic Cumberland County Power & Light Company, Portland, Me.

IN ORDER to cut labor cost on line work without investing a large amount of money in equipment used infrequently, the Cumberland County Power & Light Company has equipped a special truck with a removable tripod and winch. Four

piece of I-beam is bolted to the end of the truck chassis frame and is braced from the end of the I-beam back to the side of the truck chassis frame. Four pieces of angle, two on each end, are bolted to the I-beam with a bolt connected to each pair. To these bolts are attached the forged hooks on both ends of the two side legs of the tripod. There are also two adjustable rests or jacks, which slip on the ends of the bottom edge of



Convenient type of line truck with winch and tripod developed in Portland, Me.

G.M.C. trucks of 2-ton capacity were purchased and equipped with Meade-Morrison No. 904 drum winches with a high mounting. Special bodies were built and compartments were included to take care of necessary material and hardware for the construction work. Each truck has a special tripod built in the company's shop. These tripods are adjusted easily and can be removed from the truck when desired. The winches and tripod connections are mounted directly to the truck chassis. In position, they make the truck very efficient, having been found especially useful for unloading and loading poles and for setting them in position. The winches are also used for pulling cable and wire.

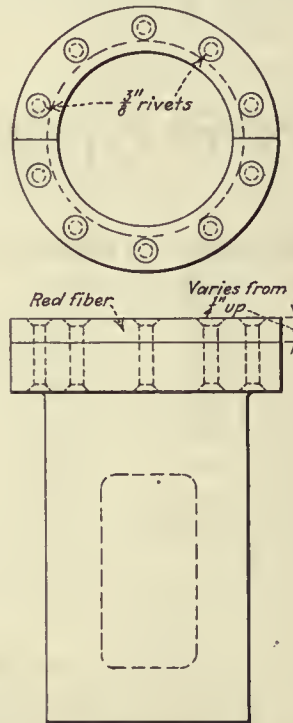
To adjust the tripod in position, a

the I-beam to take the weight off the truck spring. The third leg of the tripod is in two pieces, one telescoping inside the other for the purpose of adjusting the tripod to the maximum and minimum height. The bottom end of the third leg is adjusted to the truck chassis by means of a link, one end being fastened to the swivel foot on the tripod and the other to the connecting jaw bolted to a piece of channel section that is securely bolted transversely to the truck side frame.

The top ends of the two outside legs are equipped with forged eyes. The third or center leg, with a yoke that carries the sheave wheel with guard, is mounted on a hollow steel axle. To assemble the tripod all that is necessary is to put a shoulder bolt through the eyes and the hollow axle. This takes from five to ten minutes.

Fiber for Bearing Flange

WEAR of axle bearing flanges is always greater in some localities than in others. It is uneconomical to scrap the bearings and it is the general practice on many roads to build up the surfaces in some manner so that additional mileage can be obtained. This problem has been bothersome on the New York & Harlem Railroad, New York City, and numerous tests were made to determine the best method for building up these surfaces. It was determined finally that greater life could be obtained if the surface is built up with red fiber. All axle bear-



Method of attaching fiber to worn flange of axle bearing

ing flanges are now faced off and drilled for the reception of ten $\frac{3}{8}$ -in. flat-head rivets. A piece of red fiber is then riveted to this trued surface and the fiber face and flange are trued to a perfect surface. This shop endeavors to restore the flange to as near its original thickness as possible with a minimum of labor. Therefore the thickness of the fiber used varies from $\frac{1}{4}$ in. up, depending upon the amount of wear. It is claimed that with moderate lubrication a fiber faced flange will give a longer life than a babbitted surface.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Portable Armature Rack



Armatures are kept off the floor with this type of stand

CCARELESS handling of armatures through the shop for various repair operations often causes failures which are sometimes not discovered until the final test is made. Often the fault does not develop until shortly after the armatures are returned to service. This incurs con-

siderable avoidable work and increases materially the annual maintenance cost.

In the shop of the Binghamton Railway, Binghamton, N. Y., a special armature rack eliminates the necessity of placing the armature on the floor and prevents damage to the coils and commutators by coming in contact with obstacles or metal chips. The rack was designed and built in the shops. Armatures undergoing repairs are stored on these racks until all work is completed, when they are put in their places on the large armature racks. These racks are about 11 in. wide by 18 in. long by 8½ in. high. The feet are made of 2½-in. oak and are concave to correspond to the contour of the armature. A 2-in. x 4-in. oak block installed between these feet on either end and tied with a ¾-in. bolt makes the base rigid and maintains the 11-in. centers. The top of the frame is covered with ¾-in. x 2-in. oak strips.

ing. While theoretically concrete is a fluid, it is well known that even after thorough mixing it contains air and water pockets and is capable of considerable reduction in volume, as is indicated by ordinary tamping methods. Moreover, this principle avoids mere puddling of the mix, which has a tendency to cause a settlement of the heavy aggregate. The 300 to 500 lb. of compressive force applied by compression tamping drives the concrete, without disturbing the relative position of the aggregate, into complete and full contact with the tie-bearing surfaces. The result is a solid support for the track structure over a very large area of tie bearing by a more dense concrete than is obtainable in any other way.

New Equipment Available

Compression Tamber Is Redesigned

FOLLOWING a careful redesign, based on field tests made in Buffalo after the first showing at the Cleveland convention last fall, the International Steel Tie Company, Cleveland, Ohio, has shipped a new model "A" compression tamping machine to the Kansas City Public Service Company. The new machines have 19 in. diameter standard electric railway wheels and a lifting mechanism for the two sets of tamping arms which raises and lowers them. In the raised position all the tamping mechanism is clear of the rail head and the paving, so that the machine can be hauled to the work behind a motor car or work train. The rack and pinion arrangement which does the lifting also provides for adjusting the tamping arms for rails from 5 to 7 in. in height.

The drive from a 2-hp., 550-660-volt d.c. motor is through a completely-enclosed worm reduction gear running in oil, with the clutch contained in the same housing as the reduction gear. The machine is propelled along the track by means of hand-operated drive geared to the rear axle. The operator's position has been located carefully for con-

venience of control. Hand levers and clutch pedal are within easy reach, while the position of the tamping arms and their action as they compress the concrete under the plates are in plain view of the operator.

A new principle in track construction with concrete ballast and steel ties is involved in compression tamping.



The operator's position has been chosen carefully to give a good view of the action of the tamping arms



New model "A" compression tamping machine

Association Activities

Service Improvement Occupies Attention of Southwestern Transportation Men

ELECTRIC railways occupied an important place on the program of the Southwestern Public Service Association during its annual meeting at Dallas, Texas, May 2-5, 1928. More than 500 utility men, representing electric, gas and railway properties in the fast-growing Southwest entered into the spirited discussion of the problems of their respective branches of the utility industry.

An address by President R. P. Stevens of the American Electric Railway Association, which in his absence was read by J. W. Welsh, general secretary, was one of the features at the general sessions. Mr. Stevens brushed aside all details and sounded a keynote of confidence in the future of the electric railway industry by a graphic presentation of the part which it plays in the life of American communities. The greatest problem of transportation companies today he said is that of keeping abreast of the times. Mr. Stevens' address is printed elsewhere in this issue.

President M. T. Walker of the Southwestern Association expressed in his annual address a similarly optimistic view of the railway outlook. "The street railways are spending their money and energy to render better service and the public is looking with favor upon fare adjustments which will approximate adequate compensation for good service," he said.

RELIEVING TRAFFIC CONGESTION

Meetings of the railway section were devoted to the discussion of the general subjects of traffic, personnel selection and training, bus operation and car ride merchandising. Charles Gordon, editor *ELECTRIC RAILWAY JOURNAL*, outlined the progress that has been made in the relief of traffic congestion. "Traffic congestion," he said, "is primarily a community problem, not a transportation problem. It is, of course, of direct interest to transportation men because of the effect which congestion has upon the operation of public transportation facilities. But substantial and permanent relief measures are dependent on enlisting the support of all the factors in a community that are affected by traffic.

"Congestion has particularly serious consequences to centrally located business and property. It keeps people out of the central business districts, and as a consequence the development of outlying community and business centers has been proceeding rapidly because many people refuse to subject themselves to the hazards and inconveniences of downtown travel. As a consequence

downtown banks, department stores and shops of various kinds have been forced to establish branch establishments to reach customers who cannot conveniently come into the central district to do business. The threat which thus exists to the stability of investments in centrally located property makes the problem of bringing about relief from congestion of vital importance to those very business and property interests that frequently stand in the way of proposed remedial measures." Mr. Gordon said that transportation men are in a position to play an important part in helping to bring about improved traffic conditions, but that their success in such activity is dependent on their winning the confidence of the community through directing their efforts to improvements in the interests of the community as a whole and not merely that of the transportation company.

The importance of basing traffic regulation upon sound principles of street economics was emphasized. The speaker held that the purpose of regulation should be to serve the interests of the greatest possible number of people, and not any particular class of vehicle. He said that sound traffic regulation should be based upon the following principles: (1) The best interest of the community as a whole must take precedence over all other considerations in the allotment of street space; (2) regulation should be built on the principle of serving the interests of the greatest number of people; this is not synonymous with the number of vehicles; (3) use of street space as a public garage is a privilege, not a right.

CONGESTION A COMMUNITY PROBLEM

In the discussion of this question D. C. O'Dowd, superintendent of transportation New Orleans Public Service, Inc., agreed that congestion is a community problem even more than it is a transportation problem. He suggested the opportunity that exists for electric railway companies to render a distinct service to their communities through the employment and training of engineers qualified to aid in bringing about traffic improvement measures.

Parking was held by A. F. Townsend, manager Northern Texas Traction Company, Fort Worth, to be one of the bad practices that materially decrease the capacity of existing streets. He expressed the opinion, however, that short parking periods produce more traffic interference than do longer intervals, because frequent changes in parked vehicles result in more frequent inter-

ruptions to the traffic stream due to automobiles moving in and out of the parking spaces.

According to L. L. Allbritton, general manager Wichita Falls Traction Company, most electric railway men need to change their conception of their own business. The only possible means that is available for discouraging the use of private automobiles that produce traffic congestion and also reduced railway revenues, is that of offering a more attractive and more convenient public transportation service. G. I. Plummer, superintendent Dallas Railway & Terminal Company, cited the improvement in traffic movement in Dallas that has resulted from the elimination of parking in the business district during the morning peak traffic period.

B. R. Brown, chief engineer Dallas Railway & Terminal Company, questioned the possibility of getting acceptance of engineering recommendations for traffic relief and cited the experience of the Dallas Technical Club after it had spent almost a year in making an intensive study of traffic matters and had developed a report suggesting measures for relief. Mr. Gordon held that the process of improving traffic conditions has only started when the measures for relief are determined. A very important requirement is that of enlisting public interest in the proposed measures and winning the co-operation of the several interests in a city that are powerful in the determination of community policies.

The effect of improved electric railway equipment upon speed and ability to get through congested traffic was discussed by C. B. Frazer, superintendent of traffic Houston Electric Company. He held that faster public transportation service can be developed only through the better utilization of all electric railway equipment, and that although it has been demonstrated that new cars are revenue builders in Houston, the mere addition of a few modern cars is ineffective as a means of speeding up service unless the operation of the entire property is tuned up to present-day conditions.

Mr. Townsend supported this view by citing the average speed of car operations in Fort Worth, which has been increased from 8.5 m.p.h. to more than 10 m.p.h. through the purchase of new equipment and the rehabilitation of existing equipment to facilitate the loading and unloading of passengers.

J. W. Welsh, general secretary American Electric Railway Association, was introduced by Acting Chairman Holden, and suggested the advisability of forming local groups in each community to co-operate with the National Conference on Street and Highway Safety as a means of enlisting support

and co-operation in the application of remedial measures for street congestion.

Personnel selection and training was the subject of an address by C. J. Crampton, superintendent of public relations Dallas Railway & Terminal Company. Three factors were held to be important in the selection of satisfactory electric railway employees. First, the man must be a pleasant-looking representative of the company; second, he must have a certain background of education and intelligence upon which to build further instruction and training for transportation work; third, his record of previous experience and employment is a valuable guide as to any tendency of restlessness that would make him unsatisfactory raw material upon which to build.

Satisfactory results in the training of new men are dependent, according to Mr. Crampton, on the development of a well-planned training system. The job of running a car can be broken down into its elements so as to facilitate the work of training a new man. An important element in the success of such work is the development of properly qualified instructors who are competent to impart operating policies, methods and information to new men. "Even then," Mr. Crampton insisted, "the work of training has only started when the new man has been employed and given an assignment. Assurance of his success as an employee depends on a careful follow-up by a properly organized personnel department.

Additional experience in building a satisfactory body of employees was contributed in the discussion by R. C. Allen, superintendent of transportation Houston Electric Company, Mr. Frazer of Houston and Mr. O'Dowd of New Orleans. Mr. O'Dowd called attention to the fact that a busy conductor sometimes does not have the time or the opportunity to give a satisfactory explanation to a dissatisfied passenger, and cited the success which the New Orleans Public Service, Inc., has had with the plan of having conductors take the names and addresses of such passengers, so that a properly qualified representative of the company may call to give a thorough explanation or otherwise adjust any unsatisfactory experience to which a passenger may have been subjected.

EXPERIENCES WITH BUS SERVICE

Bus operation in both urban and interurban service occupied attention during the Thursday session of the railway section. R. L. Miller, Texas Motor Coaches, Inc., outlined the experience of his company with interurban buses, and R. C. Allen of Houston discussed the development of city bus service by the Houston Electric Company. The problems encountered in fitting the automotive vehicle into a transportation system provoked a lively discussion, and additional comments were added by W. W. Holden of San Antonio, C. B. Frazer of Houston, A. F. Townsend of Fort Worth, Charles Gordon and J. W. Welsh.

After a period of uncontrolled com-

petition by independent individual operators between Fort Worth and Dallas, the Texas Motor Coaches, Inc., was organized by the Stone & Webster Company to acquire and operate a dependable and responsible service between these two cities, and to coordinate this service with that of the interurban line of the Northern Texas

Traction Company. All of the non-descript buses formerly used have been scrapped and the line is entirely equipped with new vehicles suitable for providing a responsible service. Experience with this line has demonstrated that bus patronage fluctuates considerably more with weather conditions than does interurban patronage. Wet or inclement weather is particularly discouraging to bus riding, and Mr. Miller attributed this to the fear of skidding in rubber-tired vehicles. The speaker also emphasized that a bus driver is in much closer contact with his passengers than is an interurban car operator, and that his job is even more a sales job than is that of the car man. Successful bus operation was held to be dependent upon having a rate of fare adequate to permit the proper character of service to be given. Experience has shown that the flexibility of the bus lends itself to the development of chartered business much more readily than does the interurban.

The beginning of bus operation in Houston was attributable to a compromise for the elimination of jitneys in that city, according to Mr. Allen. Starting in a small way some four years ago, a total of 65 buses are in use at present. The new express line to Harrisburgh, which is equipped with Twin Coaches, is the latest step in the extension of buses in that city. Mr. Allen expressed the opinion that the bus has its place in any complete public transportation system, but that there is still much to learn about the proper basis of its use, the types of vehicles most suitable for various classes of service, and the factors which affect the success or failure of any given line. Comparison of the relative costs of car and bus operation are hard to make and easily may be misleading unless very carefully weighed.

In San Antonio, bus service has grown to 14 lines with approximately 67 miles of route, according to Mr. Hostetter of the San Antonio Public Service Company. Approximately 20 per cent of the passengers carried by the company are handled on buses, which constitute about 25 per cent of the active equipment in regular operation. In contrast to this Mr. Frazer said that only about 10 per cent of the total passengers carried in Houston are handled in buses, although the number of these vehicles operated is approximately the same as that in San Antonio.

DON'T TRUST TOO MUCH IN AVERAGES

W. W. Holden warned against the tendency on the part of electric railway men to attempt to reduce the experiences of a given line or a given property to averages and generalities in the effort to draw conclusions regarding bus operation. Particularly in the selection of equipment and in surveying the prospects of a given system, the characteristics of any particular line under consideration must be carefully weighed, he insisted. Mr. Townsend called attention to the need for considering both mileage and time in depreciation accounting. In certain classes of service where mileage is low, obsolescence becomes the con-

COMING MEETINGS

OF

Electric Railway and Allied Associations

May 16-17—Central Electric Traffic Association, Tuller Hotel, Detroit, Mich.

May 17—Society of Automotive Engineers, Metropolitan Section, Building Trades Club, New York, N. Y., 8 p.m.

May 22-24—Indiana Public Utilities Association, Columbia Club, Indianapolis, Ind.

May 24—New England Street Railway Club, annual meeting, Boston, Mass.

May 28-31—National Association Purchasing Agents, annual convention and exhibit, American Royal Building, Kansas City, Mo.

June 4-6—Midwest Electric Railway Association, Hotel Baltimore, Kansas City, Mo.

June 4-8—National Electric Light Association, Atlantic City, N. J.

June 6-8—Canadian Electric Railway Association, annual convention and exhibit, Toronto, Canada.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

trolling element in depreciation accounting and a time basis is the more suitable for setting up costs. When the mileage is high, however, that becomes the controlling element in determining the life of a bus. Mr. Townsend also indicated the desirability of charging off a heavier rate for depreciation when buses are new than when they are worn, and when the maintenance cost is increased. By starting with a high depreciation rate when the vehicle is new and maintenance cost is low, the sum of depreciation and maintenance may be made constant throughout the life of the vehicle.

Discussion of the life of buses raised a question of cost accounting practice as it influences the question of judging when a car should be scrapped because of excessive maintenance cost. Richard Meriwether, vice-president and general manager Dallas Railway & Terminal Company, said that the practice on his property is to accumulate maintenance costs for various classes of cars on the property so as to show a comparison of the costs on old and more modern equipment. Mr. Welsh called attention to the timeliness of this consideration of depreciation of buses and outlined the situation relative to the question of depreciation accounting, which is now being considered by the Interstate Commerce Commission and which may result in the requirement for giving much closer attention to depreciation analysis on electric railways than has been done in the past.

ROLLING STOCK DEVELOPMENTS

New developments in cars and buses was the subject of a paper prepared by L. E. Thorne, general superintendent Northern Texas Traction Company, Fort Worth. Mr. Thorne listed some of the more recent improvements that have been made in car design and equipment for reducing operating costs and increasing the attractiveness of the vehicle to passengers. He said that the lines recently equipped with new cars of modern design by the Northern Texas Traction Company have shown an increase of approximately 7 per cent in riding, although there has been no particular increase in population on these lines. With respect to bus design he expressed the opinion that though bus development has been more rapid than has been that of cars, there is still need for improvements that will reduce the cost of operation and insure freedom from service interruptions.

E. S. Meyers, assistant to the vice-president New Orleans Public Service, Inc., indorsed the view that buses have an important place in city transportation, but held that the need is imperative for buses that will accelerate more rapidly than do those at present available. He called attention to the possibility of the trackless trolley for certain classes of city service, particularly since improvements in chassis, motor and control design have eliminated some of the defects experienced in early types of trackless electric vehicles.

Friday's session was devoted entirely to a discussion of the problem of re-

building the car-riding habit. This was led by W. W. Holden, manager of transportation San Antonio Public Service Company. "No single factor is responsible for the success or failure of a given operation," said Mr. Holden. "On any particular line there are a number of balancing features, each of which must be carefully analyzed and weighed to determine its effect upon the success of that particular line."

SPEED OF TRANSPORTATION IS ALL-IMPORTANT

Mr. Holden agreed with the general principle that the speed of transportation service is all-important from the standpoint of patronage. But speed is merely one factor. The ultimate success or failure of a line is determined by the time which it takes a passenger to travel from his point of origin to his destination. That is determined not alone by the speed at which cars operate, but in large measure by the frequency of service, the routing of a line, the location of terminals and other similar considerations that are sometimes overlooked by transportation men.

According to Mr. Holden there is a vast difference between city and interurban conditions in determining the relative importance of the various factors that affect passenger comfort. In interurban service, for example, too much attention cannot be given to the matter of the design of seats, whereas in city service there are other items of equal or even greater importance. In the judgment of the speaker the trend toward luxurious seats for city cars can be carried beyond the economic limits of the rates of fare that can be collected for a comparatively short ride in a city car. Although it is important to provide the most comfortable possible seat in city service, the importance of the actual type of seat is overshadowed by the question of whether or not the passenger gets a seat at all, particularly in the rush hour. There is ample reason, according to Mr. Holden, for transportation men to recognize the very live demand on the part of the public for a seat for every passenger, even in the rush hours. Although the economic limitations of city operation seem to make it impossible to conceive a basis for providing seats for all rush-hour riders, the speaker held that it is nevertheless important to give attention to every possible means for making standing passengers comfortable.

REBUILDING CAR-RIDING HABIT

Many other factors were listed as being of extreme importance in the effort to rebuild the car-riding habit. These include ease of riding and quietness, comfort and cleanliness, keeping up with the traffic stream through rapid and smooth acceleration, and employees who have an adequate conception of the importance of the part they play in providing passengers with a satisfactory ride. Mr. Holden contended that fares are secondary in determining the volume of transportation patronage. He declared that the quality of service is the first consideration in determining

the success of any transportation enterprise. "Transportation men have been too prone to look at their problems as engineers and to overlook the importance of sales considerations," he said. "A product that people want can be sold at a fair profit, but it is hard to sell at almost any price something they don't want."

At the request of Acting Chairman Meyers, Mr. Gordon discussed the question of merchandising transportation service, and called attention to the need for an adequate analysis of the market for public transportation service as the first step in an effective merchandising program. Mr. Welsh quoted recent statistics prepared by the American Electric Railway Association's statistical bureau, which indicate that the riding habit on public transportation vehicles has shown a steady increase despite the enormous increase in the number of private automobiles in the country.

W. H. Burke, Southwestern district manager Stone & Webster, Inc., was elected president of the Southwestern Public Service Association.

J. P. Griffin, vice-president in charge of operation Texas Electric Railway, Dallas, was unanimously elected chairman of the railway section for the ensuing year, and thereby automatically became a vice-president of the Southwestern Public Service Association.

S.A.E. Metropolitan Section

EVOLUTION of bus design, from an engineering standpoint, will be the subject at the regular monthly meeting for May of the Metropolitan Section, Society of Automotive Engineers, to be held on May 17 at the Building Trades Club, New York, at 8 p.m. Two papers will be presented, one concerning chassis design and the other about body design. The former will be presented by George W. Smith, Jr., works manager of the White Company, and the latter by William C. Naegel, head of the engineering department of the Lang Body Company. A number of prominent engineers will present prepared discussions, and in addition, there will be open discussion from the floor. Carl W. Stocks, editor of *Bus Transportation*, is in charge of the meeting.

Plans for C.E.R.A. Meeting Progressing

EFFORTS are being made by the program and hotel and arrangements committees of the Central Electric Railway Association so that the summer meeting at Cedar Point will be an outstanding event. There will be two morning business sessions filled with interesting topics pertaining to the industry, such as "what the future holds for both city and interurban railways," "merchandising transportation," and other helpful subjects.

In the line of entertainment, there will be ample opportunity for sports.

The Road to Better City Transportation*

The Organized Street Railway Systems Are Best Fitted to Provide the Transportation for a Community. Theirs Is the Obligation to Provide It and the People's to Make This Possible

BY WALTER A. DRAPER

President Cincinnati Street Railway

DOUBTLESS there was a time when the street railway business drifted along uneventfully and was disturbed only by efforts of the public merely to get more of whatever kind of service it happened to be getting without much thought to improving. That has been changed by natural causes including the private automobile, its cousin the public automobile, commonly called the bus and other things.

We in our industry are gradually ceasing to call it the "street railway industry" and are coming to speak of it as "city transportation." The few of us who operated buses ten years ago were called either radicals or fools. Now it is not so much of a surprise to you to be told that the electric railway companies are operating some 10,000 motor coaches in regular service. This, however, does not mean that all of these coaches or even a majority have replaced electric cars, although this has been the case in some small towns. In quite a large measure these buses have been taken on by the electric car operators as a part of the general transportation service, either where rail line extensions might otherwise have had to be made or as additional service to communities already provided with rail car service.

In this recognition of the possibilities of the new type of transportation unit, whatever it may be, lies the promise of better city transportation. Just as those in any industry must adopt new methods, new ideas, even experiment with radical changes in order to keep going, so the men in the transportation industry are going to be progressive enough to take on the new things that give promise in our industry. To paraphrase a trade slogan, "when there is better transportation they will supply it."

AID OF THE BUSINESS MAN NEEDED

I assume that in talking to this group I am addressing not only city transportation men but those engaged in other pursuits that make them fairly representative of their communities and to those especially I would point out one of the greatest difficulties encountered by the transportation industry in its effort to supply the needs of the cities in which it is operating and that is the enlistment of the understanding and aid of the ordinary business man. I am not going to try to figure out just whose fault it is, but there is in the minds of many the feeling that the street railway

will somehow work itself out or be succeeded by something else that will.

This is a wrong attitude. In the first place the street railway operator is now just as much alive to the necessity of meeting the public fairly and providing the best service possible as is the department store or the automobile dealer. He does not do this for the pure pleasure of being a good fellow, but because it is good business, just the same as with the store or the dealer. He is trying his best and should be met half way. In the second place you are all going to need what he has to sell. All of us cannot drive our own conveyances all the time to all of the places to which we wish to go, and the means to get there is being provided by those who are best fitted by training and experience to do so, the men who have broadened the street car business into the public transportation business. In my opinion the rail car is now emerging from the trouble caused by higher costs and the tremendous growth of the private automobile—more the former than the latter, by the way—and with a rate of fare that pays the cost of the ride, it will prove its ability for a long time to come to handle masses more efficiently and more cheaply, even at the higher rates of fare now received, than any other form of local transportation.

RAILWAYS SHOULD PROVIDE ALL CLASSES OF SERVICE

It is true that the motor coach has developed and is still developing and is approaching the street railway car in unit size and carrying capacity, but even if it should provide a substitute for the rail car the street railway man is the one that should make the substitution. He should be expected to do it, aside from his mere willingness to do so. The street railway operator is skilled from training and experience in city transportation affairs. His experience has been bitter enough to teach him the most careful and efficient methods. Being the regularly authorized transportation provider in its community the existing street railway company, if it is alive to its job, is being depended upon to continue to provide both, or all kinds of service. If there is a proper understanding of the situation and a mutual confidence between public and company and a forgetting of the past by both (for both have been to blame) I am sure the public would rather have the existing agency serve it than a newcomer.

Another reason why the existing agency should be expected to give this service is in a spirit of fair play. While it is a fundamental necessity that a rate of fare be allowed sufficient to pay the

cost, in which is included a fair return on a fair investment, there is another real problem that is not so easily met. It is the problem of amortizing or writing off abandoned property and it can be seen how it comes into the picture when one contemplates the possible substitution of buses or some other means for cars. What is to be done with the investment in the part retired? Or, taking the extreme view of the extreme bus enthusiast who is continuously insisting that rail cars are doomed, the only way a rail car company can work out its honest investment is by going into the bus business or whatever other new form of city transportation succeeds it. This question must be studied and solved from the point of view of community as well as company, because of the mutual responsibility interdependence. It will not do for one to say, "I have no concern with that problem; let those who risked their money take their medicine, just as I who invest my money in an industrial venture must take my chances of getting it back."

REGULATIONS HAVE BURDENED RAILWAYS

The rail lines were built—most of them—in response to public demand. They encouraged the development of what had been unoccupied land. They tremendously increased the value of real estate. They added enormously to the taxable values of the community, and all the time they have been under increasingly drastic public control. They have not been free to charge "all that the traffic will bear." Their rates have been regulated by franchise agreements with the public, by ordinances or by statutory provisions putting their affairs in the control of public commissions. Had they been free to charge whatever fare was needed to assure profitable operation, or had they been free to quit when operation became unprofitable, they would have saved many millions of dollars to the investors. But such has not been the case. They have been required to render service regardless of economic conditions; they have kept on the job when privately-controlled ventures would have quit. Now, when they are prepared to render a new kind of service, their past service, their unrewarded creation of new public wealth, should be taken into consideration.

In any adjustment to new conditions extreme caution must be used in abandoning any rail line and substituting another form of service. If, after intelligent research and study, the decision is reached that unprofitable rail lines should be discontinued, then let us discontinue them. On the other hand, let us avoid repeating the mistake of years ago. Let us be slow to establish bus lines unless they can meet the test of necessity and can either become profitable or avoid becoming an undue burden on the whole system. Once a service is established it is extremely difficult to abandon.

There is another phase of city transportation toward which attention is being directed and that is rapid transit

*Abstract of an address before the group luncheon of the Transportation and Communication Section, Chamber of Commerce of the United States, Washington, D. C., May 8, 1928.

provided by other than surface lines. I have had occasion many times to point out that rapid transit is a comparative term. Today we think of subways and private rights-of-way in which and on which high speed can be attained. In providing this form of city transportation the public more than ever has to take an important part because no transportation system in and of itself could raise the money or could afford to build subways at their tremendous cost; and because the construction of subways is very properly looked upon as more in the nature of a grade separation or a two-level street than as merely a part of a transportation system. There is more traffic on the streets now than they can care for and because of all types of transportation the rail car can more readily be put underground it is not reasonable for those who use it to have to pay the cost of providing this additional way. There is no city in the country with anything like a complete subway system into which the taxpayer's money has not gone wholly or in partnership with the car rider's money. The cost is distributed variously in different cities. In some it is determined to relieve the car rider and put the load on the tax payer with the avowed purpose of keeping the fare down. In others the fare has been increased in order that the car rider might bear a proper proportion.

GETTING THE PUBLIC TO PAY FOR BETTER TRANSPORTATION A PROBLEM

One of the commonest criticisms of the street railway business is that it is archaic or obsolete. Some of the critics are honest in their beliefs. There are doubtless others who are not. It is true that the development of the automotive vehicle and the vast increase in wealth in this country have created a demand on the part of the public for greater speed and more comfort in city transportation and for more transportation facilities also. In spite of the tremendous growth in the private automobile with all the people it carries the number of revenue passengers carried by public means of transportation has shown a certain growth, with backsets from time to time, and this indicates that, to a degree at least, the more transportation facilities are offered the more traveling there will be. The difficulty has been and is going to be not in bringing about better transportation, just as we must have better homes and better clothes and better food, but in getting people to pay for it. We cannot get diamonds for the price of glass. While large numbers of people will continue to desire a form of transportation that can be provided at the least possible cost, others will be willing to pay for the faster and better service that they demand. An adjustment of these two kinds of service between the numbers that require them will be necessary. A business must be self-supporting or it cannot attract new capital to provide the improvement, development and extension of the service and to undertake experimentation and research. Public funds may supply the

capital for subways and two-level streets, but the companies will still need large amounts of capital for which the car rider himself will have to pay.

Indiana Utilities Convention Plans

PRELIMINARY programs are now being distributed for the annual conventions of the Indiana Public Utilities Association, the Indiana Electric Light Association and the Indiana Gas Association, which will be held May 22-24, at the Columbia Club, Indianapolis, Ind.

The Public Utilities Association meetings will be held on Wednesday, the program being announced as follows:

9:30 A.M.

Address by President Arthur W. Brady.

Report of secretary.

Report of treasurer.

"The Government in Business," by John B. Mailing, Hammond, Ind.

"Training of Supervisory Forces," by Morse DellPlain.

2:00 P.M.

"Advanced Safety Measures," by W. R. Hirst, Indiana Bell Telephone Company.

"Indiana's Water Supply," by H. E. Jordan, Indianapolis Water Company.

"Regulation," a paper or remarks by a member of the Indiana Public Service Commission.

"Cultivation Through Advertising." Speaker to be announced later.

7:00 P.M.—DINNER

Address by John F. Owens, vice-president and general manager Oklahoma Gas & Electric Company and national chairman of the N.E.L.A. committee on public relations.

American Association News

American Executive Committee Meets in Washington

National executive body holds its regular meeting during United States Chamber of Commerce session at capital. Progress of Cleveland convention plans reported on

SO THAT electric railway executives could attend the annual meeting of the United States Chamber of Commerce, the American Electric Railway Association executive committee held a meeting on May 9 in the Mayflower Hotel at Washington, D. C. A large volume of the association's business, including the further development of plans for the Cleveland convention, was dispatched during a meeting crowded with constructive discussion.

The large and representative attendance present included the following: President R. P. Stevens, L. S. Storrs, J. H. Hanna, J. G. Barry, S. C. Watkins, F. R. Coates, J. N. Shannahan, R. I. Todd, Thomas Conway, Jr., Thomas Fitzgerald, H. B. Potter, C. D. Cass, Harlow C. Clark, W. A. Draper, E. C. Faber, J. S. Kubu, R. H. Dalglish, Edward Dana, M. B. Lambert, S. J. Cotsworth, C. R. Ellicott, H. L. Geisse, W. F. Ham, B. A. Hegeman, Jr., L. R. Nash, C. C. Peirce, W. E. Wood, H. J. Kenfield, A. L. Humphrey, Labert St. Clair, Leslie Vickers, J. W. Welsh, A. W. Robertson, Raleigh Reese, C. S. McCalla, W. V. Hill, Charles Gordon and P. W. McGovern.

At the opening of the meeting President Stevens explained that the executive committee had decided to gather in Washington during the United States Chamber of Commerce meeting in recognition of the work being done by that body. He introduced Mr. Humphrey, chairman of the Transporta-

tion and Communication Section, who outlined briefly the work of that division of the National Chamber. President Stevens also called on A. W. Robertson, president of the Philadelphia Company, who commented briefly on the status of the local transportation industry. He called attention to the number of inhibitions that rest upon the industry, and expressed the feeling that it is to the industry's credit that it has been able to operate at all under the many restrictions and difficulties which it has experienced. He emphasized the importance of the operating personnel in the success or failure of a local transportation company and expressed the opinion that the importance of the contact made between platform men and the public cannot be overestimated, and that there is a wide field for increased efficiency through more effective use of an operating company's man power.

As national counselor for the electric railway industry, J. N. Shannahan commended the increased interest being taken by electric railway men in the work of the United States Chamber of Commerce and in that of the local chambers in their respective cities. He expressed the opinion that it has been of decided value to the entire industry.

DETAILS OF CLEVELAND PROGRAM

Chairman Frank R. Coates of the subjects and meetings committee outlined the tentative program that has been arranged for the convention in

Cleveland next fall. This includes not only a program for the general sessions, but also a series of luncheon group meetings during four days of the convention. The general subject on Monday of convention week, after the opening formalities, will be "The economics of transportation and the need for public participation in the solution of its problems." Tuesday will be devoted to the inspection of exhibits. Tuesday night is set aside for a program in the hands of the Advisory Council. On Wednesday the general subject will be modernization. Speakers on Thursday will reflect the viewpoints of others regarding the local transportation industry. The subjects of luncheon meetings will include interurbans, traffic, education, merchandising, financing, public relations, new cars, freight, motor buses, and management. Leslie Vickers, economist of the association, will act as manager of the group luncheons.

With respect to the work of the committee on national relations, Chairman J. H. Hanna outlined briefly the effort to obtain modification of the commerce act to clarify the definition of commercial electric railways, and the progress of pending legislation for the regulation of interstate buses.

DR. CONWAY REPORTS ON I. C. C. DEPRECIATION ORDER

For the sub-committee on depreciation, Dr. Thomas Conway, Jr., outlined the progress of developments with respect to Interstate Commerce Commission Order 19157 directing the electric railways reporting to the commission to show cause why the commission's rulings with respect to depreciation accounting for the steam railroads and the telephone companies should not be applied to electric railways. Dr. Conway reported that the hearings are expected to resume about May 10 in the rehearing of the railroad and telephone cases. He could make no prediction as to when the electric railway case is likely to be called. In answer to a question from President Stevens, Chairman Hanna said that although some difficulty had been experienced at first in getting from operating properties information needed by the committee, subsequently there had been full co-operation which had enabled the committee to proceed effectively in the preparation of its case. Dr. Conway explained that the committee on standard classification of accounts was working in co-operation with the sub-committee on depreciation to the end that the former committee is about to undertake a study of the need for revision of the standard classification with respect to depreciation accounting.

J. H. Hanna as chairman reported for the committee on publications. He estimated that *Aera* would about live up to the budget estimated for it at the beginning of the year, and requested for the committee expressions of opinion from the industry as to the content of the magazine and suggestions for its improvement.

In the absence of Chairman Luke Bradley, Mr. Storrs reported for the

committee on electric railway finance. This covered a tentative outline of the effort which is being made by the committee to liberalize the terms of car purchase now available through existing car financing agencies. In commenting on the report, J. G. Barry said that it was the opinion of the operating members of the committee that terms approximating 15 per cent down and ten years to pay instead of the customary car equipment terms of 25 per cent down and five years for the balance, would make it possible for railways to buy new cars out of income, and would thus stimulate the replacement of obsolete equipment. He said that the committee expected to be able to report real progress before the end of the year. M. B. Lambert suggested the desirability of making car financing facilities as broad as possible in order that as many car builders and manufacturers as desired to do so might participate. Mr. Barry explained that it was the hope of the committee that an ultimate basis of financing new cars might be developed in which all manufacturers could participate. Thomas Fitzgerald held that first cost of cars is a big factor in discouraging purchase of new equipment, and pointed out that the industry had been demanding custom-built equipment which made the price of new cars excessive. He argued that the industry should be able to buy cars built by the manufacturers on a production basis at considerably lower costs than those usually entailed under existing conditions.

PROGRESS IN INSURANCE

H. B. Potter reported for the committee on insurance. He also expressed the regret of Mr. Emmons, who was unable to attend the meeting. Mr. Potter indicated that the report of the sub-committee on fire prevention is nearly completed. He outlined also the procedure which the committee is following in an effort to work out a basis for discussion of the industry's insurance problem with representatives of the Central Rating Bureau.

C. S. McCalla reported for the entertainment committee. There was considerable discussion regarding some of the entertainment features which have been planned or suggested. General Secretary Welsh presented routine reports for several standing and special committees in the absence of their chairmen. These included exhibits, rapid transit, public speaking, bus depreciation, publicity, membership, *Electric Traction* speed contest, and co-operation of manufacturers. The Illinois Electric Railways Association was reported as a new association member. Present membership stands at 770 company and 1,195 individual members.

B. I. Budd, F. R. Coates, W. H. Sawyer, Thomas Finnigan, J. H. Alexander, J. G. Barry and T. W. Casey were named by President Stevens as a nominating committee. An invitation from Barron G. Collier to hold the next meeting of the executive committee on the yacht *Florida* on the North River in New York on July 13 was accepted.

Exhibit

UP TO the close of business on May 5 a total of 116 companies had filed requests for 65,156 sq.ft. of space at the Cleveland convention. This was the outstanding fact in the report of Chairman J. H. Alexander of the committee on exhibit, presented at the meeting of the executive committee held in Washington on May 9.

Applications were mailed to members on April 14, which is a full month earlier than they were sent out last year. In a number of instances manufacturers who had small space last year have increased their requests this year. However, there have been some membership resignations among the smaller companies. Assignments of space will be made at a meeting of the exhibit committee to be held in Cleveland on May 16. In the meantime, Chairman Alexander suggests that operating member companies instruct their purchasing agents to direct the attention of all salesmen visiting them to the desirability of having their companies participate in the next convention with an exhibit. He is particularly anxious to have a good display of cars in the outdoor track spaces.

New Association Members

FOUR manufacturers, one state association and thirteen individuals were elected to membership in the American Electric Railway Association at the meeting of the executive committee held in Washington on May 9. Resignations were accepted from three operating companies and fourteen manufacturers, while one manufacturing company was dropped. The new members elected are:

MANUFACTURER COMPANIES

Cowdrey Brake Tester Organization, Inc., Fitchburg, Mass.
Curtin-Howe Corporation, New York.
DeLuxe Products Corporation, La Porte, Ind.
Reliance Manufacturing Company, Massillon, Ohio.

STATE ASSOCIATION

Illinois Electric Railways Association, Springfield, Ill.

Summary of Uniform Vehicle Code

PAMPHLETS giving a summary of a Uniform Act Regulating the Operation of Vehicles on Highways and a Uniform Motor Vehicle Operators' and Chauffeurs' License Act, as approved by the National Conference on Street and Highway Safety, are now being distributed by the American Electric Railway Association. This summary has been prepared for the convenience of legislators, state officials and others who believe in the principle of uniformity in traffic regulation and who, while not desiring to throw away the existing laws of their own state, are ready and willing to bring these into harmony with other states as far as practicable.

News of the Industry

Special Session of Illinois Legislature

In the formal call for a special session of the Illinois Legislature to give Chicago home rule and adequate transportation 22 items are included, thirteen of which pertain to Chicago. The call includes legislation for the consolidation of the transportation agencies in Chicago; the building of subways by special assessments, and permits the Legislature to repeal the law limiting street railway franchises to twenty years and to substitute any other fixed period of time, providing all franchises for more than a year shall be approved by the electorate concerned. The Governor's call instructs the Legislature not to consider any franchise which is "indeterminate or terminable."

Although he has not signified his approval of any particular number of years as being suitable for the length of the franchise, the items in the call which have to do with Chicago are to amend the public utilities acts so as to transfer authorities and duties now vested in the Illinois Commerce Commission in regard to Chicago public utilities to corporate authorities of Chicago or in a board or commission elected by Chicago citizens. There is a further suggestion of the need to enact a new law embodying the same provisions giving Chicago the legal right to grant and control franchises; amending the utilities act of June 29, 1921; amending a clause to provide for the incorporation of cities and villages; to give their officials power to permit, regulate or prohibit laying of tracks under terms and time limits not to be perpetual and if exceeding one year not to become effective without approval by a majority of the electors. Finally, the plan is to amend the cities and villages act to comply with the foregoing provision.

Any laws limiting the time of a permit to construct railroad tracks in any city, town or village would be amended, any such amendment to provide against a perpetual, indeterminate franchise. There is an additional suggestion of legislation providing for the construction of subways by special assessment and for the laying and operation of street railroad tracks and power lines. To further unification the Legislature is urged to enact laws or amend existing laws so as to authorize the consolidation and merger of corporations organized to carry passengers for hire.

Public Control Bill of Eastern Massachusetts Signed

The new law which extends for five years more the public control of the Eastern Massachusetts Street Railway

has just been signed by Governor Fuller. This makes the act operative. Under the terms of the new measure the board of trustees of the railway is reduced to three members, two of whom are to be appointed by the Governor and one by the directors of the road.

Legislation for Boston "El" Fails

Nothing has come of all the attempts that were made in the Massachusetts Legislature this year to legislate for the Boston Elevated Railway. Numerous propositions were suggested. All that came to a vote were rejected. The only measure not voted on was Elliot Wadsworth's proposal to return the road to

the stockholders; this was not pressed because it would undoubtedly have met with the same fate as all the other ideas.

Governor Fuller, who had said that he would keep the Legislature in session all summer, if necessary, to secure satisfactory Elevated legislation, called a conference on that subject on May 7, but no definite action has been announced. It is believed that the Legislature is so unsettled by conflicting views on public control, public ownership, private operation and rapid transit extension proposals that it cannot accomplish anything. In the absence of any legislation the Boston Elevated Railway will continue under public control, subject to two-years notice of termination by either side.

Business Must Build Permanently for Prosperity

Largest United States Chamber of Commerce meeting ever held goes on record to this effect. Walter A. Draper among the speakers

WITH an attendance exceeding that of any previous meeting the sixteenth annual session of the Chamber of Commerce of the United States got under way on May 8 in Washington under the most auspicious circumstances. Teamwork in business was the keynote of the meeting. This was based upon the conception that modern business is so interwoven there is a great common responsibility to build permanently for prosperity and to eradicate those elements and influences in each specific industry that tend to seek immediate profit at the expense of stability.

This modern business philosophy was voiced emphatically in an address by Judge Edwin B. Parker, chairman of the Chamber's board of directors. "The profession of business must be purged of those pirates whose acts stigmatize and bring business generally into disrepute," he declared. "Such individuals, unmindful of their duties to the public, inevitably bring upon themselves and the entire institution of business the thunderbolts of public wrath in terms of legislative and governmental regulation that hamper a legitimate freedom of initiative. Ruthless and selfish initiative must be curbed in the public interest and in the interest of legitimate business."

Lewis E. Pierson, the president of the Chamber, came out unequivocally for the maintenance of the Chamber's position on tax reduction. "That position," he declared, "was sound when your committee made its recommendations. It was sound when the member-

ship, by an almost unanimous vote, indorsed it. Nothing has occurred since to modify it. It is sound today. The Chamber is committed to the position that government income and government expenditures should substantially balance. Large surpluses are an inducement for demands on Congress for extravagant spending."

In spite of the great increase in the use of the private automobile, the number of revenue passengers transported by public means of transportation also has increased, it was pointed out by W. A. Draper, president of the Cincinnati Street Railway, at the Tuesday luncheon of the Transportation and Communication group. The more transportation facilities that are offered, he said, the more travel there will be. The difficulty, he said, is not in providing better transportation, but in getting people to pay for it. Some will be willing to pay for a faster and better service, but large numbers of people will continue to demand the form of transportation that can be provided at least cost. An abstract of Mr. Draper's address is printed elsewhere in this issue.

In its refusal to confirm John J. Esch as a member of the Interstate Commerce Commission, the Senate, it was declared by Samuel Dunn, editor of *Railway Age*, acted as a court of appeals and made a decision in the Lake Cargo case when it had not heard the evidence or the arguments.

"Adequate, dependable and speedy railway service, such as we now have,

is essential to sound, industrial, commercial and financial conditions," Mr. Dunn continued. "We cannot have such service long unless the railways are managed efficiently and in addition are fairly and efficiently regulated. The act to regulate commerce is restrictive enough—perhaps too restrictive. The substitution for it in actual practice of a still more restrictive policy, dictated largely by political considerations, is unfair to railway managers and investors in railway securities, and is a menace to our transportation service and a threat to the economic welfare of the country."

Because of recent scandals associated with men prominent in high business circles, Judge Parker stated that "America and American business are on trial before the world" and he challenged organized business to "cast the beam out of its own eye and set its house in order." He said:

Just as nations will decline to recognize a government committed to destroying the foundations of civilization, and just as the legal and medical professions purge themselves of unethical practitioners, so will business decline to recognize as a member of the profession of business, and trade associations will decline to receive into their ranks, or will expel, an individual or an organization that wilfully violates the fundamental principles upon which sound business rests, or that persists in ignoring the decencies of business intercourse, and besmatters all business with the slime of corruption or with the muck of unclean practices.

Government regulation of business and government ownership of businesses was also scored by Judge Parker. In this connection he said:

The Chamber of Commerce of the United States is committed to the principle that government should not enter the realm of business to undertake that which can be successfully performed in the public interest by private enterprise. This principle is politically and economically sound. It is in far less danger from the propaganda of radical agitators than from the members of the business profession who are faithless to their obligations, who break down public confidence, and who provoke government regulation.

This "cleaning of its own house" was advocated as the first step that must be undertaken, in the greater prosperity that is foreseen for American business.

Wages Advance in Cleveland

A wage increase of 2 cents an hour was announced by the Cleveland Railway, Cleveland, Ohio, effective May 1 for the benefit of 2,800 motormen and conductors on street cars and motor coaches. The new rates are 67 cents for the first three months, 70 cents for the next nine months and 72 cents thereafter. The men had demanded a 5-cent raise and recognition of the union. This latter the company refused, on the ground that the Ohio Supreme Court had held that it was against public policy for a utility to make a closed shop agreement. The increase will cost the company \$160,000 a year.

Joseph H. Alexander, president of the company, said the men deserved the

increase on account of the savings they had effected in accident and power costs. He announced that an adjustment will be made in the wages of shop employees. The shop week recently was reduced from a 54-hour to a 44-hour week, with no increase in the hourly rates of pay. This reduction in hours effected a saving of \$350,000 annually in shop expenses. Part of this saving will be consumed in increased rates of pay.

\$25,000,000 Terminal Project for Newark

Long-discussed plan involving use of canal bed by local railway comes to fruition. City Commission studying project

PROPOSALS likely to change the whole aspect of the center of Newark, N. J., and alter the present trend of population were made public on May 9 by Mayor Thomas L. Raymond. Envisioned in proposed contracts between the city and the Pennsylvania Railroad and the Public Service Corporation, operating Public Service Co-ordinated Transport, are the construction of a new Pennsylvania station at Market Street, which is also to be a bus and trolley terminal, the routing of the Hudson tube trains over the Pennsylvania tracks as far as South Newark and the consequent abandonment of the Manhattan Transfer and of the present tube terminal at Park Place, the creation of a high-speed trolley line along the right-of-way of the derelict Morris Canal from Pennsylvania station to the Belleville city line and extension of South Broad Street by viaduct over Pennsylvania tracks to connect with state highway No. 1.

In the proposed contract with the Public Service Corporation the city agrees to construct a two-track electric railway in the canal bed and construct stations along the route and build a terminal under the new railroad station. The Public Service Corporation agrees to supply the cars and the power with which to operate them and to pay the city 4½ per cent of the cost of building the stations and the terminal under the railroad station. The Public Service Corporation is to get credit for franchise taxes now paid in the city on all lines using the canal roadbed.

The railway to be built by the city in the canal bed would be leased to the Public Service for fifty years, with a renewal privilege of fifty years. After the first thirty years, either the city or the company could terminate the contract on two years' notice. The Public Service would carry maintenance and repairs on the railway during the terms of the lease.

The whole project will cost \$25,000,000, it is estimated. The city will spend \$7,000,000 in connection with the erection of the new Pennsylvania station and \$5,500,000 on the improvement of the Morris Canal bed. On its part the Pennsylvania will contribute \$12,500,000 toward the cost of the station. Five years will be needed to complete the work, which will begin as soon as the contracts are signed.

Hocker Line Resumes Service

After a cessation of ten months, service on the newly organized and rehabilitated Hocker line, now known as the Kansas City, Merriam & Shawnee Electric Railway, was resumed Sunday, May 6. Herman Sonken, president of the line, and W. K. Paul, vice-president, rode the first car over the line. At each of the 33 stations along the 7-mile route, they announced the restoration of service. On the present schedule, the first car will leave Rosehill, Kan., at 6 o'clock. Cars will operate on a half hour schedule in the rush hours and on an hourly basis through the remainder of the day. A fare of 3 cents a mile will be maintained, with regular city fares added from Rosedale into Kansas City.

On Saturday, May 12, the official opening celebration was to take place. A parade of cars from the Kansas City terminus of the line at Third and Delaware Streets, to Rosehill was scheduled. Officials of both cities, the Kansas City Public Service Company, 200 Kansas City business men and a 30-piece band were to be passengers. A barbecue was to be held in Shawnee Park at the conclusion of the parade.

Situation Unchanged in Columbia

Except for an increase in the number of buses operated by the Columbia Bus Company, Columbia, S. C., an independent, there has been little change in recent weeks in the transportation problem in that city—a problem that has been acute since March, 1927, when the cars of the Columbia Railway, Gas & Electric Company went into the car-houses. In the latter part of April, an appeal was taken to the United States Circuit Court of Appeals, sitting at Richmond, Va., from an order of United States District Judge Ernest Cochran revoking an order to stay proceedings in the state courts. The action in the United States Court is to compel the Broad River Power Company, the controlling company, to resume the operation of the street cars.

The Columbia City Council recently passed an ordinance under which a committee has routed the buses of the Columbia Bus Company on 30-minute schedules, but the unregulated 10-cent jitneys are still permitted to run as free lances. Licenses for these jitneys have been refused by the City Council throughout this year and it is believed that under the "route" ordinance they will be driven from the field as their main popularity has been their elasticity.

Another angle to the transportation problem is that in the election for two members of the Columbia City Council, practically every one of the 14 candidates gave his views on transportation, and a majority expressed the opinion that the railway was the ideal system. The two men elected, both serving their first term in Council, and both young, have declared their intention of doing what they could to give Columbia "adequate, dependable transportation."

R. P. Stevens Will Head Allied Power & Light Company

Company, newly formed, under which many important utility properties are being brought together. Well-known engineering and financial interests concerned

R. P. STEVENS has been elected president and B. C. Cobb chairman of the board of the Allied Power & Light Company, organized to consolidate the interests of Hodenpyl, Hardy & Company, Inc., and Stevens & Wood, Inc., New York. It has contracted to acquire substantial stock interests in Commonwealth Power Corporation, Northern Ohio Power Company, Penn-Ohio Edison and other companies.



R. P. Stevens

Systems of great magnitude are being brought together in the new affiliation. They are not only far flung geographically, but they embrace nearly every public utility activity, with no inconsiderable part made up of railway properties. To follow the companies through in all their ramifications would be quite impossible here, but their extent is indicated by the fact that their gross annual receipts are about \$50,000,000. This puts the properties well to the forefront of systems of this kind as earners.

Among the companies included but not necessarily in the order of their importance are the Commonwealth Power Company, the Penn-Ohio Edison Company, the Northern Ohio Power & Light Company, the Illinois Power Company, the Southern Indiana Gas & Electric Company, the Michigan Electric Railway, the Electric Railway Securities Company and the Sioux City Service Company. Through one affiliation or another the allied system will include the railways in Youngstown and vicinity, Akron and environs, Chattanooga, Nashville, Grand Rapids, Springfield, Ill., Sioux City and Saginaw and the Peoples Railway in Dayton as differentiated from the other roads there. This summary does not presume to be complete, but it does show that the properties included embrace city, suburban and interurban railway operations of vast proportions.

Mr. Hodenpyl and Mr. Hardy, who

have been largely interested in Hodenpyl, Hardy & Company, Inc., since its organization, will have substantial investment interests in the allied company, but will not actively participate in its operations.

B. C. Cobb as chairman and R. P. Stevens as president of the new company, with Landon K. Thorne, Alfred L. Loomis, Jacob Hekma, J. T. Harrington and H. S. Scarritt, will constitute the board of directors of the Allied Power & Light Company. Messrs. Thorne, Loomis and Scarritt are officers of Bonbright & Company, Mr. Harrington of the Penn-Ohio system and Mr. Hekma of Hodenpyl, Hardy & Company.

Mr. Stevens, in addition to being president of the new company, is President of Penn-Ohio Edison Company, which is just taking over the Northern Ohio Power Company, and chairman of the board of Stevens & Wood, Inc., also president of American Electric Railway Association.

Mr. Cobb, in addition to being chairman of the board of the new company, is president of Consumers Power Company, Northern Ohio Power Company and is vice-president of Commonwealth Power Company.

Hodenpyl, Hardy & Company, Inc., was organized in 1914 and with its predecessors has for more than 30 years been interested in the organization, development and operation of public utility properties. Many of such properties are now successful component parts of the Commonwealth Power Corporation System. Hodenpyl, Hardy & Company and associated interests were among



W. H. Sawyer

the pioneers in the development of the holding company plan of diversifying utility interests, the development of hydro-electric plants, the long distance transmission of electricity by high-tension lines, and in the distribution of securities on the customer-ownership plan.

Stevens & Wood, directly or through

their predecessor companies, for many years have engaged in the general engineering and construction business and the managing, supervising and financing activities of public utility corporations. In addition, their engineering work in the industrial field has been varied and considerable. Among their important power house undertakings at the present time are the Toronto station of the Ohio River Edison Company, the completion of the Fairbanks, Alaska, power station for the U. S. Smelting, Refining & Mining Company, and the design and construction of the new Deepwater power station at Wilmington, Del., for the American Gas & Electric Company and the United Gas Improvement Company, which is to be used jointly by these companies and also to supply process steam to E. I. duPont de Nemours & Com-



B. C. Cobb

pany. This latter is the first new station to be designed for 1,200 lb. steam pressure. It has attracted national attention on this account and on account of its many other progressive design features. Stevens & Wood, Inc., of which W. H. Sawyer is president, will continue business as at present as a subsidiary company and as consulting engineers. Hodenpyl, Hardy & Company will be dissolved. Management of the companies brought together will be under the new Allied company.

Bonbright & Company, Inc., expect to offer in the near future an issue of securities of the new company.

"Give and Take" Suggested in Omaha

President Shannahan of the Omaha & Council Bluffs Street Railway has submitted to the City Council of Omaha a proposal whereby the stockholders, bondholders and the bondholders' protective committee agree that if the city will not begin an ouster suit against the company when its franchise expires on May 22 next, the company will not object to the inclusion in the new franchise of a provision that the company waive all claims and rights under past franchises and ordinances upon which is based the claim to the possession of a perpetual franchise. The new fran-

chise is scheduled for submission to the voters at the November election.

The attorneys on both sides have filed a stipulation in the federal court in the case brought by the Guardian Trust Company for the bondholders to establish the right to a perpetual franchise setting forth the agreed facts. The case will be ready for immediate submission if a new franchise is denied, and will be dismissed if a new franchise is granted.

Oldest Horse Car Presented to Henry Ford

At a rather unusual ceremony on May 8, H. Hobart Porter, president of the Brooklyn City Railroad, Brooklyn, N. Y., presented to Henry Ford for installation in his museum at Dearborn, Mich., the oldest horse car of its type in existence. After an exhaustive search by Mr. Ford's agents the Brooklyn selection was made. This car, known

became a motorman. He still is in the company's employ on the Flatbush Avenue Line.

H. Hobart Porter, president of the railway, in presenting the ancient vehicle to Mr. Ford said:

In 1853, at the very inception of street car transportation, the Brooklyn City Railroad was organized by the citizens of Brooklyn in order that they might enjoy this then modern method of transportation. The funds for this company were secured by a door to door sale of its \$10 par value stock for \$10 in cash. During the 75 years which have intervened the Brooklyn City Railroad has never been in receivership or reorganized, and many of the owners of its stock today are direct descendants of the original purchasers. During this three-quarters of a century the management of the Brooklyn City Railroad has confined itself to endeavoring to serve the public and, I believe, has a very enviable record therefor.

I have heard it said, Mr. Ford, that you are the man that made walking a pleasure and I, who have a long memory and lived some years in the past century, have al-



P. & A. Photos, Inc.

Henry Ford drives model of yesteryear

in its time as a "Jigger," is a one-horse model and was originally placed in service in 1868.

For twenty years the car was operated on the crosstown line of the Brooklyn City Railroad from Hunters' Point, Long Island City, to Erie Basin in South Brooklyn. In 1888 the car was taken from this main line and replaced by a vehicle of the two-horse type. The original car was then put into service on a route from Hunters' Point to the 34th Street Ferry at the foot of Borden Avenue. Here, under the guidance of Michael O'Connor, long since passed away, it was operated until 1897, when this route was discontinued. The car was built by the Jones Car Company, West Troy, N. Y.

An interesting feature of the ceremony on May 8 was the fact that the driver in charge of the car was James P. Gregory, who entered the service of the Brooklyn City Railroad in 1884. He long served as a driver of horse cars, and with the advent of the electric car

ways taken exception to that statement. Long before the birth of the Model "T" there was a vehicle that made walking, running or swimming even a joy. There is that vehicle, the old horse car. It served a useful purpose and was superseded. It is a mute witness of another day.

Concluding he said that as Mr. Ford had done more than any other man to modernize the transportation methods of the world, it was fitting that this well-preserved relic of urban mass transportation should be entrusted to him and in behalf of the Brooklyn City Railroad and the people of Brooklyn he turned the car over to him for his museum.

Among the prominent men invited to attend the ceremony were the Honorable James J. Byrne, president of the Borough of Brooklyn; Barron Collier, Col. W. N. Dykman, E. P. Maynard, officials of the Ford Motor Company. C. E. Morgan, vice-president and general manager of the Brooklyn City Railroad, and other officers of that company also witnessed the presentation.

Vote in St. Louis Favors Strike

A strike of the St. Louis Public Service Company's trainmen and shop workers affiliated with the Amalgamated Association seems likely. On Wednesday, May 9, the question of a strike was submitted to the workers at secret meetings. Since then it has been announced that 4,455 men voted for and 16 against a walkout unless the company recedes from its stand against the increased wages sought by the men and its intention of forcing through a lower wage schedule when the contract expires on June 2.

On May 3 the company served written notice on the union officials that it had exercised the 30-day clause of cancellation and that so far as it was concerned the contract would be a dead letter on and after June 2. The time for the strike, if one is called, is up to a special committee appointed by the union. In the meantime it is understood the union will not abandon hope of reaching a satisfactory understanding, and negotiations will continue up to the expiration of the present contract.

To date neither side to the controversy has seen fit to use a clause in the contract under which disputes as to wages, etc., may be submitted to the Missouri Public Service Commission. Mayor Victor J. Miller has declined to act unless requested to do so by one of the disputants.

The present wages of the carmen range from 50 to 67 cents an hour, the average weekly wage being \$36. Shopmen under the scale asked by the union would receive an increase of 10 cents an hour and the carmen 5 cents. This would mean a total increase of \$2,833,000 in the annual payroll or 28.5 per cent, the union contends. The company's answer is, the increase would total far in excess of the union's figures. In turn it has asked that wages be cut 4 to 6 cents an hour. This would save 8.27 per cent on the payrolls and total \$837,000 annually. According to the company fares would have to be increased to grant the union's demands.

The decrease in the number of passengers carried in St. Louis since 1923, when the present wage scale went into effect, has reduced revenues \$5,790,000.

Sam W. Greenland, manager of the company, has expressed a willingness to conduct further negotiations with the workers.

Fare Change Impends at Harrisburg

According to the *Harrisburg Patriot* the Harrisburg Railways, Harrisburg, Pa., has in mind an increase in fares. The corporation's property is being inventoried and appraised. The same authority says that several plans for an increased fare are under consideration. One is to maintain the present 6-cent fare and eliminate the transfer. Another is to retain the transfer and raise the rate to 7 cents. Still another plan provides for fare zones.

Decision in Piedmont & Northern Case to Be Appealed

Suit is to be filed as a result of the recent refusal of the Interstate Commerce Commission to grant the Piedmont & Northern Railway permission to build a connecting link between its North Carolina and South Carolina divisions from Spartanburg to Gastonia and to extend its lines from Charlotte to Winston-Salem. At the time of the hearing of the case last summer, Mark W. Potter, New York, one of the attorneys for the company, stated that the railroad reserved the right later to question the commission's jurisdiction in such cases.

The Piedmont & Northern, through its proposed extensions, would have provided an outlet southward for the Norfolk & Western, which, with connecting lines, would have made possible formation of a new trunk line railroad to Florida. The Southern Railway, in particular, along with the Louisville & Nashville and the Seaboard Air Line, opposed the application, and the commission decided that the Piedmont & Northern was really a railway doing a general business, the only difference between it and other roads in the section being that it was operated by electricity.

Slogans in Philadelphia

Prizes have just been awarded by the Philadelphia Rapid Transit Company, Philadelphia, Pa., for three safety slogans suggested by its employees. Two winners were bus operators, the other a chemist connected with one of the power stations. The slogans follow:

The best safety device is located just above your ears. Use it.

Habits are easy to form. Make safety one of them.

Do your hesitating on the sidewalk, not in the street.

Be careful and take a look. After you have looked be careful.

"Aladdins of Industry" Distributed in Ohio

Complete and accurate information about electric railways is being put into the hands of the student generation of Ohio by a school textbook, "Aladdins of Industry," compiled by the State Committee on Public Utility Information. This book, now used by 1,152 high schools and colleges as a basis for their regular class-room work, has run into five editions, comprising 192,000 copies. All branches of public utility operation are discussed. The history of electric railways is traced, their growth pictured, present-day activities described and plans for the future discussed. Regulation, fares, taxation, cost of service and the like are treated at length.

In its study of textbooks then in use, the Ohio committee found the subject of utilities was generally confined to a chapter or less, the information often being sadly out of date.

The subject of regulation, where it was touched upon at all, stressed the need of regulation for the public's safety, but said nothing about the equally important function of protecting the utility industry's service to the public and its investors.

After due deliberation the committee decided a new book should be written that would tell the truth, the whole truth, and nothing but the truth about the utilities. The first few books off the press were sent rather diffidently to school officials with letters telling them that if the books met with their approval, and if they believed their students could use them with profit, more would be furnished free of charge. The response was very gratifying.

Progress Made Toward Changes in Toledo Operation

Representatives of the city and the Community Traction Company, Toledo, Ohio, have agreed upon major ideas in a plan for a solution of railway matters at issue in Toledo for several years. These grew out of features of the Milner service-at-cost plan that proved disappointing and the slump in car riding brought about by the tremendous gain in the number of privately owned automobiles. According to the program of Mayor Jackson, one of two suggested changes will be presented to the City Council on May 21.

Street Railway Commissioner E. L. Graumlich and David H. Goodwillie, member of the board of street railway control, had a large part in drawing up the new plan. Mr. Goodwillie is a former city service director and has served on the board during the entire six years of operation under the Milner ordinance.

The Community Traction Company will pay off a paving obligation of \$185,000 plus interest, and the Toledo Edison Company will reduce the power rate as agreed upon in recent negotiations. The Doherty interests have also agreed to provide nearly \$1,000,000 of new capital to finance the work of rehabilitating and extending the railway lines.

The company will also agree to purchase about 125 buses. In return the city plans to pass an ordinance which will prohibit independent bus lines from operating within a quarter mile of existing transit lines, a plan that could not be construed as monopoly under the city charter. Arrangements will be made to purchase at a fair appraisal the property of present lines which have no franchise or operating rights in the street.

Under the general plan no vote of the people will be necessary to put into effect several improvements and retain the general Milner plan.

Railway revenues have responded favorably as a result of increased employment in Toledo, and with the sinking fund requirements now eliminated, a surplus will probably be shown by the Community Traction Company each month.

Electrification Rumors About New York Central Revived

The New York Central Railroad has spent upwards of \$1,000,000 making a survey to study the advisability of electrifying its entire main line from New York to Buffalo, in which work about \$20,000,000 will be spent in electrifying its Buffalo terminals. This statement is attributed to William E. Robertson, vice-president of the Terminal Grade Crossings Commission, Buffalo, and vice-president of the Robertson Electric Construction Company, Buffalo.

Mr. Robertson says the information came to the commission in its negotiations with the New York Central Railroad. The announcement of reported plans of the New York Central was made by Mr. Robertson before a meeting of the Buffalo City Council in which he added that the company's lines within the city will be electrified within the next ten years. Mr. Robertson said:

The survey already completed by engineers for the New York Central indicates the electrification of the main line between Buffalo and New York will cost \$350,000,000. Carrying out the plan, of course, involves the matter of financing the change from steam to electricity on about 450 miles of main line track right-of-way and is consequently a matter on which the bankers and financiers must express their approval before work actually gets under way.

Mr. Robertson says he believes the work will be started within five years and will be completed within the ten-year period.

On May 9 the *New York Times* said:

Wall Street expects an announcement soon of plans for the electrification of the New York Central Railroad main line between New York and Buffalo. It is said that the large initial cost of electrification is the main obstacle in the way of realization of such a project, and the financial district reports indicate that \$100,000,000 annually would be required to be spent for three years to complete the work.

Nine Cents in Sioux City

A ten-day notice of an increase in its fares in Sioux City, Iowa, to 9 cents, with three tokens for 25 cents, effective May 10, was given recently by the Sioux City Service Company. Children's fares are 5 cents.

W. J. Bertke, vice-president and general manager, said that continuous decrease in revenue and increased taxation, necessitated the fare increase. Passenger revenue last year was \$246,716 less than in 1926. Under its franchise the company is allowed a 6.5 per cent return upon its appraised valuation of \$5,186,533 and the 8-cent fare, in force the last fifteen months, has failed to meet this limit. The operating return last year was \$211,806 below the \$337,125 permitted under the franchise. Operating revenue last year was \$814,535, of which all but \$6,887 came from passenger tariffs. The operating expense was \$696,758.

Recent Bus Developments

Another 25-Cent Line in Pittsburgh

Advantage was taken of the idea of direct mail advertising by the Pittsburgh Motor Coach Company, Pittsburgh, Pa., in connection with the establishment on April 23 of service on the company's fifth de luxe motor coach line, which connects the Highland Park district, a high-class residential section, with the downtown business section of Pittsburgh. The new route intersects one of the present lines in the East Liberty district, at which point transfers are issued to and received from the East Liberty line. The new route is 7 miles long. The fare is 25 cents with 21 tickets for \$5.

The letter to prospective customers was signed by T. W. Noonan, general manager. It was as follows:

Commencing Monday, April 23, motor coach service will be started between downtown Pittsburgh and the Highland Park district.

The new route will operate between the East End terminal, Callowhill Street and Highland Avenue, and the downtown terminal, Liberty Avenue at Grant Street. This route will operate via Euclid and St. Clair Streets, through the Shadyside and Oakland districts to downtown Pittsburgh via the Boulevard of the Allies as indicated by the inclosed schedule.

The fare will be 25 cents one way, with tickets on sale at 21 for \$5.

Transfers will be issued if you wish, to the present inbound East Liberty route (passengers to change at Penn Avenue and Highland Avenue) upon payment of regular fare, and will also be accepted from the outbound East Liberty route at Penn Avenue and Highland Avenue.

Powerful, roomy, comfortable and safe coaches are to be used, the very latest and best in motor coach design and manufacture.

Relieve yourself of the inconvenience, worry and nerve strain that always go with driving, by riding the coaches.

The motor coach company is a subsidiary of the Pittsburgh Railways.

Another Bus Purchase Reported in Washington

Purchase of the Montgomery Bus Line by the Washington Railway & Electric Company, Washington, D. C., is said to be under way. The bus line is owned and controlled entirely by citizens of Rockville. It was started some years ago as a jitney undertaking. Four buses now make thirteen round trips a day between Washington and Rockville, Md. They enter Washington via Massachusetts Avenue, and run to the bus terminal at Ninth and E Streets. Only recently the bus line obtained from the Maryland Public Service Commission the right to pick up passengers at any point along its route. Railway officials are said to have indicated that the bus service would be amplified and ar-

rangements made for transfers to the lines of the Washington Railway & Electric Company in the city. Despite these negotiations there is said to be no intention to abandon the Georgetown-Rockville Railway. On the contrary, the company is said to plan to improve the roadbed and renovate the cars. The Washington Railway & Electric Company recently took over the privately-owned bus route to Cheverly, Md., and is improving service to that suburban community.

Would Operate in San Leandro

Certain officers of the Key System Transit Company, Oakland, Cal., have applied to the California Railroad Commission for authority to operate a bus service in the city of San Leandro. It is the intention of the applicants to transfer the said operating right to a corporation which is being organized, and will be known as the Key System-San Leandro Bus Company.

Transfer in Binghamton

The Triple Cities Bus Lines, owned by Edward A. Dorey, has been granted permission by the Endicott Board of Trustees to transfer the Binghamton-Endicott bus routes to the Binghamton Railway Bus Lines, Inc., subsidiary of the Binghamton Railway, which now leases the bus line. The railway has been operating the route for some time and now desires to purchase it. It is necessary to secure permission from the communities through which a route passes before formal application is filed with the New York Public Service Commission requesting the transfer of franchise.

Symbolic Radiator Caps in Washington

NEW radiator caps, consisting of a miniature copy of the dome of the Capitol with wings on either side and the letters "D. C." on a plate in front have made their appearance on the buses of the Washington Rapid Transit Company, Washington, D. C. The device was designed by Harry Burlingame, a student at McKinley Manual Training High School, and was adjudged the best of all the designs submitted in the recent contest. The cap has been worked out in polished aluminum. The rules of the contest called for a device "symbolic of the District of Columbia as the Nation's Capital," and the winged dome was considered particularly appropriate. Incidentally, Mr. Burlingame received \$100 for his suggestion.

7½-Cent Fare Suggested on Philadelphia Substitute Line

Bus operation at a 7½-cent fare rate will be attempted by the Philadelphia Rapid Transit Company, Philadelphia, Pa., for the first time under the authority of two ordinances approved by the transportation committee of the City Council. The measures contemplate substitution of bus service for trolley lines A and B, one line operating from Bethlehem Pike and Germantown Avenue to City Line and Perkiomen Avenue and the other running over Perkiomen Avenue and Hillcrest Avenue to Erdenheim. The new bus routes, X and X-1, when finally approved by the Council, also will provide free transfer privileges for interchange with electric railway route 23.

A companion ordinance, authorizing the removal of tracks from the streets where the railway service will be abandoned, also was ratified by the committee. The usual bus fare is 10 cents, with 3 cents additional for exchange privileges. Coleman Joyce, of Philadelphia Rapid Transit counsel, pointed out that the northwest service merely contemplated a substitution of buses for trolleys and that no bus route through new territory was being established, as in the northeast. The advocates of the plan said they had taken into account the fact that the Public Service Commission might decline to approve the contracts after passage by City Council on the ground that the fare was not consistent with the established charge for bus service.

St. Louis-Alton Route Sought

A permit has been asked of the Missouri Public Service Commission by the Alton Railway, a subsidiary of the East St. Louis Railway, East St. Louis, Ill., to operate buses between St. Louis and Alton. The route would cross the Missouri River and the Mississippi River on new privately owned bridges being built near Fort Bellefontaine and Alton. The granting of the permit by the Missouri Public Service Commission will enable the Alton Railway to place in service on this new route the de luxe Blue Goose Motor Coaches.

Extension of Coach Route in Los Angeles Desired

The Los Angeles Railway and the Pacific Electric Railway have filed a joint application with the California Railroad Commission for permission to extend their Sunset Boulevard motor coach line. Permission is also asked to increase the one-way fare to 15 cents, to apply between Fifth and Hill Streets and Sunset Boulevard and Crescent Heights Boulevard; one-way fare between Fifth and Hill Streets and Sunset Boulevard and Western Avenue, 10 cents; one-way fare between Sunset Boulevard and Crescent Heights Boulevard and First Street and Vermont Avenue, 10 cents.

Commission Powerless to Act in New York-Canada Case

The Public Service Commission of New York has decided that it is without authority to entertain the petition by Melville L. Van Dyke for a certificate covering operation of a bus line from Shelton Square over certain streets in Buffalo as a part of a line to Fort Erie and Bridgeburg, Canada. A memorandum by Commissioner Pooley says:

From the cases considered by the United States Supreme Court and the courts of this state it appears that while bus operators, engaged exclusively in interstate business, are subject to regulation by the state to insure safety and convenience and the conservation of the highways and may be required to contribute to their cost and upkeep, they are not required to obtain either a consent from the local authorities or a certificate of convenience and necessity from the commission.

Van Dyke has been operating under a revocable consent by the city of Buffalo. The International Railway contended that it now afforded adequate service to the Peace Bridge and that operations by Van Dyke from Shelton Square would deprive it of revenue.

Boston-Lowell Route License Sought

The Eastern Massachusetts Street Railway, after an attempt to establish bus service between Boston and Lowell, Mass., has again applied for a license to operate this service. If permitted the proposed route will function via Cambridge, Arlington, Winchester, Woburn, Burlington, Billerica, Chelmsford and thence to Lowell. Trustees of the company announce that the plan is a restoration of a service rendered by the railway from Oct. 1, 1924, to May 1, 1925, but withdrawn at the request of the Boston & Maine.

Fred A. Cummings, vice-president of the Eastern Massachusetts, said that when the foundation for this route was laid four years ago the Boston & Maine made no protest although public hearings were held in each place; that his company invested \$200,000 in motor coaches but the Boston & Maine Railroad protested that the route was cutting into the railroad's revenues between Lowell and Boston. He declared that, in the public interest, his company is willing to join with the steam road in a joint operation between Boston and Lowell on equal terms.

Would Make Substitution on California Line

The Pacific Electric Railway, Los Angeles, has applied to the California Railroad Commission for authority to abandon service and remove its tracks on its Upland-Ontario line in the city of Ontario. A certificate of public convenience and necessity for the operation of a motor coach line between the cities of Upland and Ontario in place of the present railway service is sought.

Financial and Corporate

Segregation of Indianapolis & Cincinnati Properties Proposed

Two new corporations will be formed out of the property of the Indianapolis & Cincinnati Traction Company to serve the central southeastern part of Indiana. Charles T. De Hore and Leroy E. Eastman, purchasers of the railway at foreclosure, are reported to be planning to spend more than \$425,000 in the development of the property.

A company to be named the Indianapolis & Southeastern Railway will be formed, subject to the approval of the Public Service Commission, through the combination of two divisions of railway lines running, respectively, from Indianapolis to Rushville and Connersville, and to Shelbyville and Greenburg.

The second company, to be called the Southeastern Indiana Power Company, will be formed by the combination of power distribution business in twenty communities and towns with five small power companies serving twelve other towns in adjacent territory which had been bought in recently by Messrs. De Hore and Eastman.

Approval of \$1,000,000 Increase in Bonds Sought

A special meeting of the stockholders of Monongahela Street Railway, Pittsburgh, Pa., has been called to convene on May 29 for the purpose of approving of the proposed increase of the indebtedness of the company from \$4,400,000 to \$5,400,000 to provide funds to take up, pay off and discharge the first mortgage 5 per cent 30-year gold bonds of the company, dated June 1, 1898, and maturing June 1, 1928, consisting of an original issue of bonds in the face amount of \$1,000,000. The Monongahela Street Railway is included in the system of the Pittsburgh Railways.

Connecticut Company Sells Millerton Electric

The Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y., has applied to the Public Service Commission for authority to acquire the outstanding capital stock of the Millerton Electric Light Company, serving Millerton and the town of Northeast, and for approval of the merger of the Millerton Company with the Central Hudson Gas & Electric Corporation. The petition states that the capital stock of the Millerton company is owned by the Connecticut Company. It is planned to purchase the Millerton company's stock from the Connecticut Company and also to purchase a transmission line in Northeast forming part of a transmission line between Poughkeepsie and Falls Village, Conn., which connects the Central Hudson Company and the Connecticut

Company, for \$105,000 in cash and issuance to Connecticut Company of 2,000 shares of the no-par common stock of the Central Hudson Company. The Millerton and the Poughkeepsie companies serve adjacent territories.

Operating Profit on Michigan Suburban Line

The United Suburban Railway, the "shortest electric railroad with the longest list of stockholders in the United States," held its first annual meeting recently and reported an operating profit of \$2,950 at the close of its first seven months of service. This report covers operations from July 22, 1927, to Feb. 29, 1928, of the company, which leased the right-of-way of the Holland division of the Michigan Railways when that division discontinued operations on Nov. 17, 1926. It now operates its line from Grand Rapids to Jenison, 9 miles, with a 25-minute service. The stock in the company is held by the residents in the villages and along the right-of-way that the road serves.

No cash dividends were declared at the annual meeting but President E. F. McCarrick said he hoped that in a year the company would be in a position to pay a cash dividend on the investment.

Secretary Slaght reported that Grand Rapids banks, with faith in the project, had loaned the new company \$12,500 to start operations and that these loans had been reduced to \$9,000. Further, with \$7,450 soon to be available on unpaid pledges for stock the company would almost be in a position to pay off its indebtedness at the banks. His report showed the company collected \$27,198 in fares and \$500 income from all other sources during the first seven months. Operating expenses were \$24,747, and for repairs and maintenance \$2,566 was spent. The company's net worth on Feb. 29, 1928, was \$50,399.

Improvement in industrial conditions in Grand Rapids explained the satisfactory earnings in January and February. The construction of 40 modern homes along the interurban line in 1927 is a major development to the credit of the interurban company. The contractors decided to build these houses after the interurban line became a certainty. Many other homes have been erected in the suburban territory since the line resumed operations, giving fifteen-minute rush-hour service and 25-minute shopper service.

The suburban company has one competitor, the Andringa & Datema Bus Line, Inc., which made an offer in writing to the annual meeting to sell its franchise and equipment to the railroad for \$57,000. Stockholders of the railroad were only lukewarm toward the bus proposal, but a committee was appointed by President McCarrick to investigate.

Ohio Interurban Makes Good Showing

Both passenger and freight service developed intensively. Many obstacles overcome in first full year of operation of the Cincinnati, Hamilton & Dayton Railway

TRAFFIC and revenues of the Cincinnati, Hamilton & Dayton Railway, Dayton, Ohio, were adversely affected during the year by the general economic situation in the territory in which it operated. Beginning in March, 1927, a marked reduction in the volume of employment and output of the manufacturing enterprises in the Miami Valley, as elsewhere in the United States, was evident and became more pronounced as the year advanced. The tonnage shipments of the manufacturing enterprises were reduced in proportion substantially like the reduction in the man-hours worked; the volume of passenger traffic moving between points in the Miami Valley was also adversely affected. In Hamilton the reduction in the volume of employment was unusually severe, due, in part, to the partial shut-down of the plant of the Ford Motor Company throughout the greater part of the year. The total man-hours paid for by the larger manufacturers in Hamilton in 1927 were 81.5 per cent of those in 1926. Under these conditions travel decreased on local lines in Hamilton, the revenues being 6.1 per cent below those in 1926.

The results of operation during the year 1927 (the first full year of operation by the company) are as follows:

CINCINNATI, HAMILTON & DAYTON OPERATING RESULTS	
Gross revenue from railway operation...	\$1,065,056
Operating expenses including maintenance, rentals, general taxes and general interest.....	934,358
Net operating revenue.....	\$130,697
Other income.....	2,270
Total income.....	\$132,968
Interest on bonds.....	*63,846
Balance available for depreciation and surplus.....	\$69,121
Appropriation to renewal and replacement reserve.....	45,600
Balance transferred to surplus.....	\$23,521

*After deducting credit for interest during construction—\$16,466.

Despite this situation the passenger revenues of the interurban line in 1927 were 2.1 per cent in excess of those in the preceding year, while the total tons of freight handled in 1927 were 26.2 per cent in excess of the tonnage handled in 1926 and the freight revenues were 23.2 per cent greater in 1927 than in 1926.

Naturally it is a matter of gratification to the management that in the face of the economic conditions which prevailed during 1927 the gross revenues from operation of the entire property were 4.9 per cent greater than in 1926.

During the year 1927 the company secured the privilege of participation in the joint freight tariffs promulgated by the Central Freight Association, making possible better service to the manu-

facturers and shippers of the Miami Valley and the development of traffic which theretofore could not be attracted.

On Aug. 1, 1927, the company established a freight receiving station in the Cincinnati Terminal Warehouse in the heart of the wholesale district of Cincinnati. Prior thereto the only freight terminal which the company possessed in Cincinnati was at Cumminsville at the southern terminus of the interurban line, approximately 5 miles from the center of Cincinnati. The new downtown freight station attracted a large volume of business not previously obtainable which has steadily increased from month to month. Freight is transferred between the downtown terminal and Cumminsville by truck.

On Feb. 1, 1927, Richard Breckinridge was elected vice-president in charge of traffic. Under his direction the traffic department was enlarged substantially and the work of actively building up and soliciting traffic has been prosecuted vigorously. The results secured are reflected in the remarkable development of the freight tonnage and revenues in the face of a period of industrial depression.

TRAFFIC RESPONDS TO NEW ROLLING STOCK

On May 6, 1927, the company introduced new modern de luxe suburban type equipment on its Dayton city lines and at the same time increased the frequency of service on these lines approximately 25 per cent. As a result of this improved service and a vigorous publicity policy a very substantial and immediate increase in traffic on these lines was enjoyed while, at the same time, a marked reduction in operating expenses was effected. Similar cars, operated by one man, were introduced on July 15 into the local service between Dayton and Miamisburg. The total number of revenue passengers carried on the Dayton City-Dayton-Miamisburg lines was 14.6 per cent greater in 1927 than in the preceding year. On June 26 new interurban passenger equipment was placed in service on the interurban line between Dayton and Cincinnati. On the same day a local half-hour service was established between Hamilton and Cincinnati. This materially increased the volume of business carried between these cities.

On July 25 eight new automatic substations, embodying the latest features of construction were placed in operation. Their aggregate rated capacity was 3,800 kw. The old, obsolete and relatively inefficient 25-cycle substations were shortly thereafter dismantled and the equipment sold. During the first five months of 1927 the company generated 4,673,683 kw.-hr. at an average cost of 1.680 cents per kilowatt-hour.

During the last five months, in which the new substations were in operation and power was secured entirely from the Union Gas & Electric System, the company purchased 4,139,901 kw.-hr. at an average cost of 1.180 cents per kilowatt-hour. During June and July, in which a portion of the power used was generated and a portion thereof purchased, the total kilowatt-hours purchased and generated were 1,701,206 at an average cost of 1.798 cents per kilowatt-hour. The average consumption per car-mile was 3.70 kw.-hr. in 1927 compared with 4.35 kw.-hr. in 1926.

MOST MODERN SHOPS OF THEIR KIND

The main car shops at the time of the organization of the company were situated at O'Neils, about 5 miles south of Dayton. These shops were of inadequate capacity and were most poorly equipped as regards machine tools and other labor-saving devices. After much consideration the company purchased two large, modern steel and concrete shops and approximately 12 acres of ground on the main-line tracks at Moraine City, together with a full equipment of machine tools. Title to these shops was acquired on April 23. Immediately thereafter the work of installing tracks and making other changes necessary to fit them for their new uses was undertaken. On Aug. 15 the O'Neils shops were abandoned and the shop forces transferred to the new Moraine shops. The old car shops at O'Neils, and approximately 10 acres were sold upon advantageous terms. As a result the company now possesses what are probably the most modern car shops of any interurban in the United States.

Additions and betterments aggregating \$1,424,306 were made as follows:

ADDITIONS AND BETTERMENTS OF CINCINNATI, HAMILTON & DAYTON	
Paved track reconstruction in Hamilton.	\$49,272
Other track reconstruction and reconstruction	19,309
Telephone and distribution system reconstruction.....	6,887
Construction and reconstruction of stations and miscellaneous buildings.....	6,863
Roadway equipment and automobiles.....	9,310
New freight facilities at Hamilton, Cumminsville, etc.....	11,917
Eight new 60-cycle substations, including buildings, equipment, land, etc.....	176,432
Purchase and equipping new Moraine shops and offices, including yard tracks, and additions to Hamilton shops.....	569,647
Purchase of ten interurban cars, ten suburban-type cars, one freight motor, 25 freight box cars, reconstruction of certain Hamilton City equipment, etc.....	546,780
Miscellaneous items.....	16,142
Interest during construction.....	11,747
	\$1,424,306

During the year the company sold \$500,000 par value of its first and re-funding mortgage 6 per cent gold bonds, due 1941, at par and accrued interest to the reorganization managers as provided in the plan and agreement of reorganization. The company also sold upon favorable terms an issue of \$450,000 par value of equipment trust certificates, issued under the so-called Philadelphia Plan, due serially from Oct. 1, 1927, to April 1, 1937, the proceeds being used to pay in part the cost of the new passenger and freight equipment.

In this connection it should be explained that the Cincinnati, Hamilton & Dayton Corporation is a holding company owning all of the common stock (except directors' qualifying shares) of the Cincinnati, Hamilton & Dayton Railway.

No dividends have been declared or received on the stock of the railway owned by this corporation, and hence

CINCINNATI, HAMILTON & DAYTON CORPORATION AS OF DEC. 31, 1927	
Assets:	
Cash.....	\$10,075
Investments.....	3,599,460
Incorporation expense.....	16,093
	\$3,625,628
Liabilities:	
Prior debenture bonds due 1976.....	\$2,135,000
Adjustment income bonds due 1976.....	\$875,000
Less treasury bonds.....	26,250
Surplus—represented by 24,500 shares of no-par common stock of which, 105 shares are held in the treasury.....	651,878
	\$3,625,628

Note—In the item "cash" is included the balance remaining in the hands of the reorganization managers otherwise unappropriated which upon the completion of the work of the managers is to be delivered to the corporation for its general corporate purposes.

no interest has been declared payable upon the debenture bonds or on the adjustment income bonds of the corporation. Under the provisions of the indentures securing the bond issues the coupons maturing prior to Jan. 1, 1930, are void in the absence of affirmative action prior to the maturity dates thereof by the board of directors declaring the payment of interest thereon.

The reorganization managers, constituted under a certain plan and agreement of reorganization for the railway property of the Cincinnati & Dayton Traction Company, dated Oct. 1, 1925, practically completed their work before the close of the year but were not able to wind up their affairs and file their final accounts with the Wilmington Trust Company, Wilmington, Del., reorganization depository, prior to the close of the year. Under the plan and agreement of reorganization any balance remaining otherwise unappropriated is to be delivered by the managers to the corporation for its general corporate purposes and any securities of the corporation remaining in the hands of the managers, free from liens or other charges, are to be assigned and delivered to the corporation to be held by it as treasury securities.

Shelburne Falls Road Sold

Michael J. Brophy has sold at public auction for the trustees of the Shelburne Falls & Colrain Street Railway, Shelburne Falls, Mass., all the real estate, consisting of office buildings, power houses, machine shops, carhouses and rights-of-way belonging to the company, located in the towns of Shelburne Falls, Colrain and Buckland, to Carleton P. Davenport, Shelburne Falls. In addition Mr. Davenport also purchased all of the personal property, tracks, cars and other equipment of the railway.

Sault Ste. Marie Buys Line

The Sault Ste. Marie Traction Company, Sault Ste. Marie, Mich., became a community enterprise on May 1. The new owners, mainly business interests, industrial interests and working men, hope that the road can be made self-sustaining. According to the secretary there will probably be about 400 stockholders, of whom 250 will each hold one \$10 share. The former owners of the Sault Ste. Marie Traction Company, the Algoma Steel Corporation and Lake Superior Corporation, planned to suspend service, but realizing that it would be detrimental both to the business and industrial interests of the community to stop the service, these companies sold the road at its scrap value to the community. The system comprised 7 miles of track.

Muskegon Interurban Out of Business

The Grand Rapids, Grand Haven & Muskegon Railway, serving a territory in Muskegon County and northern Ottawa County out of Grand Rapids, Mich., ceased operations April 18. For 27 years this company transported thousands of citizens between the ten cities and villages along its lines and hundreds of thousands to the Lake Michigan beaches in the Ottawa and Muskegon country regions.

The death knell of the Muskegon interurban was sounded when Federal Judge Fred M. Raymond in United States District Court in Grand Rapids signed an order on March 24 ending the life of the railway on petition of the Guaranty Trust Company, New York. This petition asked that the Grand Rapids Trust Company, which had been receiver since July 31, 1926, be authorized to end its endeavors to put the road back on a paying basis. The Guaranty Trust Company was trustee for holders of \$1,500,000 in bonds upon which interest amounting to \$75,000 annually had been defaulted for a year prior to the receivership.

A report showed that on July 31, 1927, the close of the first year under the receivership, the interurban lost \$24,768, not including the interest on the bonds, and that these losses had multiplied during 1928 in spite of a valiant fight to avoid further deficits. Receiver's certificates amounting to \$30,000 had been issued to provide operating and other expenses up to the time the company ceased operations. More than \$20,000 is owed to the state of Michigan and counties through which the road operated.

Since the interurban company ceased operations its bus line has been more or less in public print. First, O. W. Hess, engineer of the Kent County Road Commission, proposed conversion of the interurban's right-of-way into a wider US16 trunk line where the railway now runs close to the highway. This recommendation is now being considered by the Highway Commission. Then the Greyhound bus line petitioned for a

franchise for its buses to operate on a route paralleling the old interurban line. Previously the interurban company had blocked this petition by supplementing its car service with rapid bus service on an hourly schedule. Finally, three applications were made to the State Utilities Commission for permission to operate freight-bearing motor vehicle lines connecting Grand Rapids, Grand Haven, Muskegon and Holland by the receivers for the Michigan Electric Railway, the Star Transfer Company of Grand Rapids and William Bronsema, Grand Rapids. The Grand Rapids Trust Company, receivers for the Muskegon interurban, opposed the petitions pending a deal whereby the Greyhounds might purchase the bus line service of the Muskegon company. Recently the deal was closed by the Public Utility Commission order whereby the Greyhound lines take over the buses and route of the interurban company known as the Lake Line Company. New schedules went into effect on May 7. They call for hourly service both ways.

\$38,000,000 Spent in Boston

There was expended by the trustees of the Boston Elevated Railway, Boston, Mass., between July 1, 1918, and Dec. 31, 1927, upon road and equipment, about \$38,375,000 as follows:

Cars and buses.....	\$18,779,000
Carhouses, shops and garages.....	6,288,000
Power houses and transmission of electricity.....	4,587,000
Surface lines (track and line betterment)	5,350,000
Elevated structures and appurtenances	2,128,000
Miscellaneous improvements.....	1,243,000
Total.....	\$38,375,000

When added to the total of \$3,434,000 which had been expended upon road and equipment in excess of any capital issues at the time the trustees took charge of the railway property on July 1, 1918, it made a total of about \$42,000,000 to be provided for during the first 9½ years of public control. The sources were:

Part of the proceeds from the sale of preferred stock which the stockholders were compelled to subscribe before the public control act could take effect.....	\$2,000,000
Proceeds from the sale of the Cambridge subway to the Commonwealth.....	7,868,000
Available from the depreciation charge July 1, 1918, to Dec. 31, 1927.....	21,680,000
Approximate amount received in settlement of fire insurance losses.....	1,000,000
The approximate cash proceeds resulting from the sale of real estate properties	1,850,000
Additional bonds issued against the preferred stock which was sold under provisions of the public control act..	3,000,000
Additional Boston Elevated bonds issued Feb. 1, 1927.....	1,926,000
Capital provided to Dec. 31, 1927....	\$39,324,000

Illinois Line Purchased

The electric railway lines of the Central Illinois Public Service Company running from the Southern Illinois State Hospital, Anna, to the tracks of the Illinois Central Railroad at Anna, were purchased recently by the Anna-Jonesboro Railroad. The price paid was \$134,399.

Book Reviews

Transit and Transportation

By H. M. Lewis with supplementary reports by W. J. Wilgus and Daniel L. Turner. Published by Regional Plan of New York and Its Environs, Volume 4, New York, N. Y. 226 pages.

Regional survey Vol. 4 is a sequel to that on traffic. Under the transit problem present conditions are discussed, the systems in New York City and in the suburban territory are described and an explanation is made of the relation of buses and surface transit lines to the rapid transit system. Under the transportation problem are included the railroad system, the waterway system and the airway system.

Part two of Volume 4 covers a study of port and industrial areas and the possibilities of the Hackensack Meadows.

In this volume Mr. Lewis has completed an interesting and valuable diagnosis of existing conditions. The supplementary reports of William J. Wilgus and D. L. Turner embrace a study of transportation in the New York region and the requirements of New York City rapid transit. The volume contains many maps, charts and diagrams.

The report presents the findings and conclusions of a large corps of experts in the fields of economic research, engineering and community planning, who have for six years conducted an intensive study of the situation in New York City and its 400 neighboring cities and villages, preliminary to the drafting of a plan for the future development of this city and the suburbs linked with it economically. It analyzes the plans contemplated or in process of execution for increasing the rapid transit facilities of northern New Jersey, Westchester County and Long Island. A conclusion is drawn that additional facilities should be planned to encourage a better balanced distribution of industry and population.

Bills of Lading

By Ernest W. Hotchkiss, LL.B. The Ronald Press Company, New York, N. Y. 287 pages. Price, \$5.

As Mr. Hotchkiss defines it, a bill of lading is a written acknowledgement of the receipt of personal property and a contract to transport and deliver it, at a certain place, to a certain person or his order, and when to order, is a document of title, acceptable for credit. It has four functions because it is: (1) a receipt; (2) a contract, and when made to order (3) a document of credit, and (4) an instrument of credit. Transportation contracts are of such vital importance to corporation executives, traffic managers, railroad officials, bankers, lawyers and shippers generally that a need exists for a statement of the present laws pertaining to bills of lading. "Bills of Lading" is an attempt to supply that need by bringing together references to related statutes concerning bills

of lading; decisions of courts; forms, regulations, and rules as published in the tariff structures of the carriers and approved by the Interstate Commerce Commission, all of which becomes a part of the contract of shipment within the federal transportation act. In addition to a table of cases cited, given in the early part of the volume, considerable material, with forms of the several bills of lading, and structures concerning them, has been included in appendices for convenient reference.

Electric Traction on Italian Railways

(La Trazione elettrica sulle ferrovie Italiane). Published by the Minister of Railways and Communication in connection with the Volta Centenary in 1927. Board covers, illustrated. 194 pages and 2 large maps.

In a country like Italy, where coal is expensive but waterpowers are abundant, it is not surprising that a great deal of attention should have been paid to railway electrification. In fact, in many forms of railway electrification, Italy was a pioneer. Thus, the Milan-Varese third rail direct-current road, installed in 1901 and 1902, was one of the most important of its kind up to that time, and the Lecco-Sondrio-Colico three-phase railway, built in 1902, was the pioneer of three-phase operation on a large scale. Up to Sept. 1, 1927, there had been built and put into operation by the Italian government heavy electric traction lines comprising 1,149.8 km. (718.5 miles) of route and 2,399 km. (1,499 miles) of track, and there was in course of equipment 257 km. (161 miles) of route and 744 km. (465 miles) of track. These lines in course of construction included the Foggia-Benevento line to be operated with 3,000 volts direct-current, and the Rome-Sulmona line to be equipped with 10,000-volt three-phase.

These figures, with a great deal of other very interesting information, are contained in a book recently issued by the Minister of Railways and Communication of the Italian government. It is divided into five sections as follows: General statistics and discussion; detailed information of the electrical equipment and distribution system of each of the lines of the State railway system; data on the sources of electric power supply; detailed information of the electrical locomotives; brief information in regard to 33 interurban electric railways not forming part of the State railway system. These lines have a total length of 1,005 km. (628 miles).

The book is very well illustrated, among the prints being two large maps. One shows all of the interurban and trunk electric railway lines in Italy. The other is on a larger scale and shows the electrified lines in the Milan-Genoa-Leghorn District, with their transmission lines.

Aladdin, U. S. A.

By Ernest Greenwood. Harper & Brothers, New York, N. Y. 265 pages. Price, \$2.50.

It was an ambitious task upon which Mr. Greenwood entered—that of attempting to set forth as briefly as possible something of the history and development of the spirit of electricity, together with its social, industrial and political implications and the tremendous change which it has brought about in our daily lives. He has succeeded to a degree that might at first seem improbable. To keep it within the boundaries of reasonable length, the book has, of course, been confined to the barest outline of the contribution made by applied electricity to the social and material welfare of the nation, but the choices which the author has made are judicious and the balance of the subjects is well preserved. This is all the more praiseworthy since it is apparent that each chapter might easily be developed into a number of volumes. There is some history, but not too much. There are some economics, but not too much. There is some technology, but not too much.

The foreword is by Thomas A. Edison. He says that despite the fact progress has been so rapid we may require a breathing spell in which to consolidate our gains, the electrical development of America is only well begun. If this statement needed to be borne out, Mr. Greenwood has done it in his own text. It is not always easy to agree with the appraisal on the jacket of a book, but in this case the text bears out the statement that Mr. Greenwood has written a fascinating record of the wonderful accomplishments of electricity and of the way it has contributed to American progress and prosperity.

American Electric Railway Association Proceedings for 1927

Published by American Electric Railway Association, 292 Madison Avenue, New York, N. Y.

The 1927 Proceedings contain a complete report of the twentieth annual convention held at the Public Auditorium, Cleveland, Ohio, from Oct. 3-7, 1927. Five volumes have been issued covering the work of the American Association and its affiliated bodies, the Transportation and Traffic Association; Claims Association; Accountants Association and Engineering Association.

500 Representative Public Utility Advertisements

Public Utilities Advertising Association, Jackson, Mich. Single copies \$10. In quantities of five or more, \$7.50 each.

The 1928 edition of the compilation issued annually under the above title is ready for distribution. The book is published by the Public Utilities Advertising Association, of which Donald M. Mackie, Jackson, Mich., is president this year. This is a collection of utility advertisements selected from among thousands submitted, by a competent committee.

Personal Items

A. E. Reynolds Heads Missouri Association

A. E. Reynolds, vice-president and general manager of the Springfield Traction Company, Springfield, Mo., was elected president of the Missouri Association of Public Utilities at the 22nd convention, held in Jefferson City, Mo., April 26-28. In 1926 Mr. Reynolds was elected to the presidency of the Midwest Electric Railway Association. This new honor adds something more to the active career of a man who has been identified with public utilities for many years. Before going to Springfield in 1923, Mr. Reynolds had been general manager of the United Traction Company, Albany, N. Y., and the Hudson Valley Railway, Glens Falls, N. Y. A review of his career was published in *ELECTRIC RAILWAY JOURNAL*, issue of July 24, 1926.

A. V. Bennett Vice-President of West Penn Power

A. V. Bennett, connected with the West Penn System, Pittsburgh, Pa., since 1918, has been elected vice-president of the West Penn Power Company. Before he entered the service of the West Penn, Mr. Bennett was associated with the American Water Works & Electric Company, Inc., as assistant superintendent of the Birmingham Water Works Company, Birmingham, Ala., and later as superintendent of the Arkansas Water Company at Little Rock, Ark. In 1918 he was transferred to the Pittsburgh office of the West Penn System as assistant to the president, later being made vice-president of the coal companies and several other subsidiaries.

H. G. McEldowney Added to G. E. Directorate

Henry C. McEldowney, president of the Union Savings Bank and the Union Trust Company, both of Pittsburgh, was elected a director of the General Electric Company at the organization meeting of the board held at Schenectady on May 8.

The stockholders, at their annual meeting, authorized the additional director, increasing the total from twenty to twenty-one. Other directors were re-elected. Mr. McEldowney is a director of the Mellon National Bank of Pittsburgh and of the Pittsburgh Chamber of Commerce. All other officers of the company were re-elected.

At noon on the day of the meeting, in the presence of 20,000 employees of the company and directors, a bronze tablet honoring the memory of Charles A. Coffin, founder of the company, was unveiled by Miss Alice Coffin, a

daughter. At this ceremony, Owen D. Young, chairman of the board, presided and the principal address was by E. W. Rice, jr., honorary chairman of the board and one of the oldest living associates of Mr. Coffin.

Changes on Sacramento Northern

Changes in the personnel of the Sacramento Northern Railway, San Francisco, Cal., are as follows:

Charles Elsey is now serving as vice-president; W. G. Bruen, secretary; D. C. DeGraff, auditor. J. R. Parke was formerly secretary and auditor. H. K. Faye is freight traffic manager and Bode K. Smith passenger traffic manager. These duties were formerly performed by R. D. Williams with the title of traffic manager.

ARTHUR J. METZDORF has been made manager of the Wildwood Amusement Park of the Twin City Lines on White Bear Lake east of St. Paul on the Stillwater suburban railway line, succeeding his father, the late P. J. Metzendorf. He has been a supervisor for the St. Paul City Railway.

Obituary

Edward W. Moore

Edward W. Moore, builder of city railways and pioneer in the promotion of interurban electric railways, died on May 8 at his home in Cleveland, Ohio, after a long illness. Mr. Moore had been identified with electric transportation in Cleveland and northern Ohio since electricity replaced the horse as motive power on city railways. He relinquished his last active electric railway connection when he retired from the presidency of the Lake Shore Electric Company several years ago.

Mr. Moore's connection with electric railway finance started in 1889, when he purchased stock of the East Cleveland Railroad. In 1891 he was a member of a syndicate which purchased and re-equipped the Wheeling Traction Company and another syndicate which bought the Toronto Railway and changed it from horse to electric power. Three years later the Everett-Moore syndicate built the Akron-Cleveland & Bedford interurban line, which later obtained control of the railways and the power and light plants in Akron and Cuyahoga Falls. These properties were the nucleus out of which later was evolved the Northern Ohio Power & Light Company.

In 1898 the Everett-Moore syndicate obtained control of the Cleveland Electric Railway, comprised of most of the independent lines in Cleveland, and op-

erated it until the Taylor grant became effective in 1910. During this period Mr. Moore and his associates, among them the late John L. Stanley, went through one of the trying periods of railway history in Cleveland in which the late Tom L. Johnson as Mayor was one of the participants. The Everett-Moore syndicate built the Cleveland, Painesville & Eastern Railway, which recently passed out of existence, and the Lake Shore Electric Railway. After his retirement from the presidency of the London Street Railway, London, Ont., he gave his attention to these properties and to the Detroit United Railway, of which he was vice-president for many years.

In addition to his interurban activity he also promoted nine independent telephone companies in Ohio.

Mr. Moore was born at Canal Dover, Ohio, 64 years ago. He is survived by his wife, a son and three daughters.

Paul T. Brady

Paul T. Brady, special representative in New York of the Westinghouse Electric & Manufacturing Company, with which he had been associated for 34 years, died suddenly on May 3 in Portland, Ore. He was 71 years old.

Mr. Brady was one of the pioneers of the electric light and power industry. Combining technical electrical knowledge with financial ability, he has left behind him more than a score of successful electrical systems. New York State owes to him much of its telephone system, electric power and electric railways. His work in Georgia, West Virginia and Alabama is of great economic value to those states. In spite of his years he was actively engaged in development work up to the very last day of his life.

After he was graduated from Phillips Exeter Academy Mr. Brady taught school for a brief period. Since 1881 he had been engaged in various branches of the electrical industry. In the Eighties he was with the American Telephone & Telegraph Company and helped the telephone system through the southeastern portion of New York State, also building some of the first electric light plants in this territory. In 1890 he joined the Thomson-Houston organization and became its manager for that state and the Middle West.

In 1894 Mr. Brady was appointed New York State manager for the Westinghouse concern, with headquarters at Syracuse. In 1907 he was transferred to this city as special representative.

Among the public utilities which Mr. Brady founded, reorganized or helped to develop, are the Rochester Railways, Rochester Gas & Electric Company, Niagara, Lockport & Ontario Power Company, Central Georgia Power Company, Virginia Power Company, Missouri River Power Company and South-eastern Light & Power Company. He brought into operation the 60,000-volt long-distance transmission line to carry power from Niagara Falls to Syracuse.

Manufactures and the Markets

Foreign Trade Combinations Can Be Made Valuable

Foreign business concerns have made great progress in consolidated trade effort. Exporters in this country should meet competition on even terms

CLEARLY the day of integrated mass trade effort, as a counterpart of mass production, is at hand, according to Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, in his address before the sixteenth annual meeting of the Chamber of Commerce of the United States, a report which is published elsewhere in this issue. The situation calls for sober factual analysis, calm planning, and courageous action; there is no room for emotional patrioteering on the one hand or supine defeatist submission on the other.

It was hoped that in the Webb-Pomerene combines had been found the answer to foreign collaborative competition, but the last decade of the operation of that act has revealed some unexpected obstacles to its complete success. Although some 57 export associations are now registered under it, only a small proportion of these are actively operating. Their total export trade in the last fiscal year was about \$200,000,000, a third of which was supplied by metals and minerals, another third by forest and food products, and the remainder by miscellaneous manufactures and partly processed goods. The bulk of the commodities, the traders in which avail themselves of the privileges of the act, were raw materials. They seemed to fit more easily into the scheme through the convenience of establishing uniform standardized documents, accounting methods, inspection and grading, allocation of cost quotas, and prorating of good will and other intangible assets.

Germany has led in the movement of consolidated international trade effort for two reasons: (1) more than 2,000 cartels and similar market and production agreements have thrived on her soil; and (2) she is dependent to an unusual degree on the restoration of unrestricted commerce on the Continent, where 75 per cent of her exports are now marketed, partly because of the loss of her colonies. In Austria some 65 corporations have consolidated in the past two years, several being "vertical" mergers linking the successive independent units of the given industry from raw materials through to finished production, along lines quite similar to those followed in the United States.

The experimental period of these post-war undertakings has scarcely gone far enough to warrant definite deductions as to their actual achievement in cutting costs, and in more effective

marketing operations. There is clearly an inclination in some European quarters to count too much on the economies of mass production—to over-play the "mass mania," which has been evident in so many of our own plants, not always with sound profit-making justification.

As a protection against consolidated selling, there is also much discussion regarding the possibility of consolidated buying. The Newton bill, recently defeated in Congress, proposed such a device, and somewhat similar measures and practices have been in use for years in other countries, notably in such lines as bauxite, vegetable oils, zinc, manganese and iodine. In the case of the American rubber import trade the principle has already been applied with considerable effect. It contributed very materially toward the collapse of the attempted producers' control.

Doleful observations have been made that, by proposing to authorize such temporary import defensive measures, we were simply indulging in the same form of criminality which we were condemning in foreign export circles. Careful comparisons, however, of the two

projects—collaborative buying and selling—reveals them as being of diametrically opposite type and purpose. In the minds of these critics who denounce any defensive spirit on the part of American consumers, apparently the only response which we should make is that of complete passive submission. However vicious and unscrupulous the operations of the given foreign combine might be (and there has been more than one episode of just such rapacity in recent years), we should under no circumstances meet aggression with aggression, so we are told, but rather should we undertake to reason with our assailants, to point out the error of their ways, and to dispel their dark intentions by the force of economic logic! In the presence of the burly realities of the trade rivalries and acquisitive aspirations of today, such amiable academic sophistry is nothing but solemn nonsense. The best defense on the part of the consumers, and the only honorable one, is through co-ordinated action under such proper restraints as are necessary in behalf of the general public interest.

The experience of some 2,000 trade associations in the United States offers abundant reasons for assuming large opportunities in internationalized trade collaborative effort. It is to be hoped, for example, that early headway will be made toward interchange of credit information among foreign traders throughout the world. There is a large field for consumer education on the part of many world trades. The need for collaboration in the furthering of uniform commercial legislation, for the interchange of statistical information along mutually helpful lines, for such valuable propaganda as highway education in behalf of automotive trades—along all of these and a hundred other lines are there abundant needs for combined effort in advancing the standards and possibilities of the world's commerce.

Exhibitograph No. 8

NEWS

UNEMPLOYMENT
POOR BUSINESS
PRESIDENTIAL CAMPAIGN
NERVOUS STOCK MARKET

STILL

after space applications for the A.E.R.A. show had been in the mail less than four weeks, requests had been received from 153 exhibitors for 87,601 square feet of space.

The Convention

is STILL nearly five months off. Notwithstanding all the scare headlines the wide awake, solid, substantial, manufacturer STILL has both feet on the ground and is showing the industry that he is carrying on as he has for years with the National Association, realizing the truth of the old saying

**Bread cast upon the waters
returns a hundred-fold**

Die Chasers Recommendation in Effect

A sufficient number of written acceptances having been received for Simplified Practice Recommendation No. 51, Die Head Chasers (for self-opening and adjustable die heads) recently revised by the industry. The division of simplified practice of the Department of Commerce announces that the project is now in effect, as of April 1, 1928, subject to annual revision or reaffirmation by the industry.

Electric Locomotive Shipments Up

Although only six electric locomotives were shipped in April of this year as compared to 23 shipped in April, 1927, the total domestic shipments for the first four months were 55 as compared to 52 for the same period in 1927, according to the U. S. Department of Commerce. The shipments during the

first three months were all higher this year than last. The unfilled orders totaled 42 on the end of April, 1927, and were 41 the last of the same month this year.

Consumer Production of Gases Foreseen

Large consumers of gases for welding and cutting may be potential gas producers, according to F. P. Wilson, Jr., General Electric Company, and, should economies justify the installation of equipment, consumers should be in a position to judge the relative merits of the apparatus available and determine which process would best suit the requirements with respect to the following factors:

The kinds of welding and cutting gases now used and possible substitutes; the effect of such substitutes on the selection of a process for manufacturing these gases; the economic need of consumer manufacture; the need of endeavoring to establish an economic balance between the gases used and the process selected for their manufacture, and the possibilities of applying these gases in industrial operations in which their use is now limited or in which it is non-existent.

Oxygen can be economically produced from the air by means of air liquefaction and subsequent fractionation, a physical process; or by the electrolysis of water, an electrochemical process. In the former case nitrogen is a by-product in the ratio of four volumes to one volume of oxygen. In the latter case hydrogen is a by-product in the ratio of two volumes to one of oxygen. Another commercial method of producing hydrogen in large quantities is by the liquefaction and fractionation of water gas. This latter process although used in Europe is not in general use in this country.

Acetylene and the electric arc have until recently been supreme in their respective fields of application in welding and cutting. Now, however, the economic supremacy of the former has been seriously challenged in welding as well as in the cutting to an extent which may result in an economic adjustment in the present system of gas manufacture and distribution.

The atomic-hydrogen flame has demonstrated characteristics which indicate its great value in many welding applications, and in many instances molecular hydrogen or city gas can replace acetylene as the fuel gas in cutting. Oxygen, the active agent in metal-cutting operations, will undoubtedly be used for years to come in this application and in constantly increasing quantities.

Because of the annual value of the gases used in many industries today, and the impending economic changes just over the horizon, the need is emphasized for a general knowledge of the relation existing between the process of manufacture and the use of these various gases.

\$60,000 for Dallas Tracks

Three track rebuilding plans to be carried out by the Dallas Railway & Terminal Company, Dallas, Tex., have been tentatively announced by the supervisor of public utilities.

The plans include the removal of street car tracks on Parry Avenue and their rebuilding within the Fair Park, the rebuilding of car tracks on Cole Avenue from Lemmon to Knox Street and paving between them, and the rebuilding of car tracks on Commerce Street between Exposition Avenue and the Houston & Texas Central Railroad. These three projects would cost more than \$60,000.

It was indicated that two other other improvement projects are being considered and will be incorporated in the plan before it is finally adopted.

T-Rails for Galveston

Permission has been granted the Galveston Electric Company, Galveston, Tex., by the city commissioners, to install T-rails instead of girder rails on Market Street from Nineteenth to Sixth Streets. The contract for the paving of the street has already been let and it is likely that the electric company will soon begin work on the installation of the new track and concrete surfacing.

Thirty More Cars for Mexico Tramways

In addition to the twenty single-end cars delivered last October to the Mexico Tramways, Mexico City, the J. G. Brill Company, Philadelphia, Pa., has just delivered to the same company, 30 double-end cars.

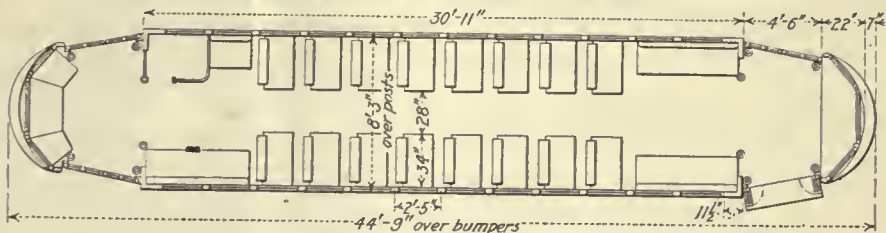
These cars are 44 ft. 7 in. long, 8 ft. 5 in. wide and weigh 33,500 lb. They

are of the two-man type and seat 50 passengers. The trucks have a wheelbase of 4 ft. 10 in., weigh 5,212 lb. each, and are equipped with outside-hung motors.

The finish is in Durban red enamel. The interior is trimmed in aluminum. An interesting feature is the use of ventilators over the vestibule windows.



One of the double-end cars just delivered to the Mexico Tramways



Floor plan of the Brill cars for Mexico Tramways

Name of railway	Mexico Tramways, Mexico City, Mexico	Couplers	Self-supporting radia
Number of units	30	Curtain fixtures	Curtain Supply Company
Type of unit	Two-man, motor, passenger, city double end, double truck	Curtain material	Pantasote
Number of seats	50	Destination signs	Hunter
Builder of car body	The J. G. Brill Company, Philadelphia, Pa.	Door mechanism	National Pneumatic
Date of order	12/14/27	Fare boxes	Cox
Date of delivery	10 cars 3/22; 10 cars, 3/31; 10 cars, 4/13	Finish	Enamel, Sherwin-Williams Old Dutch railway
Weights:		Gears and pinions	Grade M
Car body	15,585 lb.	Glass	D.T.A.
Trucks	10,425 lb.	Hand brakes	Peacock Staffless
Equipment	7,490 lb.	Headlights	Crouse Hinds
Total	33,500 lb.	Headlining	Agasote
Bolster centers	19 ft. 11 in.	Interior trim	Aluminum
Length over all	44 ft. 7 in.	Journal bearings	Plain
Length over body posts	30 ft. 11 in.	Journal boxes	Brill, semi-steel
Truck wheelbase	4 ft. 10 in.	Lamp fixtures	Brill-G. E.
Width over all	8 ft. 5 in.	Motors	G.E.-275B, outside-hung
Height, rail to trolley base	10 ft. 6 1/2 in.	Painting scheme	Durban red
Window post spacing	29 in.	Roof material	Poplar covered with canvas
Body	Semi-steel	Safety car devices	Safety Car Company
Roof	Arch	Sash fixtures	National Lock Washer
Doors	End, folding	Seats	Brill No. 103
Air brakes	General Electric	Seat spacing	30 1/2 in.
Armature bearings	Plain	Sealing material	Birch slats
Axles	A.S.T.M.-A-2-27	Slack adjusters	American Brake Company E-1
Car signal system	Faraday	Steps	Folding
Compressors	CP 27-B	Step treads	Kass
Conduit	Metal	Trolley catchers	U. S. No. 13
Control	K	Trolley base	Brill 76-E-1
		Trucks	Brill exhaust
		Ventilators	Brill exhaust
		Wheels, type	Root life guard
		Wheelguards	Root life guard

Four Cars for Lackawanna & Wyoming Valley

Four cars were ordered by the Lackawanna & Wyoming Valley Railroad, Scanton, Pa., from the Osgood Bradley Car Company on April 18, as mentioned in the April 21 issue of the JOURNAL. The cars are to be of the two-man interurban type. Each car is to be 63 ft. 2 in. long, 9 ft. 3 in. wide. The weight will be 81,000 lb., and there will be seats for 76 passengers. The cars are to be equipped for both 600-volt third rail and overhead trolley operation. Complete specifications are given in the following table:

Name of railway	Lackawanna & Wyoming Valley Railroad, Scanton, Pa.
Number of units	4
Type of unit	Two-man, motor, passenger, interurban, double-end, double-truck
Number of seats	76
Builder of car body	Osgood Bradley Car Co., Worcester, Mass.
Date of order	April 18, 1928
Date of delivery	July, 1928
Weights:	
Car body	39,000 lb.
Trucks	25,000 lb.
Equipment	17,000 lb.
Total	81,000 lb.
Bolster centers	40 ft. 7 in.
Length over all	63 ft. 2 in.
Length over body posts	52 ft. 5 in.
Truck wheelbase	7 ft. 0 in.
Width over all	9 ft. 3 in.
Height, rail to trolley base	13 ft. 2 in.
Window post spacing	32 in.
Body	Semi-steel
Roof	Monitor
Doors	End, sliding
Air brakes	Westinghouse Air Brake Co., Automatic
Armature bearings	Plain
Car signal system	Westinghouse Air Brake Co.
Compressors	DH-25
Conduit	Flexible and metal
Control	Westinghouse AB
Couplers	Tomlinson
Curtain fixtures	Curtain Supply Co., ring type
Curtain material	Double faced pantasote
Door mechanism	Hand
Finish	Paint
Floor covering	Battleship linoleum
Glass	Plate
Hand brakes	Horizontal ratchet type
Heat insulating material	3-ply salamander
Heaters	Consol. Car Heating Co., R1501, A 500 watt
Headlining	4-in. Agasote
Interior trim	Mahogany
Journal bearings	Plain
Lamp fixtures	Electric Service Supplies Co.
Motors	Two, Westinghouse 557-D8, outside hung
Painting scheme	Maroon
Registers	Ohmer
Roof material	Steel frame, wood and duck
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn, Spec. 392 EE
Seat spacing	32 in.
Seating material	Chase plush (leather in some)
Steps	Stationary, steel
Step treads	Anti-slip
Trolley retrievers	Earl 5A
Trolley base	No. 3 Sterling
Trucks	Baldwin 84-35 AT & AA
Ventilators	Osgood Bradley duplex auto
Wheel diameter	33 in.

Electrical Glossary Published

For guidance in properly listing and classifying electrical apparatus and supplies in shippers' export declarations the Bureau of Foreign and Domestic Commerce, Washington, D. C., has compiled a glossary of electrical terms and instructions to exporters. Each item is listed alphabetically giving opposite each the class number and unit of quantity. A second listing contains the items listed by numbers. The foreword consists of articles of customs regulations for the guidance of exporters.

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

	May 8, 1928
Metals—New York	
Copper, electrolytic, cents per lb.	14.0125
Copper wire, cents per lb.	16.00
Lead, cents per lb.	6.10
Zinc, cents per lb.	6.3125
Tin, Straits, cents per lb.	51.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	4.20
Somerset mine run, f.o.b. mines, net tons	1.875
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.40
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots) N. Y., cents per lb.	10.60
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.25
Turpentine (bbl. lots), N. Y., per gal.	\$0.5875

ROLLING STOCK

MONTREAL TRAMWAYS, Montreal, Canada, plans the purchase during 1928 of 58 buses of the 37-passenger, 15,000-lb., 90-hp. type. The bodies are to be constructed of duralumin and steel.

SAN ANTONIO PUBLIC SERVICE COMPANY, San Antonio, Tex., has purchased one 21-passenger, street car type, bus from the Studebaker Corporation, South Bend, Ind.

BOSTON ELEVATED RAILWAY, Boston, Mass., will purchase 28 gas-electric buses. Ten will be manufactured by the Twin Coach Corporation, Kent, Ohio, eleven by the American Car & Foundry Motors Company, New York, and seven by the Versare Corporation, Albany, N. Y. All buses will be equipped by the General Electric Company.

TRACK AND LINE

SPRINGFIELD STREET RAILWAY, Springfield, Mass., is planning to renew ties at various points on Carew Street.

LOUISVILLE RAILWAY, Louisville, Ky., is doing considerable track raising on Fourth Avenue at the present time, having raised the crossing at Fourth and Jefferson Street during the past week. The street has dropped as much as 6 in. in some places between Broadway and Main Street, as a result of the driving of a large sewer tunnel.

TRADE NOTES

BLACK & DECKER MANUFACTURING COMPANY, Towson, Md., has recently made the following changes in their sales organization: H. L. Balke is with the Kansas City branch, covering the territory around Omaha, formerly covered by Mr. S. D. Shawgo; G. F. Parr is with the Buffalo office, and has taken over the territory of J. H. Hutton; G. N. McCarthy has filled the vacancy at the Buffalo office, made by H. B. Austin, who has been transferred to Chicago; J. A. Murray is working in Baltimore, taking over the accounts formerly

sold by Curtiss Watts; H. B. Hazerodt has resigned as manager of the Detroit branch and J. H. Walker, who has been a salesman in that territory, has been appointed manager. The new Detroit branch office is located at 11501 Woodward Avenue.

ROME WIRE COMPANY, Rome, N. Y., has appointed L. A. Zima district engineer in the New York office. Mr. Zima was formerly cable engineer in charge of design and specification of cables for power stations substations, and transmission and distribution systems of the Brooklyn Edison Company.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has appointed C. W. Stone, formerly manager of the central station department, to the position of consulting engineer, and has selected M. O. Troy as manager of the central station department.

IDEAL COMMUTATOR DRESSER COMPANY, Sycamore, Ill., has appointed Superior Supply Company, Bluefield, W. Va., as sales representative for the sale of ideal commutator resurfacers and other maintenance equipment in the Bluefield territory.

ROLLWAY BEARING COMPANY, Syracuse, N. Y., announces the appointment of Alfred E. Munch, Jr., as representative in the Chicago-Milwaukee district, with headquarters at 544 Railway Exchange Building, Chicago.

ADVERTISING LITERATURE

INGERSOLL-RAND COMPANY, 11 Broadway, New York, has just completed the sixth edition of its 140-page, two-color book, entitled, "100 and 1 Ways to Save Money with Portable Compressors." In this book the company has embodied comparative cost data on its portable air compressors and air-operated tools. The information has been put together in handy reference, cross index form. In most cases, figures are presented on a man-hour basis so that they can be readily applied to local conditions in any part of the world. Free copies may be obtained by writing to the company in New York or at any of its local branches.

MARTINDALE ELECTRIC COMPANY, Cleveland, Ohio, announces a new No. 10, 36-page catalog on motor maintenance equipment.

JOHN C. DOLPH COMPANY, Newark, N. J., has published a solvent and calculating chart for insulating varnish. It enables the user to determine the correct amount of solvent needed to bring the varnish to the required gravity for dipping. It also includes directions to determine the number of gallons of varnish contained in removable head drums.

AMERICAN CAR & FOUNDRY MOTORS COMPANY, New York, has published two booklets descriptive of A.C.F. parlor coaches and A.C.F. de luxe urban coaches.



A service requirement— Maximum platform space!

In considering specifications for those new cars, give just consideration to the question of platform space. Consider only the equipment that will occupy a minimum of such valuable space.

Their requirement of very little platform space is but one of the many advantages which have made "Peacock" Staffless Brakes standard equipment on nearly all modern cars.

Three times the braking power of ordinary hand-brakes, almost unlimited chain-winding capacity, easy operation, low installation and maintenance costs, and their unfailing reliability are other factors which have led to their popular adoption.

Why not get the complete "Peacock" Story which discloses in detail the reasons why nearly all modern cars are using them?



The
Peacock
Staffless

National Brake Company, Inc.

890 Ellicott Square

Buffalo, N. Y.

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



75

Timken-Equipped Cars for Cleveland Railways

CREATED for high efficiency, the Duplex Articulated street car is made still more efficient by Timken Bearings. Timken-equipped journals have been specified by the Cleveland Railway Co. for 25 of these cars and for 50 single cars. All of these cars are Timken-equipped Kuhlman-Brill cars—the largest order ever placed for roller bearing street cars!

They assure much smoother travel and far-reaching economy. The fast, jerkless starting signifies reduced frictional resistance which saves lubricant, power, motors, and wear and tear.

Extreme endurance, due to Timken full thrust capacity, and greater load carrying area, eliminates most journal maintenance.

High wear-resistance and low rolling resistance are combined in Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken-made electric steel. That is the reason for Timken eminence in every type of rail transportation.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN

Tapered

ROLLER BEARINGS



The Passenger's Comfort *isn't all in the seat* , , ,

A LOT of it's "below the axles"

—the physical comfort of easy-flexing, smooth-rolling Goodrich Heavy Duty Silvertowns

—plus the mental comfort of a safe, sure, road-biting grip where the tread meets the road.

Back of it all is a carcass with extra

strength—extra toughness. Extra rubber between the outer plies anchors the tread and cords together. Water Cured rubber—cured so accurately that these tires are tough clear through.

Comfort — safety — economy — longer mileage and better performance for each mile in the total—these factors are winning and keeping a place for Goodrich Heavy Duty Silvertowns—on some of the biggest fleets on the road.

THE B. F. GOODRICH RUBBER COMPANY *Est. 1870*
Akron, Ohio Pacific-Goodrich Rubber Co., Los Angeles, Calif.
In Canada: Canadian-Goodrich Rubber Company, Kitchener, Ont.

Goodrich

HEAVY DUTY

Silvertowns

HIGH PRESSURE OR BALLOON

The Electric Railway Industry writes
its own recommendation

For **YELLOW**

*Again in 1927 as in
1925 and 1926 more
Yellow Coaches were
purchased by Electric
Railways than any
other make.*

*And a greater
percentage of Electric
Railways bought
Yellow
Coaches*



COACHES



General Motors Truck Company
Pontiac, Michigan



Part of the layout floor in the Bethlehem Frog and Switch Plant at Steelton, Pa.

Why Bethlehem Track Layouts Assemble in the Field *Without a Hitch*

Because every Bethlehem Special Track Layout is carefully fitted together *under cover* by skilled workmen, in heated and well-lighted shops, where the ideal working conditions promote care and accuracy. This assures freedom from trouble due to improperly fitted parts, when putting together in the field. Assembly without a hitch!

Below is a partial list of Bethlehem Products for Electric Railways:

Rolled Alloy Steel Crossings
Machine Fitted Joints
Rolled Steel Wheels Bolts
Hard Center Frogs Tie Plates
Abbot Base Plates
Forged Axles Splice Bars
Hard Center Mates Tie Rods
Pole Line Material
Tee and Girder Rails
Center Rib Base Plates

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporters of Our Commercial Products.

BETHLEHEM

102 YEARS OF MANUFACTURING EXPERIENCE

Rattan car seat webbing may be ordered through any H-W sales office



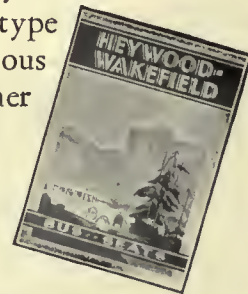
No. 55 P-X

BRINGS PULLMAN COMFORT TO THE INTERURBAN CAR!

THIS beautiful de luxe seat, mounted on our new revolving base, brings to the interurban car all the comfort and convenience of the finest parlor car chair. Deep, spring-filled seat cushions and backs, make this the most luxurious and comfortable car seat made today.

The seat revolves easily by pressing the foot pedal which is handily located on the steel base. The revolving mechanism has been purposely made as simple and as strong as possible so that there is nothing to get out of order. If you are interested in making your interurban cars the finest and most comfortable type in use today, by all means give the 55 P-X, as shown, your serious consideration. The base illustrated will also accommodate other car seats which we make.

If you have not received a copy of our new Bus Seat Catalogue, write for it.



Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Company, Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Company, Houston, Texas. John R. Hayward, Liberty Trust Building, Roanoke, Va. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.



*"We never have
any trouble in
the way of
CHASSIS and
UNIVERSAL
lubrication"*

← This is what
Yellowway, Inc.
"The Longest Bus Line in the world,"
says about

TEXACO MARFAK GREASE

The buses of this company operate under the hardest kind of service.

Each bus weighs 11,800 pounds empty.

Each hauls from twenty-five to thirty passengers.

The motors are rated from 55 hp. to 103 hp.

If your own buses are subjected to hard service (where is the bus that isn't?)—if you "never want to have any trouble in the way of Chassis and Universal Lubrication" try **TEXACO MARFAK GREASE**. This grease is way ahead of any other universal joint lubricant on the market.

It is soft, pliable and plastic and has decided non-fluid tendencies. It is noted for its ability to "train" or adhere to itself and to the wearing surfaces. (In much the same way that bread dough adheres yet strings out).

TEXACO Marfak Grease resists heat and centrifugal force. It will not break up under the roughest kind of treatment.

Best of all, TEXACO Marfak Grease is an all-purpose grease. Use it on Universal Joints, wheel bearings, brake connections—any place in fact, where there is provision for pressure lubrication.

It's economical, too, and lasts a long time.

We shall be glad to demonstrate **TEXACO MARFAK GREASE** on any of your buses, any time. Try it.

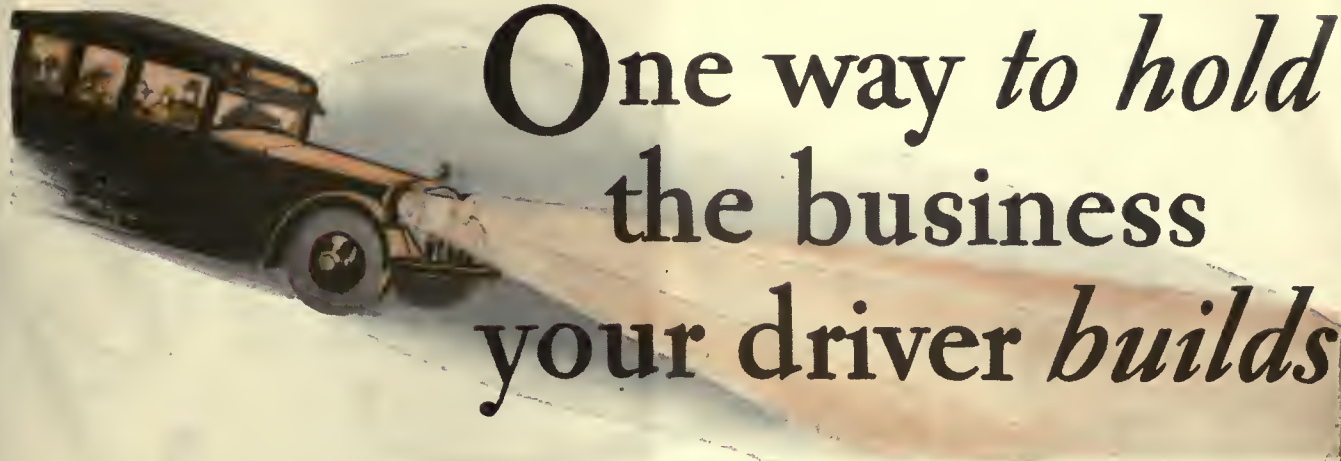
THE TEXAS COMPANY

Texaco Petroleum Products

Dept. E5, 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES





One way to hold the business your driver *builds*

*Don't let
POOR LIGHTS
tear down the business
his courtesy and skill
are building up.*

A COURTEOUS driver, keen and alert, can do much to build business. Good lights, well placed, giving reading comfort to the coach passengers, are a material aid in holding this business. On the other hand, business suffers if lights grow dim.

No ordinary power plant can keep lights at their brightest in the motor coach. Long hours of operation, heavy lamp load, gruelling day-in-

and-day-out service—call for extra power—extra stamina. Only a generator of the right capacity, in combination with a dependable battery of the proper size, can handle the job satisfactorily.

Well-paying coaches

That is why owners of well-paying coaches use the Exide Motor Coach Battery. It is specially designed for this battery job, by engineers who know how difficult that job is.

Profit two ways

Besides insuring good lights for drivers and customers, these owners are lighting their coaches at the lowest operating cost per mile. Thus they profit two ways . . . they save money by cutting operating costs—they make money by building and maintaining business.



THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, Toronto

LB Lang

The Sterling Mark on Bus Bodies



A Lang Body—whether built on a new chassis—whether built on an old chassis—whether our new all metal job:

Produces the same results

The Lang

Bodies

*“After all—
it's the Setting
that counts!”*

PASSENGER Attraction—Passenger
Comfort—Increased Revenue—
Longer Life—Lower Maintenance
Cost.

Answers every problem of the operator.

What More Can You Buy At Any Price



*Body Co., Cleveland
Ohio*



—the Upholstery
that invites and
holds patronage
—saves and serves
as only this regal
Mohair Velvet can



Chase VELMO—Made by Sanford Mills, Sanford, Me.
L. C. Chase & Co., Selling Agents, Boston
New York - Atlantic City - Detroit - San Francisco - Chicago

The Upper Ray

The Lower Ray



**THE BETTER YOU SEE
THE SAFER YOU GO.**

Driving at night, whether it's out on the open road or thru crowded city streets, the better you see, the safer you go.

Thus is it explained why Guide Tilt Ray Headlamps have come into such popular favor with makers and operators of automobiles, trucks, and motor-coaches.

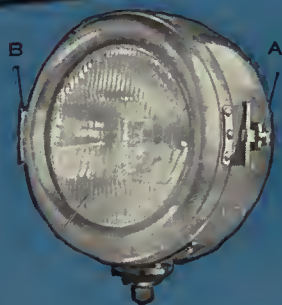
Guide Tilt Rays furnish the kind and volume of light necessary for all conditions—the upper ray for faster open road driving, the lower ray for city driving and passing—always under control without removing the hands from the steering wheel.

If you would make your night operations safer, equip with Tilt Rays. Catalog on request. Address Fleet Sales Department, The Guide Motor Lamp Manufacturing Company, Cleveland, Ohio.

Guide
**TILT RAY
HEAD LAMPS**

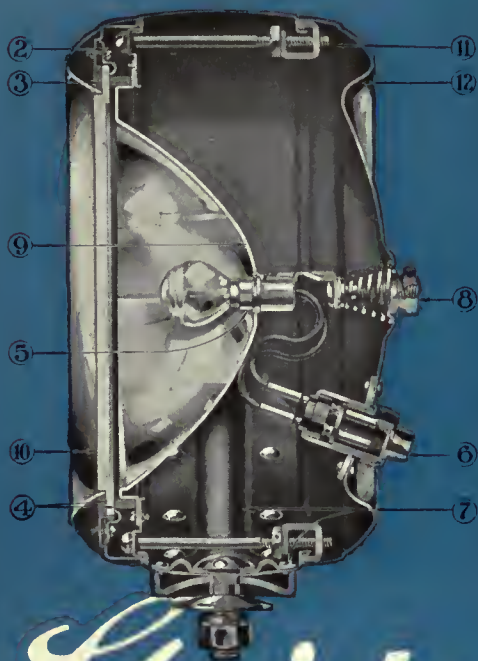
A DOZEN REASONS

WHY TILT RAYS STAND THE STRAIN OF HEAVY DUTY SERVICE



A—Thumb screw catch that makes the opening of lamp door easy, simple and positively locks door securely.

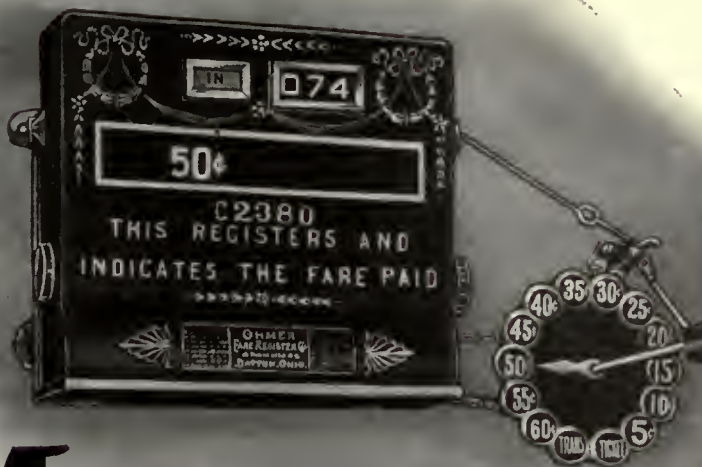
B—Hinge for door of lamp.



- 1 An upper and lower ray.
- 2 Door stiffener on inside for reinforcing purposes with glass ring that positively holds glass in place at all times. No danger of glass dropping out when the door is opened.
- 3 Felt seals for air-tight waterproof condition.
- 4 Reflector is locked to the body—sealed between body and glass ring by additional cork seal.
- 5 Bulb firmly held in place—no distortion or wobbling. A special designed bulb socket.
- 6 Special bus connectors, proven correct by actual performance.
- 7 Bracket and body properly reinforced by heavy inside steel stiffener.
- 8 Outside ratchet adjustment for focusing bulbs.
- 9 Special reflector with four distinct sections, scientifically designed to contribute its share to an optically correct vertical distribution of light controlling upper and lower beam. Labelled with the word "Top" at the upper part to prevent incorrect installation.
- 10 Lens divided into three sections to properly distribute light where needed. A notch in the edge of lens into which a lug fits is provided to prevent the lens from rotating. Also labelled "Top" in its proper place as a guide for installation.
- 11 Four bolts for reinforcement and locking purposes.
- 12 Lamp constructed of extra heavy material. Trouble-proof.

Guide

TILT RAY
HEAD LAMPS



Methods may differ— but Principles survive

It is significant, to those responsible for transportation *profits*,

- that practically all the successful pioneers in electric traction have continuously used Ohmer fare registers for more than twenty-five years;
- that more than 150 electric railway lines have used Ohmer equipment for over ten years;
- that over ninety per cent of the interurban systems in the United States are OHMER-ized.

Wherein lies the significance? On three counts, chiefly:

- First*, The same basic principles originally championed and applied by John F. Ohmer have stood the test of time unchallenged.
- Second*, Every Ohmer register is built to deliver long and faithful service, supported by a nation-wide service organization of marked efficiency.
- Third*, By constant refinement of product and broadening of service, Ohmer has consistently anticipated the growing demands of passenger transportation.

Products ever finer and better, utility ever more complete and more adaptable, —constant improvement in scope and form, but constant adherence to the same basic principles—thus has Ohmer kept faith with the Industry it serves.

And therein lies *your* assurance of continued profits from Ohmer service.

OHMER
REG. U.S. PAT. OFF.
FARE REGISTER CO.
Dayton, Ohio



Mutual Service

TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

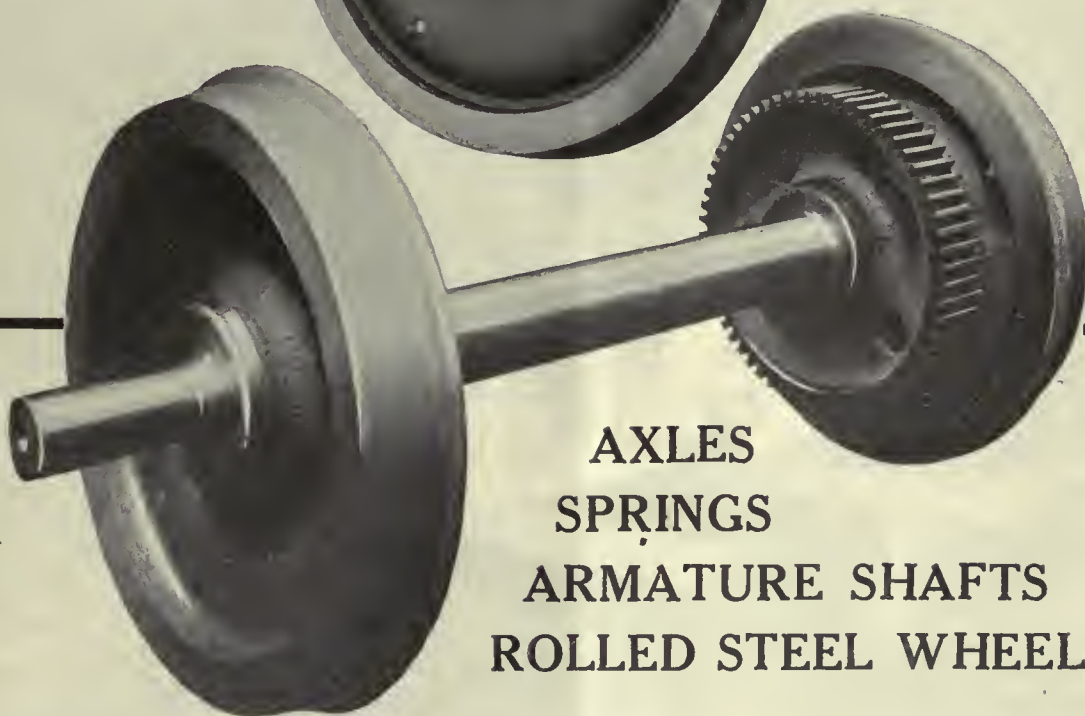
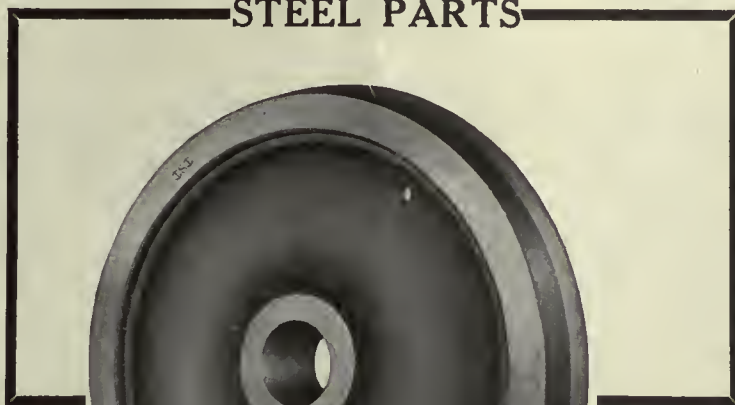
Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



CANDLER BUILDING,
NEW YORK, N. Y.

MAINTENANCE RECORDS PROVE
 THE RELIABILITY AND ECONOMY OF
“STANDARD”

STEEL PARTS



AXLES
 SPRINGS
 ARMATURE SHAFTS
 ROLLED STEEL WHEELS

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS

NEW YORK
HOUSTON

PORTLAND
RICHMOND

SAN FRANCISCO
ST. PAUL

PITTSBURGH
MEXICO CITY

WORKS: BURNHAM, PA.

1 ton or 1000

RAILS

L. B. FOSTER CO.
PITTSBURGH NEW-YORK CHICAGO

The advertisement features a large, curved rail track that arches over the word "RAILS", which is rendered in large, three-dimensional block letters. The background is a detailed illustration of a steel mill or factory complex with multiple buildings, smokestacks, and cranes. The overall scene is set against a dark, night-like sky. At the bottom, the company name "L. B. FOSTER COMPANY" is printed in a bold, serif font, with the cities "PITTSBURGH · NEW-YORK · CHICAGO" listed below it.



Looking west on Washington Street at the intersection of Cincinnati Street. Note the excellent condition of the tangentials and the smooth surface of the track area. Carey Elastite Track Insulation was used throughout.

“...a test installation in 1924...
 now standard in all
 track construction”

“IN 1924, we made a test of asphaltic rail filler, installing it on each side of the rails,” said R. E. Standish, Superintendent Maintenance, Peoples Railway, Dayton, Ohio.

“In this way, we became thoroughly sold on this type of track insulation, and it is now included as standard in all our track construction work.

“We use Dayton-Mechanical ties, 100-lb. ARA-A rails, thermit-welded joints, Carey Elastite System of

Track Insulation, brick paving and asphalt filler.”

The Carey Elastite System of Track Insulation, referred to by Mr. Standish, is a preformed asphaltic compound reenforced with asphalt-saturated fibres. It is impervious to moisture, and forms a lastingly shock-absorbing cushion between the rails and paving.

Write for full particulars. If you are planning any track construction work, our representative will be glad to call and tell you all about this efficient material. Write.



The Philip Carey Company
 Lockland, Cincinnati, Ohio

SYSTEM OF TRACK INSULATION



He is your business partner

He considers first and foremost your interests.

He is truthful and honest in his dealings with you.

He is not provincial, but his experience is nation-wide in scope.

He is not opinionated, but brings to you unbiased facts, news, and reports.

He has a finger on the pulse of your trade's activities. He promulgates helpful information.

He is in close touch with manufacturers, producers, distributors—those from whom you buy.

He deals with none which has a tendency to mislead or which does not conform to business integrity.

He is a consultant that "sits in" with you regularly. His suggestions are profitable to you.

He holds a fellowship in a select association with exacting standards of membership.

He has pledged himself to determine the highest and largest function of the trade which he serves, and to strive in every legitimate way to promote that function.

HE IS THIS PAPER.

Your paper. A member of the Associated Business Papers, Inc.

THE ASSOCIATED BUSINESS PAPERS, Inc.

Executive Offices: 220 West 42nd St., New York, N.Y.

A. B. P.

The A.B.P. comprises a group of business papers that reaches 54 fields of trade and industry. Membership requires the highest standards in every department of publishing, circulation, editorial, and advertising.

The advertisers in this publication demonstrate by their presence here that they are awake to modern methods of selling as well as production—methods that cut costs and standardize operations.

Clean the Oakite way —and forget about scrubbing!

NO NEED to spend valuable hours scraping and scrubbing repair parts to remove the grease, dirt and muck—not when you clean the Oakite way.

Your shopman merely lowers dirty parts and assemblies into the Oakite tank—and forgets all about scrubbing. The solution soaks them clean while he is busy with actual repair work. It saves you money by saving your mechanics' time.

Write us for details about this better way to handle all your shop cleaning jobs. Ask for "Oakite in Railroad and Car Shops." Sent on request.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.

OAKITE

TRADE MARK REG. U. S. PAT. OFF.

Industrial Cleaning Materials and Methods



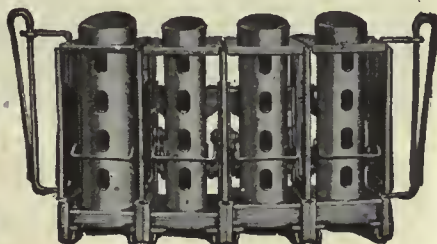
JOHNSON FARE COLLECTING SYSTEMS



Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates. It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.



Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

Creosoted ties cut costs to the first cost



Under the pavement, deep into dank, musty earth . . . where untreated wood could not resist the ravages of decay-producing fungi and the destructive termite (white ant) . . . where replacements involve great cost, interruption of service, interference with street traffic, the far-sighted operating officials of the South Carolina Power Company placed these Prettyman *creosoted* ties with confidence and assurance.



Creosoted

Railroad Cross-ties; Switch Ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber Piling; Poles; Posts and other Forest Products

J.F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place

New York

STONE & WEBSTER

Incorporated

Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties

NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION

Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management

52 Vanderbilt Ave.

New York

SANDERSON & PORTER

ENGINEERS

PUBLIC UTILITIES & INDUSTRIALS

Design Examinations Construction Reports Valuations Management

CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST

Consulting Engineers

Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management

683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

BYLLESBY ENGINEERING AND MANAGEMENT CORPORATION

231 S. La Salle Street, Chicago

New York

Pittsburgh

San Francisco

O. B. BUCHANAN W. H. PRICE, JR. JOHN F. LAYNG President Sec'y-Treas. Vice-President BUCHANAN & LAYNG CORPORATION

Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance

BALTIMORE
1004 Citizens National
Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
49 Wall Street

DAY & ZIMMERMANN, INC. ENGINEERS

DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

NEW YORK

PHILADELPHIA

CHICAGO

HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells

Albert W. Hemphill

APPRAISALS

INVESTIGATIONS COVERING

Reorganization Management Operation Construction

43 Cedar Street, New York City

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

Holbrook Hall 5-W-3

160 Gramatan Ave., Mt. Vernon, N. Y.

KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

Operating Problems

Valuations

Traffic Surveys

111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD

Incorporated

ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations
Transportation Problems—Power Developments

68 Trinity Place, New York

Chicago

St. Louis

E. H. FAILE & CO.

Designers of

Garages—Service Buildings—Terminals

441 LEXINGTON AVE.

NEW YORK

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

**Builders since 1868 of
Water Tube Boilers
of continuing reliability**

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



WORKS
Bayonne, N. J.
Barberton, Ohio

BRANCH OFFICES

ATLANTA, Candler Building
BOSTON, 80 Federal Street
CHICAGO, Marquette Building
CINCINNATI, Traction Building
CLEVELAND, Guardian Building
DALLAS, TEXAS, Magnolia Building
DENVER, 444 Seventeenth Street
DETROIT, Ford Building
HOUSTON, TEXAS, Electric Building
LOS ANGELES, Central Building
NEW ORLEANS, 344 Camp Street

BRANCH OFFICES

PHILADELPHIA, Packard Building
PHOENIX, ARIZ., Heard Building
PITTSBURGH, Farmers Deposit Bank Building
PORTLAND, ORE., Failing Building
SALT LAKE CITY, Kearns Building
SAN FRANCISCO, Sheldon Building
SEATTLE, L. C. Smith Building
HONOLULU, T. H., Castle & Cooke Building
HAVANA, CUBA, Calle de Agular 104
SAN JUAN, PORTO RICO, Royal Bank Building

The Pioneer

Blazing trails has always been the work of the pioneer. And where he has lead, progress has followed.

Engineering service is a pioneer, blazing new trails of economy and efficiency for the business that employs it.

W. H. Sawyer
PRESIDENT.

STEVENS & WOOD, Incorporated
Engineers and Constructors
120 Broadway, New York
Chicago . . . Youngstown, O.

A Personalized Service



Double Register
Type R-11

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

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

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Efficient Bus Heating

with

The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

EIGHT WORKS
RAMAPO AJAX CORPORATION
RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE WORK A SPECIALTY
SALES OFFICES AT ALL WORKS
Main Office, HULLBURN, N.Y.

HULLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
LUEBEL, O. & TORONTO
SENECA FALLS, N.Y.
LOS ANGELES, CAL.
NIAGARA FALLS, 1902, N.Y.

BELL CEDAR POLES

NORTHERN WESTERN
BUTT TREATING ALL GRADES TIES
BELL LUMBER CO., Minneapolis, Minn.

ANACONDA Rod, Wire and Cable Products
from mine to consumer
ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - 25 Broadway, New York
ANACONDA TROLLEY WIRE

Brick-Paved Track Areas Keep Down Expenses and allow Uninterrupted Schedules



*National Paving Brick Manufacturers Association
332 S. Michigan Ave.,
Chicago*

**VITRIFIED
BRICK PAVEMENTS**
FACE THE FUTURE—PAVE WITH BRICK



COLUMBIA

Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings
Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

*The Columbia Machine Works and M. I. Co.
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York*

PHONO-ELECTRIC CONTACT WIRE

gives three times the service of hard drawn copper. Standard with leading railways.

Write for Phono Book—full of useful facts.

BRIDGEPORT BRASS CO.
BRIDGEPORT, CONN.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost
Least Maintenance

Lightest Weight
Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

New York City, 30 Church Street

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:
Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:
Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
 1 to 3 inches.....\$4.50 an inch
 4 to 7 inches..... 4.30 an inch
 8 to 14 inches..... 4.10 an inch
 Rates for larger spaces, or yearly rates, on request.
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

Make your used equipment help cut the cost of replacements!

Used Railway Equipment—cars, rails, poles, appliances, road building equipment, etc.—that you consider of no further value in your service, may just fit the need and purpose of some other organization in the field of electric railway operation.

There's always a market for used railway equipment somewhere. Don't make the mistake of junking equipment that you consider of no value, when there's a possibility of turning it into cash to be applied against the cost of replacements—that's not good business. Send us a list of the equipment you wish to dispose of to be advertised here. Over 6,000 executives and officials in the electric railway field watch the Searchlight Section for opportunities to purchase used equipment.

Advertise it in the—

SEARCHLIGHT SECTION

POSITIONS WANTED

EQUIPMENT superintendent, experienced and successful on maintenance of electric car and bus equipment, desires to change, can get you the desired results; references. PW-106, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

I CAN manage your street railway property regardless of location, size or local difficulties. PW-108, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT transportation, broad experience, proven successful record, street railways and bus transportation; available short notice; high grade references. PW-109, Electric Railway Journal, Tenth Ave. at 36th St., New York.

WANTED—Position as manager, general superintendent or M. M. of electric railways. Can qualify in every way. PW-99, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

FOR SALE

MOTORS

130 Westinghouse, Type 514-C.
 Fine condition. Low price.

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

When Writing Your Ad

Provide an indexing or subject word.

Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column.

The right is reserved to reject, revise or properly classify all Want Advertisements.

*Proper Classification
 increases the possibility of
 Prompt Returns*

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue
This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

- Advertising, Street Car**
Collier, Inc., Barron G.
- Air Brakes**
General Electric Co.
Westinghouse Traction Brake Co.
- Anchors, Guy**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co.
- Automatic Regulators, Voltage, Current & Synchronizing**
American Brown-Boveri Electric Corp.
- Automatic Return Switches**
Rampax Ajax Corp.
- Automatic Safety Switches**
Rampax Ajax Corp.
- Axles**
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Westinghouse E. & M. Co.
- Babbitt Devices**
Columbia Machine Works
- Badges and Buttons**
Elec. Service Supplies Co.
International Cash Register Co., The
- Batteries, Dry**
Nichols-Linnann Co.
- Batteries, Storage**
Electric Storage Battery Co.
- Bearings, Anti-Friction**
Timken Roller Bearing Co.
- Bearings and Bearing Metals**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Westinghouse E. & M. Co.
- Bearings, Center and Roller Sides**
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.
- Bearings, Roller**
Timken Roller Bearing Co.
- Bearings, Thrust**
Timken Roller Bearing Co.
- Bells and Buzzers**
Consolidated Car Heating Co.
- Bells and Gongs**
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.
- Benders, Ball**
Railway Trackwork Co.
- Body Material, Haskellite Plymetite**
Haskellite Mfg. Corp.
- Bodies, Bus**
Brill Co., The J. G.
Graham Bros.
Lang Body Co.
- Boilers**
Babcock & Wilcox Co.
- Bond Testers**
American Steel & Wire Co.
Electric Service Supplies Co.
- Bonding Apparatus**
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
- Bonds, Rail**
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
- Brackets and Cross Arms**
(See also Poles, Ties, Posts, etc.)
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
- Brake Adjusters**
Brill Co., The J. G.
Cincinnati Car Co.
- National Ry. Appliance Co.**
Westinghouse Tr. Br. Co.
- Brake Shoes**
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
- Brake Testers**
National Ry. Appliance Co.
- Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.
- Brakes, Magnetic Rail**
Cincinnati Car Co.
- Brick, Paving**
National Paving Brick Mfrs. Assn.
- Brick, Vitrified**
National Paving Brick Mfrs. Assn.
- Brushes, Carbon**
General Electric Co.
Westinghouse E. & M. Co.
- Brushholders**
Columbia Machine Works
General Electric Co.
- Bulkheads**
Haskellite Mfg. Corp.
- Buses**
Graham Bros.
- Buses, Motor**
General Electric Co.
Yellow Truck & Coach Mfg. Co.
- Bus Lighting**
National Ry. Appliance Co.
- Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
- Cables (See Wires and Cables)**
- Cambrie Tapes, Yellow and Black Varnish**
General Electric Co.
Irvington Varnish & Ins. Co.
- Carbon Brushes (See Brushes, Carbon)**
- Car Lighting Fixtures**
Elec. Service Supplies Co.
- Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
- Car Steps, Safety**
Cincinnati Car Co.
- Car Wheels, Rolled Steel**
Bethlehem Steel Co.
- Cars, Dump**
Brill Co., The J. G.
Differential Steel Car Co.
- Cars, Gas-Electric**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
- Cars, Gas, Rail**
Brill Co., The J. G.
- Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. O.
Wason Mfr. Co.
- Cars, Self-Propelled**
Brill Co., The J. G.
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(Continued on page 50)

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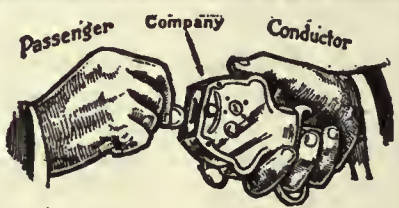
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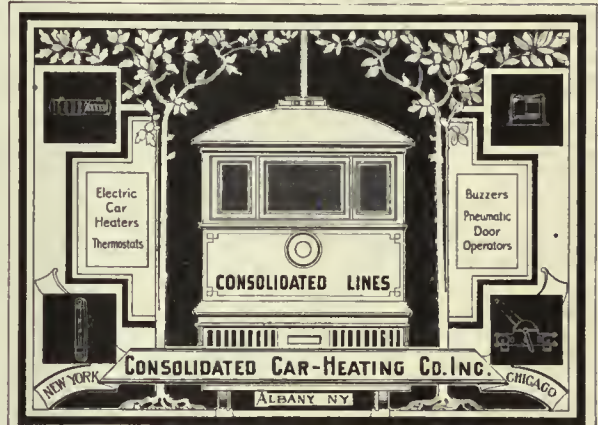
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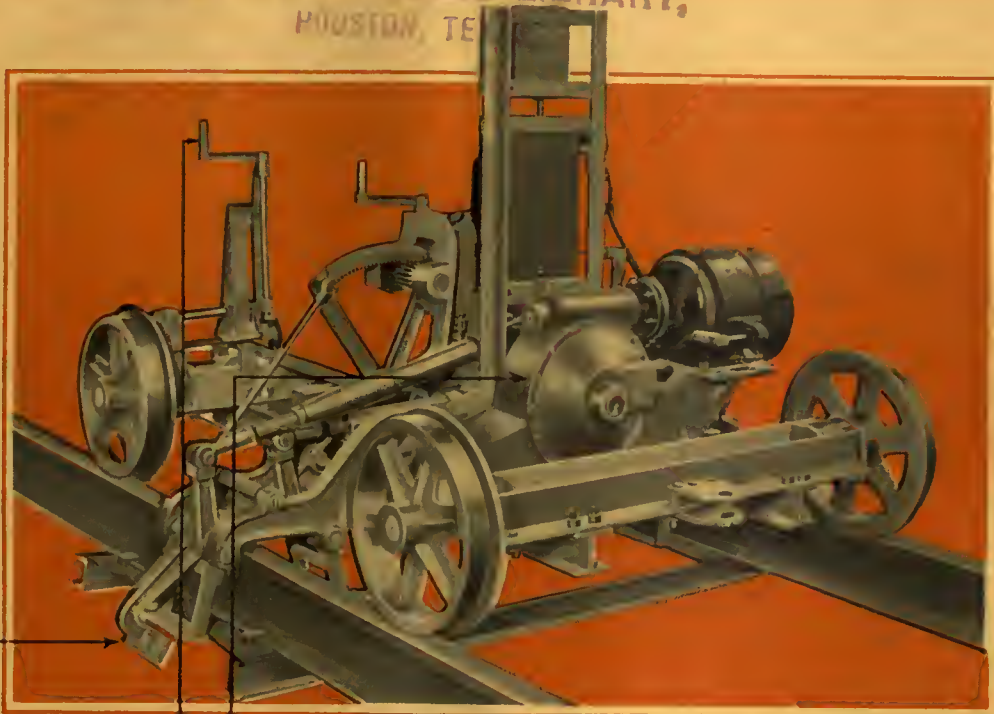
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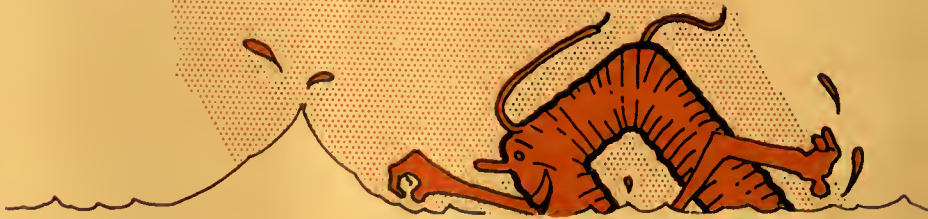
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No. 21

May 19, 1928

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BY THOMAS V. CAMPBELL

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Wheel, Gear and Axle Maintenance in Brooklyn 805

BY CLARENCE W. SQUIER

An account of mass maintenance work, so systematized as to eliminate all unnecessary handling. The most modern machine tools are used in this work by the Brooklyn-Manhattan Transit lines. Maximum efficiency of equipment is secured, with more mileage in revenue service.

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A Maintenance Contest Winner Speaks

HERE is a word from a recent winner in the JOURNAL's monthly maintenance contest:

"I appreciate very much notification of my success in winning the monthly maintenance prize. But I appreciate even more the JOURNAL itself. Its value to maintenance men cannot be estimated, for it brings every week money-saving methods that are worth thousands of dollars to those properties that utilize them.

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This issue contains another group of items submitted in the monthly maintenance contest. In addition, the feature articles are devoted primarily to construction and maintenance subjects. Here are more ideas that are worth money to your property if they are applied.

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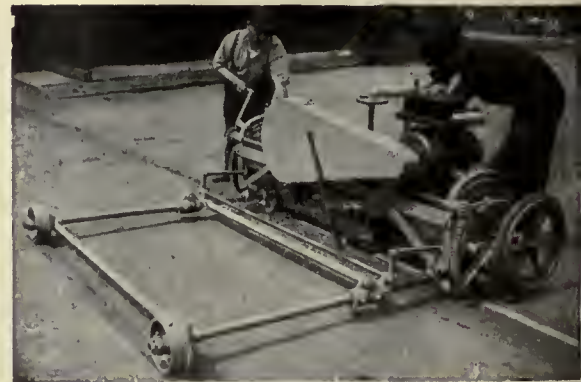
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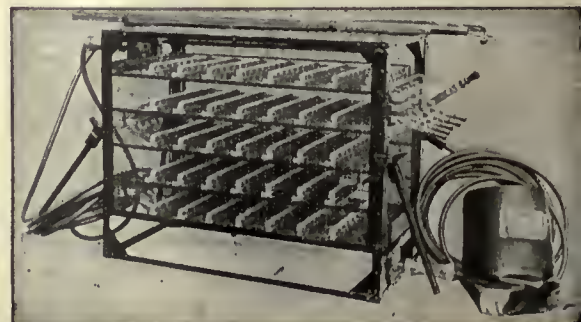
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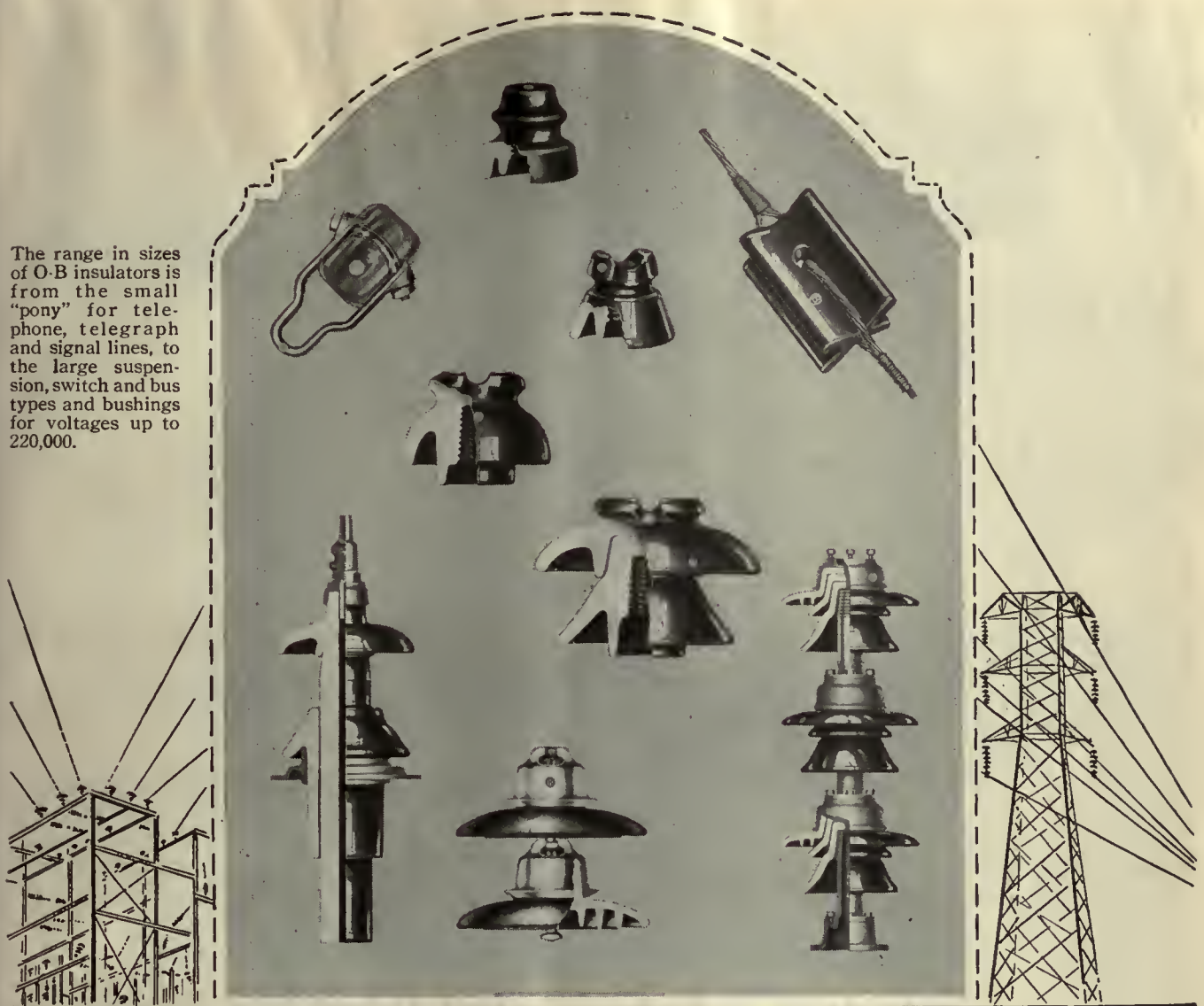
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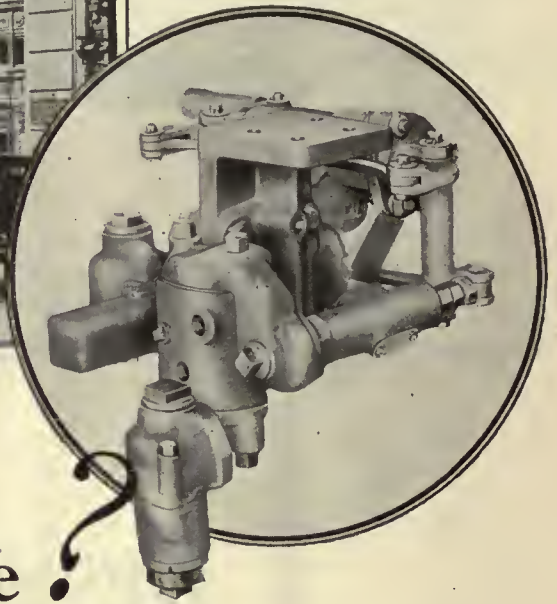
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Looking Ahead in Highway Transportation

The growth of highway transportation is one of the marvels of the 20th century. In a few brief years a network of regularly operated routes has covered the country from coast to coast. Suburban service has multiplied a thousandfold. City traffic conditions have visibly altered, requiring more mobile lines of transportation and vehicles of adequate capacity with lower operating and maintenance cost.

It is a time when every executive might well pause for a moment and look ahead—that he may reap the advantages of the new developments in highway transportation.



Versare

A Radical Departure from Conventional Design



Traction companies have desired a single - deck, large-capacity, easily handled vehicle, that had ample leg and head room, wide aisle space, provision for circulating load, with doors that enabled the car to take on or let off passengers quickly to cut stopping time to a minimum.

It is here in the 6-wheel, gas-electric Versare Highway Unit, with the power plant in the rear!

Versare engineers have developed this transportation unit along lines radically different from familiar types. In Boston, Montreal, Albany, Providence, Cleveland, New York and elsewhere this unit is meeting with such extraordinary success, and has so satisfactorily overcome every operating handicap, that it is destined to create a new era in highway transportation.



Versare

Greater Capacity the Revenue Builder

Let us briefly touch on a few points of this new transportation unit—the Versare. They are well worth your serious consideration.



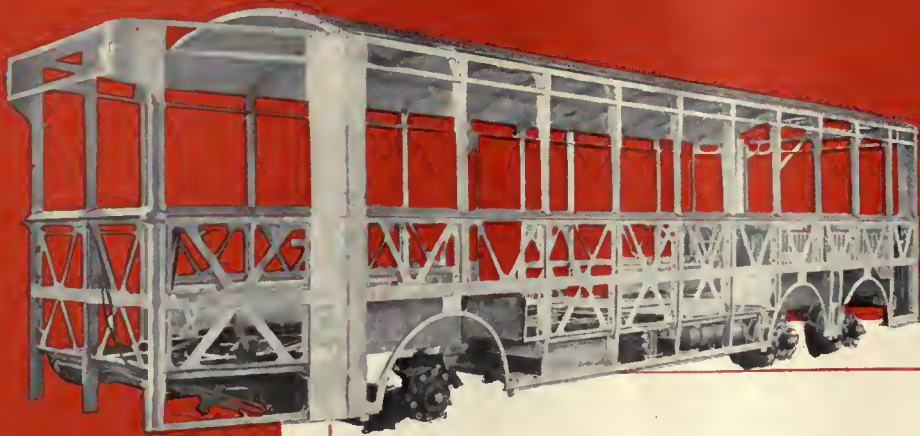
Here is a vehicle that utilizes every square foot of space for revenue. It carries comfortably 74 passengers—37 seated and 37 standees. With a powerful 125 h.p. gasoline engine and two 33 h.p. electric motors it has brute power for any grade, quick pick-up and speed. Easily handled in traffic; equipped with latest safety devices; exceptionally easy to keep clean and maintain due to accessibility of all parts.

The power plant can be removed and replaced in an hour without use of a crane. For quick inspection simply lift a panel.



Versare

Consider the Construction!



Side view of Versare frame, showing girder construction, extruded side posts, and wheel housings. This entire fabric is of Duralumin and Aluminum.



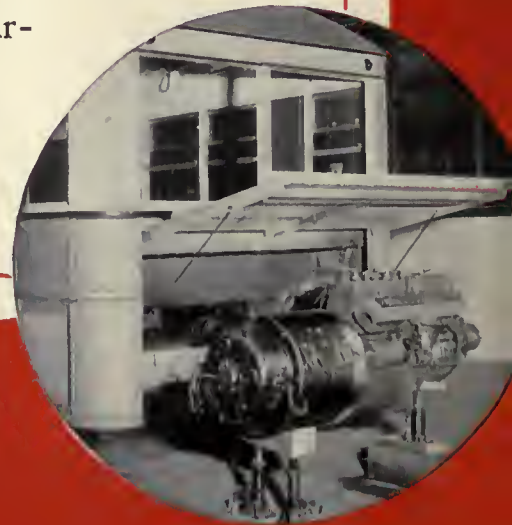
Rear view of Versare frame showing engine mounting and heavy channels affording protection at corners. When engine is installed this channelling extends clear across the back behind the bumper.

Here you have bridge type truss construction, the same as used for strength in cantilever bridges and dirigibles. There is nothing like it in highway transportation vehicles. The girders, angles, castings and side posts are of Duralumin, an alloy selected where tremendous tensile strength is required.

The frame is sectionalized. In case of a smash, the damaged section is easily replaced. Your maintenance men will appreciate this time saving and low cost feature.

In fact, everything has been incorporated in the Versare Highway Unit that would contribute to greatest earning capacity with lowest operating and maintenance cost per car-mile.

**Versare
Corporation
Albany, N. Y.**



Versare

They paid



The above page is from a report of the Georgia Power Company operating the Atlanta street railways and inter-urban service.

Economy Meters were installed on all motor cars at an approximate cost of \$27,000. After eleven months in operation Atlanta figured a power saving of \$30,000. An enormous return on the investment when you realize an even greater amount than just a power reduction, is being saved by the railway.

ECONOMY ELECTRIC

DISTRIBUTORS OR AGENTS FOR

Sangamo Economy Watthour Meters
Economy Gasoline Vehicle Meters

Haskelite and Plymetl

Woods Fare Box
Peter Smith Heate

for themselves in less than a year at Atlanta

Every Railway Company, large or small, can afford to have Economy meters on this basis.

The experience of the Georgia Power Company in Atlanta is only typical of the results obtained wherever Economy Meters have been installed and an effective power saving campaign launched.

ECONOMY METERS for Electric Railway Operation

Based on the fact that there is an approximate difference of 30% in power used between the average good operator and a poor one, Economy Meters serve to point out the poor operators. Corrective instruction soon brings your motormen up to standard.

As a further power saver, metering the energy used at the car points out defective equipment. By means of the inspection

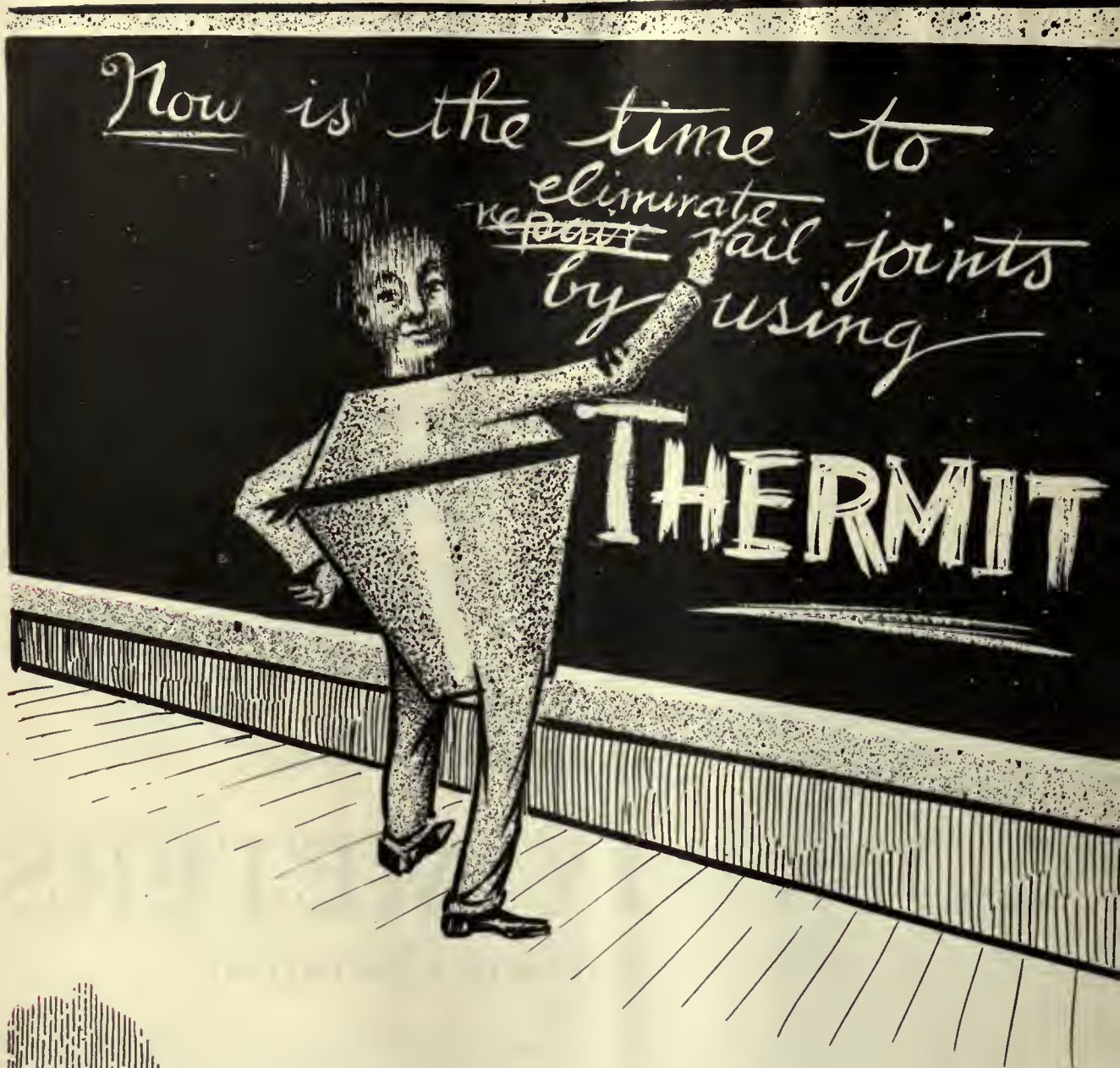
dials an accurate check can be maintained on the service that equipment has rendered. Inspections can be made directly from the meter readings without complicated clerical records.

The meter itself is ruggedly built, requiring very little maintenance. It is also simple to install. May we send you further information on the savings others have made with Economy Watthour Meters?

DEVICES COMPANY

37 W. Van Buren St., Chicago

Cable Address: Sangamo, Chicago



Don't repair—
 eliminate!

Lessons learned through experience are seldom forgotten. That's why so many roads are now using Thermit for repairs, as well as on new construction. They've found that by Thermit welding old joints, there's no more cupping, no more noise, and no more patching, as long as the rail itself lasts.



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

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Do you think beauty is a factor in winning riders?

Perhaps you do not agree entirely with the opinion held by many transportation engineers that beauty of design is important.

But take the question from another angle. Do you object to accepting their opinion if you get "Beauty at Low Cost" along with "Speed with Safety," "Comfort with Capacity," and "Lightweight with Strength?"

When may we present facts and figures to show how vitally these four combinations bear on the ability of Cincinnati BALANCED Lightweight Cars to increase patronage?

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI

BALANCED
LIGHTWEIGHT

CARS

—still a step ahead of the modern trend



Illustration shows International Poles in a 66-KV. line crossing Swampy territory in service of the Louisiana Electric Co. (Stone & Webster)

Long Life Makes Low Cost

THE FIRST COST of Creosoted Pine Poles, all sizes and lengths, compares favorably with other poles. But, on the basis of annual cost, the real economy becomes strikingly apparent. Creosoted Pine Poles are strongest and have longest life. When the initial investment is distributed over their 35 to 40 years of service, the very low annual cost proves that the pole that lasts longest is least expensive.

Other marked economies are due to the fact that the Creosoted Pine Pole is so far superior in strength and durability that standard construction prescribes that smaller poles or fewer poles per mile be used in Creosoted Pine construction than when other woods are used.

International has poles in service 28 years and still in excellent condition. They last and lead in service.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont



International Creosoted Yellow Pine Poles



Bringing Them Out with Good Varnish

Heavy weather—insulations burned out—idle cars. Idle cars are expense items—they produce no revenue. All this because of a few cents saved in insulating materials.

¶Bring the cars out of the repair shop with G-E insulating varnish. It resists moisture and oil—it stands the gaff of rough wear. G-E varnish is continued protection through good weather and bad. ¶These varnishes were originally developed to insulate G-E railway motors and other apparatus. You are taking no chances when you specify G-E insulating materials.

Five popular G-E varnishes are:

- | | |
|--|----------------------|
| No. 152 Clear Air Drying | No. 450 Clear Baking |
| No. 457 Black Air Drying | No. 460 Black Baking |
| No. 447 Black Baking (especially recommended for railway use.) | |

PROMPT SERVICE

G-E insulating materials are sold only by G-E Merchandise Distributors located throughout the country who are equipped to give you prompt service. Get in touch with the G-E Merchandise Distributor near you or write to the Merchandise Department, General Electric Company, Bridgeport, Connecticut.

This catalog contains a complete listing of the following G-E insulating materials:



Insulating and finishing
varnishes
Insulating oils
Stickers
Shellacs and paints
Filling and sealing compounds
Varnish-treated cloths and cloth
tapes

Flexible varnished tubing
Insulating fibers and papers
Motor tubing
Asbestos and cotton tapes
Friction and rubber tapes
Prepared paper tapes
Cords
Twines

Send for your copy to the Merchandise Department, General Electric Company, Bridgeport, Connecticut.

GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT



They must not fail!

Traffic conditions in New York demand that the subway trains must not fail.

Two years ago, the New York Rapid Transit Corporation found the operation of its two experimental G-E equipped, triplex, articulated cars to be so satisfactory that sixty-seven three-unit cars, each equipped with four GE-282 motors and duplex Type PC 15 control, were then placed in service.



If you need electric railway equipment or supplies, whether for extension, replacement, rehabilitation, or maintenance, it will be well worth your while to consider the advantages of equipment and supplies which bear this monogram.

These equipments have been so reliable and economical in operation that the New York Rapid Transit Corporation will soon place in service 50 more articulated cars, of which all will be equipped with G-E control, and three-fourths with GE-282 motors.

GENERAL ELECTRIC

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

Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
Street Railway Journal and
Electric Railway Review

CHARLES GORDON
Editor

Volume 71

New York, Saturday, May 19, 1928

Number 20

Adequate Testing Is Good Insurance

CLOSE attention to every detail of maintenance of the motor, which is the heart of the car equipment, will do much to prevent failures. All motor repairs for a system should be done at one shop. It is only by such centralization that uniformly good results can be obtained. Overhaul methods which have been tried and found most effective should be used. Chemical cleaning tanks for housings, boring of armature bearings after they are pressed into housings, and dipping and baking processes are some outstanding practices that produce real results and eventually lower maintenance costs.

Adequate tests of overhauled motors is important as a means of making sure that nothing has been overlooked. The load method described elsewhere in this issue is one example of what a progressive property is doing to make certain that its equipment will perform satisfactorily when returned to service. It is the test to which all overhauled railway motors are subjected by New Orleans Public Service, Inc. At the last meeting of the Electric Railway Association of Equipment Men, Southern Properties, a representative of this railway stated that the payroll is 30 per cent less than five years ago while the number of car-miles operated is only 15 per cent less. This is striking evidence that money spent on putting equipment into first-class physical condition, and upon adequate testing facilities to insure against failure in service, is money well invested.

One Hundred Men in 1927 Did Work of Four Hundred in 1909

CONVINCING evidence of the great saving in manpower made possible by the use of modern machinery is found in figures compiled by the Boston Elevated Railway concerning a recent track reconstruction job in Somerville. The work involved the reconstruction of 17,566 ft. of single track which had been in service for eighteen years. The old track was built in 1909 with 8-in. T-rail laid partly on wood ties and partly on steel ties. Joints were cast welded. The new track is built with 7½-in. T-rail on International twin steel ties. Joints are seam welded. The old concrete base has been retained and the new track laid upon it.

On account of the narrowness of the street it was impossible to use a temporary third track during the course of construction. Work was carried on during regular working hours with a maximum force of 100 men. The entire job was completed in a period of four months without interruption to car traffic on the line. At the time of the original construction a maximum force of 400 men was employed. Curiously enough, the same foreman was in charge of both jobs.

Modern track-building machinery was responsible for this impressive reduction in the size of the force required to do the work. In 1909 all material was handled by trucks drawn by teams of four or six horses. Loading, unloading and placing of material was done by hand. In 1927 the old granite-block paving was broken up by means of a pavement plow. The blocks were loaded on motor trucks by a Barber Greene snow-loading machine equipped with special buckets. The old rail was cut by acetylene torches to short lengths for easy handling. Fastenings of the steel ties were burned off. The old base was swept clean by means of a tractor sweeper. New rails and ties were handled by a special rail carrying car equipped with an electric crane. Joints were welded electrically.

On this recent job one man with modern equipment accomplished a better result than four men with old tools had accomplished eighteen years ago. In the entire electric railway field it would be hard to find a better example of the profitable employment of machinery to save manual labor.

A Field for Special Bus Maintenance Equipment

VISITING the bus repair sections of most shops, one is impressed particularly with the lack of sturdily built tools for carrying on the work. Many of those in use are obtained from automobile accessory distributors and do not stand up in the continued service of a bus repair shop. In keeping buses on the road, tools are subjected to hard and continuous service that calls for very much more rugged design than has been customary in automotive practice.

Usually the tools now available were designed for automobile work and are little better than toys when put in the severe service of bus repairs. More sturdy tire changing equipment is needed. Wrenches and hand tools of cheap construction should not be used, stones and honing machines for hand-lapping and valve grinding often do more damage than they do good for the class of work found in bus repair shops. Presses, jacks, motor stands are among the miscellaneous items of shop equipment designed particularly for the service imposed in a bus garage. More production machine tools of this type are needed so that the work can be turned out rapidly and satisfactorily.

Shop equipment of ample capacity and ruggedness for bus maintenance is far too difficult to obtain at the present time. Some electric railway maintenance men have been misled into the installation of the comparatively light and ineffective equipment developed for automobile garages. All too often such equipment has

proved entirely inadequate for bus maintenance purposes. Obviously there exists a distinct opportunity for the alert manufacturer of such equipment to develop machinery suitable for the maintenance of buses on a commercial basis. It is probable that there is a considerable field for the sale of such heavier duty maintenance equipment to large truck fleet owners as well as to bus operators and that a large and growing market exists which has been comparatively undeveloped.

Replacement Before Breakdown a Criterion for Pull-Ins

WHY does one city company show pull-ins every 4,000 miles and another show pull-ins every 100,000 miles? Is it necessarily due to a difference in definition of "pull-in," of character of equipment, of quality of materials, of skill in workmanship or character of service?

Inspection of property after property, over many years, indicates that the predominant reason is none of the foregoing. The most important factor is managerial policy. Does the department head or management place more stress on the minor factor of getting the last mile of service from materials or on the major factor of uninterrupted delivery of vehicle-miles to the public?

There is a strong temptation to place too much stress upon comparisons that don't compare, so to speak. The superintendent of equipment is driven to the point where he tries to get the last possible revolution out of a car wheel and trolley wheel or the final 64th of an inch from his bearings. The adoption and use of limit of wear gages as a measure of the time to scrap wearing parts has been painfully slow because of this constant pressure to get the last mile of wear.

The saying "Prevention is better than cure" is as old as the well-known hills, but it is just as true as ever. Pull-ins, exclusive of those for accidents, are not inevitable. They are preventable. Their elimination is wholly and solely a matter of replacement before breakdown. Is that trolley wheel groove so distorted and worn that it will inevitably tear down some of the overhead tomorrow, if not today? Has that car-wheel flange worn down to the chipping line? Will that commutator get by for another round trip before it is reslotted? Will those motor suspension axle bearings go till the next overhauling? All of this means taking chances on service interruptions.

A superficial view of the subject might lead to the conclusion that a more liberal scrapping policy to prevent trouble would increase costs so far as the mechanical department's showing is concerned. The contrary has proved the case on properties where maintenance policy has been altered along the lines indicated. It is true that the mileage per item may be lowered, but the over-all costs are less, since a pull-in generally involves much more than the replacement of the outworn or weakened part.

From the standpoint of the transportation department, the question of which is the better policy is not even a debatable one. It is not enough for electric railways to provide the lowest cost transportation service. They must also make good so unfailingly that those who patronize electric cars will have to think long and hard before they can recall leaving a vehicle because of a breakdown. A certain automobile maker, who shall be nameless for once, said of his product: "It takes you there and brings you back." That is a good slogan for the electric railway maintenance man!

Fenders Require Careful Attention

WHEN car fenders were first put on the market careful attention was given to the initial cost, simplicity of design, ease of installation, maintenance cost, sensitiveness, tripping and pick-up reliability before selection was made. Unsuccessful types have long since passed out of existence, so that today there are only a few types on the market. These have proved reliable after years of service. Continued reliability, however, can be assured only by proper maintenance. The cost to keep fenders in serviceable condition is only a small part of the total cost of the equipment maintenance, but nevertheless the device requires constant attention.

Often a fender will be damaged in service by hitting an obstruction. Though this damage may be slight, it is essential that all the parts should be looked over carefully and the fender tripped several times by means of the gate before the car is returned to service. Ignoring those precautions may mean a fender failure at a critical moment. This possibility of failures can be lessened to a marked degree by checking the height of the approach and gate and their freedom of operation every night or every second night. It is also important to see that the fender will pick up and latch securely. Often a fender will be tripped in service, and afterward, due to a faulty latch, it cannot be held up in position. This may cause its total destruction if the trouble is not detected with a resultant material increase in the maintenance cost.

Financial Status Improved by Better Maintenance

STANDARDS of maintenance have changed radically during the past 25 years, but not more than have the standards of service that are adhered to by the more progressive electric railways. Early in the present century car failures were looked on with a certain complacency, and were considered more or less as unavoidable evils. With the change that has taken place in the character of service it has become recognized more and more that the public is intolerant where failures of railway service are involved.

The easiest way to reduce failures in service is to replace old parts with new at the first sign of destructive wear. This is not always feasible, and occasionally it is necessary to keep equipment in service for many years longer than would ordinarily seem desirable. An instance of this is seen in the New York & Queens County Railway, particularly with regard to its motor equipment. When its cars were purchased, more than 25 years ago the motors were as good as the art afforded. Not only are these motors hopelessly out of date today, but until quite recently they had been allowed to go without even ordinary care. As a result failures were far too frequent and the service suffered accordingly.

It was not possible to purchase new cars or new motors, so the present management decided to make the best of the bargain and do away with the hand-to-mouth repairs that had become the practice. Enough money was spent on the motors not only to restore them as nearly as possible to their original condition, but in some respects to make them approach modern practice. The article by Thomas V. Campbell in this issue tells how thoroughly this work has been done.

Ordinarily it would not pay to spend as much money on rehabilitating old equipment as was done here. But

in the present instance it was manifestly impossible to obtain new capital. The repairs will permit the motors to give further reliable service. The maintenance costs have been reduced to normal. There has been about 1,000 per cent increase in bearing mileage and 75 per cent reduction in electrical failures. These are important factors in the maintenance of regular schedules, and consequently in the increased patronage now coming to the company. Furthermore, the improvement in the company's financial status may make it possible later on to finance new equipment where today that is impossible.

Equipment Designers Should Follow Closely the Problems of Operation

COMPLAINT is sometimes made by manufacturers that their equipment fails because it is improperly maintained. Often, however, it will be found that sufficient attention has not been given by the designer to making maintenance easy. If parts are to be inspected properly they must be accessible. If lubrication is needed there should be ample provision for it. The parts should be sufficiently rugged so they will not be damaged easily by unskilled workmen.

An example of unfamiliarity of the designer with maintenance occurred recently in connection with some equipment which had a shaft rotating at low speed. A pressure grease lubricating system was installed for the two bearings at the ends of the shaft. As the shaft was short, the grease cup was placed at the center and the lubricant was supposed to work toward each end. Only one end of the shaft was visible to the greaser. As it happened, the bearing at this end had more clearance than the invisible bearing. The workman forced grease in until it could be seen coming out of the end which was visible and assumed that the other end also was receiving its share. Seizing of the bearing at the far end soon resulted in serious damage to the shaft and bearing. When the apparatus was taken apart for repairs it was found that sufficient grease had not reached the damaged parts. Equipment gives best service which is worked out after close study of the conditions under which it must be maintained.

Decentralization Urged by Regional Plan of New York

SPENDING a billion dollars for subway construction in the next fifteen years will not solve the transit problem in New York City. Such is the conclusion reached in a comprehensive report on transportation recently published by the Regional Plan of New York and Its Environs. The reference to an expenditure of \$1,000,000,000 includes the Transit Commission plan of 1922 calling for extensions to existing systems to cost at least \$306,000,000, and the Board of Estimate proposal of 1925, requiring the expenditure of \$543,000,000 for an independent municipal system. The report points out that the subways have never been able to keep pace with the demand for their use, and that the building of new subways to feed the present congested areas merely makes congestion worse. Additional facilities, instead of being planned to carry people to and from districts that are already overcrowded, should be planned to encourage a better balanced distribution of industry and population.

Despite the remarkable development of skyscrapers in

the downtown section of the city, and more recently in the midtown section, the average height of buildings on Manhattan Island is still comparatively low. Yet some 3,000,000 persons now enter Manhattan south of 59th Street on a typical business day. If the policy of concentration continues, congestion will become worse. At present, however, there is no indication of a halt. The purpose of all the transit plans thus far proposed is to concentrate traffic in the congested portions of lower Manhattan, because that is where the majority of the passengers now desire to go. Rather than to foster this trend, the report recommends that additional facilities be so arranged that there will be gradual dispersion of traffic among a multiplicity of subcenters.

It is pointed out that this probably can best be attained by developing a system of belt-line and by-pass routes that would encourage a more desirable distribution. Only under a unified transit system for the entire city could such routes be developed successfully. With independent operation the tendency is always to tap the areas of greatest congestion in order to secure the maximum amount of business in the minimum time. All means of transportation, according to the report, should be planned to furnish direct routes not only to the older business centers but to the new ones which are arising or may be expected to develop. Short hauls between residences and places of work are advocated as a means of relieving congestion.

Builders of Great Industries Are Entitled to Fitting Rewards

B. C. COBB, Samuel Ferguson and M. S. Sloan are among the men in the utility industry who have deemed it judicious recently to raise their voices against the constantly growing tendency of government to inject itself into business. Although the point of view expressed by these utility executives is quite similar, the particular interest of transportation men attaches to the remarks of Mr. Cobb because of his position as chairman of the electric railway Advisory Council.

Mr. Cobb spoke before the Chamber of Commerce at Jackson, Mich. His subject was "Michigan and Her Public Utilities." In the course of his remarks he said some things about those who would create an "Electric Trust" bogey man, and the propensity of government to interfere with business, that were very much to the point. Mr. Cobb is proud of his country, but he is not proud of the mess it has made of the handling of the merchant marine. He is not proud of certain other governmental activities that might better be left to other hands. He reminded his audience not to forget that when their forefathers wrote the Constitution they intended that the government should stay out of business. Many there are who think our forefathers were wrong in what they did, but Mr. Cobb does not think so. As he sees it, tie men's hands, crush down their spirit by governmental interference and operation, take away the reward for work well done, and the incentive to do is killed.

Like many other men, Mr. Cobb is unable to understand why the desire should exist to throw a brick at the electric industry, the industry that has done more in the past ten years for the advancement of American manufacture and American labor than any other industry in the country. It certainly is a queer manifestation, this one in the United States, that looks with suspicion upon the men who build great industries.

MOTOR REHABILITATION

Decreases Troubles

By *Thomas V. Campbell*

Superintendent of Maintenance of Fisk & Roberts
Consulting Engineers and Managers New York & Queens County Railway
Woodside, N. Y.

WHAT can be accomplished to solve the problem of excessive motor maintenance costs? The answer is afforded in the experience of the New York & Queens County Railway in increasing the life of armature and axle bearings and decreasing field and armature failures. The life of bearings has been prolonged tenfold and electrical failures reduced 75 per cent as a result of a complete motor rehabilitation program involving welding and reboring of armature and axle bearing fits, dipping and baking armatures and fields and installing a new method of bearing lubrication.

REBUILDING OF GE-80 MOTORS

Early in 1902 twenty-eight double-truck cars with GE-80 four-motor equipments were put in regular service on the various divisions of the railway. The usual practices were followed in maintaining the bearings, and mileage was consistent with the grade of bearings used. However, in 1925 an epidemic of broken bearings resulted in a heavy increase in maintenance costs and a reduction in the mileage per bearing from approximately 80,000 to 15,000. After a careful study of the underlying reasons for the breakage it was determined that the cause was abnormal wear on the upper armature bearing housing, axle bearing housing and caps, which permitted the bearings to shift from their correct position.

Immediate steps were taken to prevent this bearing destruction and to restore the cost of maintenance to a normal basis. Although ample electric welding facilities were available for the building up of the worn parts, it was nevertheless found that there was no machine in the shop suitable for the boring process. A machine that had been used for similar work on another type of motor was purchased and a number of mechanical changes were made so that it would be suitable for the reboring of GE-80 motors. When these changes were completed and the machine was installed in its permanent location, plans were formulated and schedules arranged for a systematic rehabilitation of the entire group of motors.

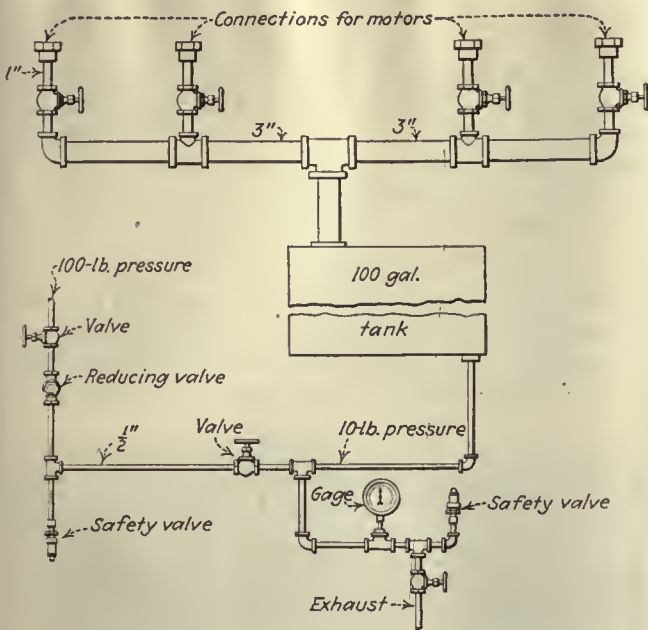


Bake ovens showing sliding doors, counterweights and motors being entered for preheating. The heater control switches can be seen on the brick wall

Electric welding was used to build up the worn surface of the armature housing. This permitted a new bore $\frac{1}{4}$ in. less in diameter than that furnished by the manufacturers. This was done in order to avoid the purchase of heavy bronze bearings, thus effecting a substantial saving. The lighter casting fitted to the new bore has shown a large increase in mileage.

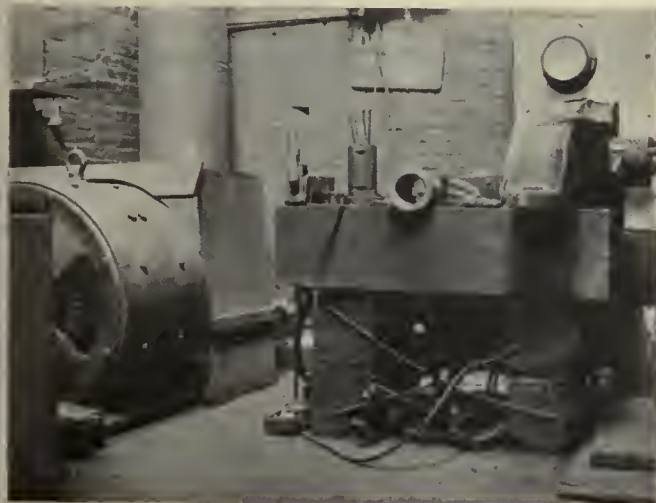
To correct the axle liner housing and cap wear, it was decided to build up the surface by electric welding to such a degree that it could be rebored to its original size. This was necessary because the axle linings used on these motors are designed with a wall only $\frac{1}{4}$ in. thick on account of being used on a 5-in. axle. The bearing would not have sufficient strength if the bore were decreased, as was done on the armature bearing housing.

The welding current was obtained from a 30-kw.



Arrangement of piping for painting motor frames and fields

motor-generator set manufactured by the Allgemeine Elektricitäts Gesellschaft, the generator being designed to operate up to 65 volts and deliver a maximum of 460 amp. The motor operates from the 500-volt shop circuit. The welding metal was laid on the surface longitudinally, and the rough edges were later trimmed off with an electric motor-driven portable emery wheel. The motor frame was then ready to be finished in the boring machine. The cutting tools of this machine are attached to the ends of the boring bars, and the centers of these bars are adjusted to the axle and armature shaft bearing centers furnished by the motor manufacturer. Since the lower halves of the motor frames were not to be rebored, it was possible to install permanently the lower half of a GE-80 motor frame on the traveling bed of the mill in correct alignment. This simplified the set-up and eliminated the necessity of lining up each top half, it being merely bolted to the lower half. A cast-iron drum or jig was made up and installed between the two halves of the motor frame at the field poles. This assured the proper distance between the shaft centers and the field poles. This jig has a bronze bushing in the center

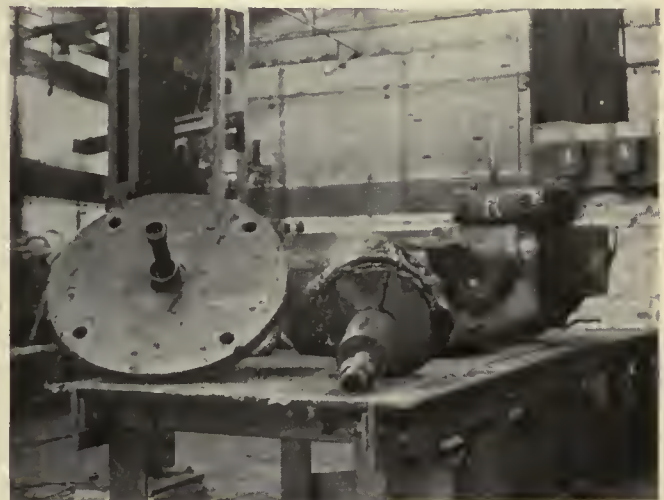


Section of welding room showing generators of 30-kw. motor-generator set

through which the boring bar passes, eliminating whipping. Two wrought-iron braces were forged and bolted to the angle projection of the traveling bed to take care of the strain caused by boring all four housings at the same time. Holes were cut in the permanent half of the motor frame to permit snap-gaging the bores on the pinion end during the machining process. The regular openings provide a means for accomplishing the same result on the commutator end. The machine is driven by a direct-connected 500-volt motor.

LUBRICATION OF BEARINGS

After careful consideration it was decided to adopt the Rico vacuum oiling system and make the necessary bearing housing changes to accommodate the apparatus while the motor frames were being rebored. This method

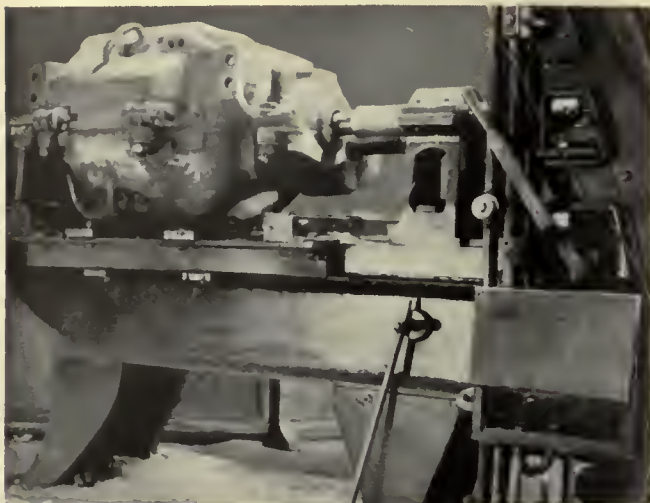


Field-coil assembly stand with finished motor frames and pinion-end connections for painting GE-80 and GE-210 motor frames. The built-up jib crane is also adjacent to bench

was considered far superior to the former one, since the employee engaged in the lubricating and inspection of bearings is guided by a specified standard.

The opening in the armature bearing housing waste window had to be reduced to 1x3½ in., and a 1x3-in. slot was left in the housing. Plates ½ in. thick welded to the outer edges of the slots in an angular position in the waste chambers form a funnel which permits the oil-saturated waste to fall by gravity to the point of contact. Similar changes were made in the axle housing to accommodate the new oiling system. In addition to the change in the top part of the axle-bearing housing, the larger waste window in the axle cap was closed entirely by a ¼-in. plate welded to the sides. This permitted changing the design of the bearings so that the upper and lower halves of the axle liner would be identical and thereby interchangeable. This is obviously a great advantage; the greatest wear occurs on the top half of the bearing, because most of the weight is suspended through the top half to the axle and the pressure is increased when the motor is in operation in one direction.

After the various parts of the motor are welded and machined, they are stenciled with a number corresponding to the manufacturer's number appearing on the motor frame. This is done to eliminate errors in assembling motors with parts which have not been machined together.



Horizontal boring machine showing the two boring bars and upper half of GE-80 motor frame bolted to lower half permanently fastened to the traveling bed

After the boring process is completed the frame is removed from the boring mill and transported to the field assembly bench. The framework of this bench is made of $3 \times 3\frac{1}{2}$ -in. angles and is 22 in. high, 30 in. wide and 12 ft. long. This framework is covered by $\frac{1}{8} \times 6$ -in. steel strips riveted to it. A built-up jib crane 25 ft. high is located adjacent to this bench and is designed with a 6-in. I-beam boom 12 ft. long that will handle the motors on this and the adjacent painting bench. The crane is made from 6-in. channels and tied together with $\frac{1}{2} \times 6 \times 12$ -in. plates. The weight is carried on a pivot plate $12 \times 12 \times \frac{3}{4}$ in. which is bolted to the floor and allows for free movement of the boom. The boom is reinforced with a 1-in. round iron rod fastened to one end and to the gaff. Adjustment is made by a turnbuckle. A 2-ton chain hoist and a 2-ton air hoist provide the motive power for lifting.

After the motor frame is placed on the assembly bench, it is blown out and cleaned thoroughly. The field coil seats are smoothed and all projections are removed. Then the frame is painted. Impregnated field coils are installed and bolted in place. Care is exercised to see that the field coil springs, oil canvas liners, side and top shields are in proper position. The connections are then

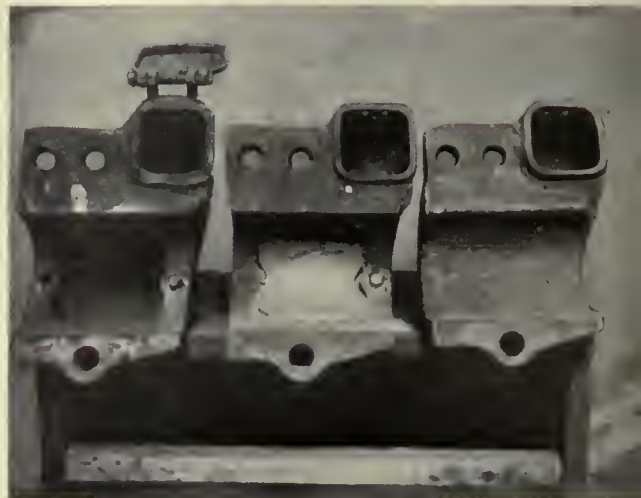


Painting stand with four GE-80 motors installed in vertical position ready for internal painting

made for internal and external use. The two halves of the motor frame are now bolted together and sealed with a canvas gasket. All drain holes are plugged with wood, and specially constructed casting with a 1-in. pipe connection in its center is fitted to the pinion end. The assembled motor frame is now ready to be transferred by a hand truck to the baking oven, where it is heated at 100 deg. C. for about seven hours.

CONSTRUCTION OF BAKING OVEN

The oven is made of furnace brick supported by a steel framework. It is 13 ft. 10 in. long, 10 ft. 2 in. wide and 6 ft. high and is divided into two equal compartments. The vertical walls are 9 in. thick. T-beams spaced 6



Three stages in changing the waste window of GE-80 axle cast. Left, on left. Center, $\frac{1}{4}$ -in. plate installed and ready for welding. Right, welding completed.

10-in. centers form the ceiling framework, which is filled in with firebrick. Each compartment is heated with 3 double coil electric heaters arranged in four circuits controlled by individual switches. The front of each compartment is inclosed by a door made from No. 16 gage sheet steel. The space between the inside and outside sheathing is filled with magnesia blocks. The doors are raised and lowered vertically and are counterweighted with a piece of 5-in. car axle suspended on a $\frac{1}{4}$ -in. steel cable passing over pulleys. The end guide for these doors is made of two angles that form a Z bar with plate bolted to it. The center guide is built up of two plates with $1\frac{1}{2}$ -in. spacers, thus providing a double guide to accommodate both doors.

PAINTING MOTOR FRAMES AND FIELDS

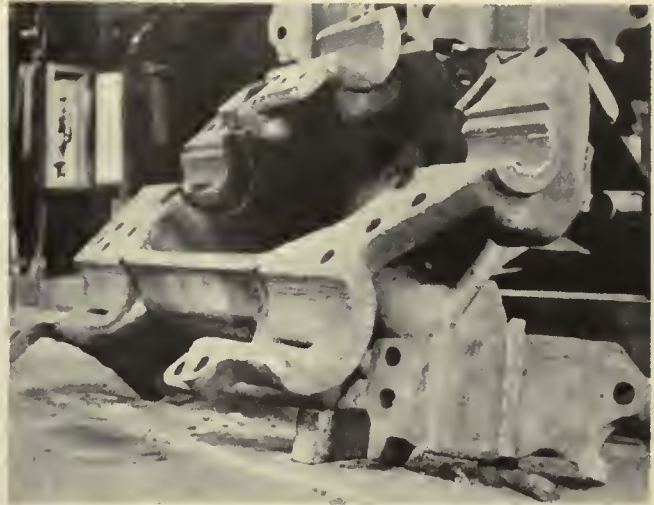
After the preheating the motor frames are removed from the oven and placed in a vertical position on a specially constructed rack. The pipe connection that was inserted in the frame before baking is now pointed downward. This rack is adjacent to the field assembly stand. Its framework is made from $3 \times 3\frac{1}{2}$ -in. angles and is 17 in. high and the same length as the assembly stand. This steel framework supports individual wood frames made of oak, each designed to support one motor safely in vertical position. The stand will accommodate four motors. Directly under it and beneath the floor is a 100 gal. tank in which the insulating paint is stored. A 3-in. header extending the entire length of the rack is installed below this rack and is connected to the top of the tank

Vertical risers are tapped off of this header under each motor. A union connection and valve installed on the end of these risers permits connecting the motor to the paint supply pipe and controlling the paint outlets. The 100-lb. shop air line is connected to the bottom of the tank through a reducing valve, gage and supply valves. This air pressure is reduced to approximately 10 lb. When the motor frames are in their proper position and the pipe connections are made, the air pressure is increased in the tank, forcing the paint into the motor frame to a height above the field coils. The paint remains in the motor frame until its temperature decreases to about 20 deg. C., measured by a thermometer. Then it is drained back into the storage tank by releasing the air pressure.

FINAL OPERATIONS

When the paint is drained thoroughly the motor frame is disconnected and returned to the assembly rack. It is opened and all sealing material and fixtures removed from the pinion end. The laminated pole faces are now cleaned thoroughly with gasoline to remove excess paint and assure a clear surface. An overhauled armature with its newly-fitted bronze bushing is then inserted. Redesigned axle liners are placed at the same time and secured by the lower cap to keep them intact until they are placed in the truck. Next the completed motor is placed on the floor, and power is applied intermittently through a controller, the motor being run in each direction for several minutes. This makes certain that the bearings are fitted properly, that no undue heating will develop, and that the electrical work has been performed properly.

The painting equipment was developed for this property by the Fisk & Roberts management primarily to safeguard the fields against premature breakdowns. Some of the tracks are laid through a section which is not



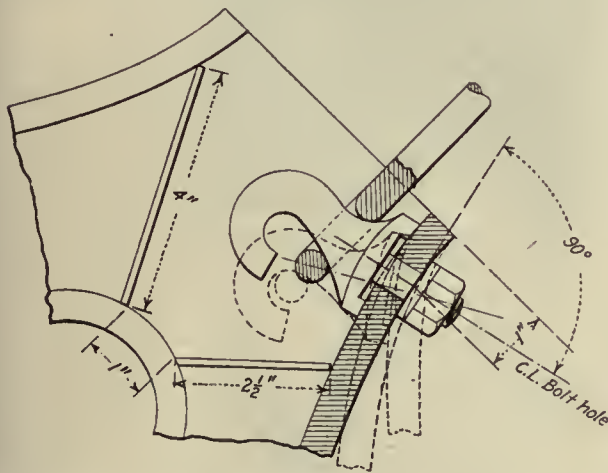
GE-80 bearing fits welded and ready for machining

Careful study was given to the fields of these motors, especially their support and painting. The field support originally supplied by the manufacturer was abandoned and a spring support substituted. This change was made to obtain a fixed tension on the field coil between the upper and lower points of contact. Prior to this change a number of field coils loosened, caused by the drying out of the insulation material. They worked about so that the insulation became worn and finally the field grounded. To install the new spring support it was necessary to cut away a portion of the old one and use it between the pole pieces and the motor frame. This had to be done to obtain the proper air gap. The remaining portion was discarded and a spring substituted that maintains a constant tension in the field coils at all times. As a result, the insulation wear caused by loose fields is eliminated.

After this field work was completed the pinion end of the motor was provided with a fixture having a pipe connection, all holes were sealed, and the same procedure followed as with the painting process on the GE-80 motors.

OVERHAULING OF ARMATURES

All GE-80 armatures are inspected carefully and, where necessary, they are rebuilt complete with new shafts, coils and commutators. After an armature core



Sketch showing angular plates installed in armature bearing lining

drained. The result is that these tracks are often covered by water 4 to 10 in. deep. The painting process has practically eliminated failures due to this cause.

OVERHAULING GE-210 MOTORS

In 1910 twenty double-truck cars with GE-210 two-motor equipments were placed in service. Since then they have been operating continuously. Early in 1924 some wear developed in the armature bearing housing. We decided not to build up the housing as was done with the GE-80 motors but to rebores it to a large diameter and install an oversize bronze bushing.



GE-80 bearing fits machined and ready for bearings

leaves the machine shop the slots are either filed or ground smooth with an emery wheel. Next the end bells are insulated with shellacked red pressed paper. Then fabric impregnated with an insulating compound is placed over the red paper and the coil slots insulated with fish paper. After this the new coils are installed in the slots, being paraffined liberally to eliminate unnecessary pounding and prevent short circuits. A piece of fish paper is placed between the upper and lower coils, and mica is inserted at the end of the slot against the edge of the laminations to prevent the coils from being injured at the point of exit from the slot. The coil ends are then inserted into their proper commutator ears.

Heating of the commutator for soldering is done by a gas flame that is directed on a remote section. When the soldering is completed the winding is again tested for grounds, open and short circuits. The armature is next removed to the banding lathe, where temporary bands are put over the flat steel plates installed on the top of each coil. This assures that the banding pulls the coils well down into the slots. The armature is then placed in the baking oven and heated at a temperature of 120 deg. C. for three hours. Afterwards the temporary bands are

removed and permanent bands put on. This method of banding draws the coils into a solid mass, preventing movement which usually results in an open circuit. After the banding, the armature is returned to the oven and baked for four hours at a temperature of 120 deg. C. It is then taken out of the oven and placed in the banding lathe and thence revolved in a bath of insulating paint and paint is poured liberally into the coils. After the armature is baked for 30 hours at 120 deg. C. all moisture evaporates. It is then fitted with new armature bearings and placed on a rack until needed for service.

This plan of motor rehabilitation has reduced maintenance costs to a normal basis and has resulted in about a 1,000 per cent increase in bearing mileage and a 50 per cent reduction in electrical failures. This rehabilitation was one of the important features of the program adopted by Fisk & Roberts in resuscitating this property. Its successful outcome is recognized as an important factor in present operation, particularly the maintenance of regular schedules, and is a contributing cause of the healthy increase in patronage now coming to the cars of this company.

Some Equipment Maintenance Notes from Atlanta

WHEN controllers are overhauled in the shops of the Georgia Power Company, Atlanta, Ga., all parts are sand blasted and cleaned, after which worn parts are renewed and put in perfect condition. The sand blasting method of cleaning has proved of great advantage. Motor rehabilitation includes the cleaning and repainting of all parts. Fields are taken out and reinsulated, dipped, baked and tested. Trucks are dismantled so that all worn parts can be inspected regularly. Compressors are overhauled every eighteen months and air-brake equipment is cleaned on a six months program.

Systematic inspection of various car equipment parts is facilitated by the report and record system. Each conductor or operator makes a daily record which embraces the performance of the car from the time it leaves the carhouse until its return. The superintendent of equipment receives the statements and uses them as a basis for his inspection procedure. As a result of this method motor troubles have decreased considerably. There were but twelve in 1926 as compared with 271 in 1921, or a 95.6 per cent decrease. There were a total of 331 hot journal troubles in 1921, and but seven in 1926. Hot armature bearings have been reduced from 45 in 1921 to three in 1926.

Other interesting figures show a decrease in controller troubles to 21 in 1926 as compared with 292 in 1921. Brake slack adjusters and other improvements incorporated in the new cars have reduced brake failures. There were 397 in 1921, and only 26 in 1926. In addition to the installation of slack adjusters PV brake valves were installed and all brake cylinder packing leathers were renewed.

In connection with one-man car operation there was at first some complaint of stiffness of brake valves which was found to be due to the system of lubrication. This was remedied by the installation of Dot pressure lubricators. These were placed on top of the valve stem. On

four-motor cars, line breakers and LB type controller handles have been installed, which has eliminated flange overers from the platform controller. The line breaker equipment is designed so that the controller handle may be stopped on the first point during acceleration. Minimum cell-type lightning arresters have replaced glass type arresters and have reduced damages from lightning from 1533 in 1921 to 0 in 1926. Behind this 100 per cent new car and rehabilitation program is a thorough modernized car shop.

Recently, a new method of car cleaning has been introduced by which the units are cleaned without the necessity of bringing them into the carhouse. Cars are dry washed instead of being washed and waxed. Commencing with the first of 1927 the company reduced its car painting interval from 24 months to 20 months. Cars are washed every six months and are swept and cleaned every time they return to the carhouse.

Additional saving has been brought about by installing Economy meters on all units at an installation cost of \$27,000. Operation was begun in February, 1926, which resulted in saving of energy at the car of 2,950,000 kw.-hr. which translated into operating expense is a saving of \$30,000. During the first month that the meters were in operation, that is, February, 1926, the consumption of energy per average car-mile was reduced 4.13 per cent below the amount consumed prior to that date, and in December, 1926, due to increased interest on the part of the personnel, there was a 13.10 per cent decrease in the amount consumed as compared to the period prior to meter installation.

As another economical adjunct to the car operation a new 12 cu.yd. sand car with a 160 cu.ft. compressor and other equipment, has been introduced. This is mounted on an old express car. The tank is filled with gravity from the dry sand bin and is unloaded by compressed air into elevated tanks or bins at the carhouse.

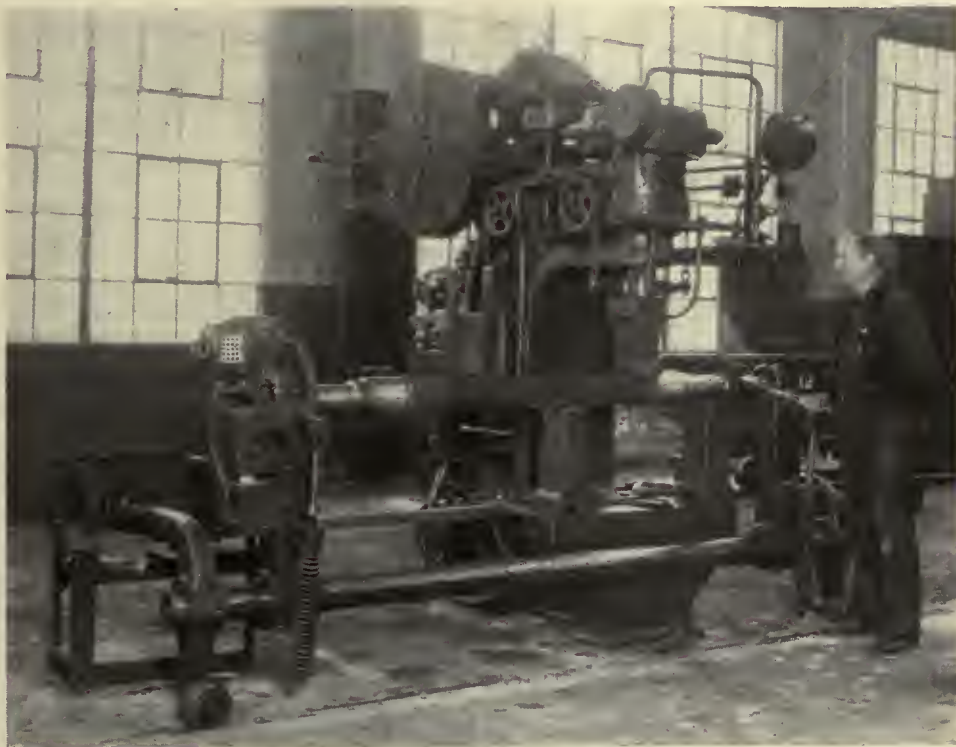
Wheel, Gear and Axle

MAINTENANCE

For efficient maintenance of these parts on the Brooklyn-Manhattan Transit lines, the most modern machine tools have been installed in the Coney Island shops. Careful grouping of machines eliminates rehandling

in Brooklyn*

By Clarence W. Squier
Associate Editor *Electric Railway Journal*



Every axle that does not go to the grinding machine for truing is tested at the 200-ton hydraulic press. If bent, this machine provides a quick means for straightening

DUE to the large volume of wheel, gear and axle inspection and repairs on most electric railways, and to the necessity for repeating maintenance operations continually, the work is placed on a production basis more often than other railway maintenance procedures. As a result it is quite common to find wheel and axle work done in sections of the shop set apart for this purpose. The wheel press, boring mill, axle lathe and wheel lathe universally used for this work are usually grouped to eliminate unnecessary handling. With the advantage of a new shop at Coney Island with new machine tools, the mechanical department of the Brooklyn-Manhattan Transit lines has been able to perfect a most effective department for this work.

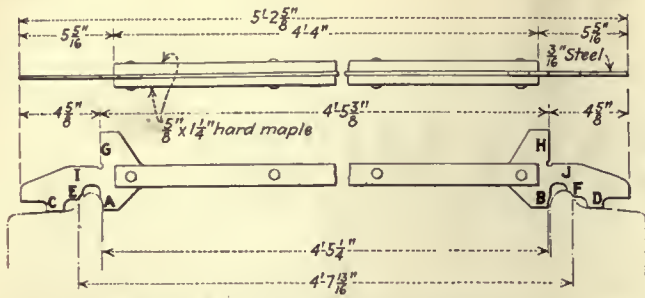
The wheel and axle department occupies a section of the shop 60x200 ft. Not all of the machine tools for

which space is provided have been installed, but when completely equipped the department will include the tools listed in the accompanying table. A large section just east of the shop provides convenient open departmental storage for wheels, axles and shafts. This material is handled by overhead electric crane and electric crane trucks through doorways directly to boring mills or lathes for the machine work. Mounted wheels that come from the truck overhauling or repair departments are handled by overhead crane and enter and leave the section at the wheel lathe end. The entire department is also served by a 7½-ton overhead traveling crane, while groups of machines have jib cranes, there being four of these in the department, each having an 18-ft. boom.

HANDLING REDUCED TO A MINIMUM

The number of times that wheels and axles are handled and the amount of handling equipment has been kept to a minimum by particular attention to location and grouping of machines. Wheel boring is done in the central

*This is the third article on methods used and equipment installed in the Coney Island shops of the B.-M.T. Corporation. Others were "Truck Overhauling," published April 21, 1928, and "Intermediate Truck Repairs," published May 5, 1928.



Wheel mounting and check gage

When mounting new or newly turned wheels after one wheel is pressed into position, the stop *A* or *B* of the mounting gage is placed against the inside of the flange of the wheel pressed in position and the corresponding tread stop *C* or *D* against the tread of the wheel. The second wheel is pressed onto the axle until the opposite tread stop comes in contact with the tread with the corresponding gage point *E* or *F* in contact with the outside of the flange.

For mounting partly worn wheels after one wheel is pressed into position, the stop *G* or *H* of the mounting gage is placed against the side of the flange of the wheel with the corresponding surface *I* or *J* resting on the top of the flange. The second wheel is then pressed onto the axle until the opposite stop *G* or *H* comes in contact with the inside of the flange of the wheel.

In checking wheels when both stops *C* and *D* will not rest on the treads of the wheels, they are out of gage.

part of the section. Each of the Sellers 48-in. car wheel boring machines has two built-in jib cranes. While one wheel is being bored another is picked up and held in position by one of the cranes to be swung on to the table of the mill, as soon as the boring of the wheel in the mill is completed. The other jib crane with the previously finished wheel in suspension deposits it on a truck placed alongside.

From the boring mill, wheels to be mounted on axles go to the Chambersburg Engineering Company double-acting, 400-ton, hydraulic wheel press. This machine is used also to press gears on and off. The double pressure heads make it possible to dismount both wheels from a trailer axle without the necessity of removal, after one wheel is pressed off, in order to turn the axle for pressing off the remaining wheel.

Hydrograph chart records are kept of each pressing-on operation. These are numbered consecutively for each day's work, and a notation is also made on each record of the wheel number, the man that fitted the wheel, and the diameter of its bore. Each day's records are put in an envelope and filed by dates. If it is necessary to consult the records for a particular wheel pressing later, the

truck overhauling report furnishes the date wheels were changed and number of the wheels. The hydrograph records for that date with wheel number identify the particular operation. In addition, a book record for each pressing is kept at the press. When filled these books are filed.

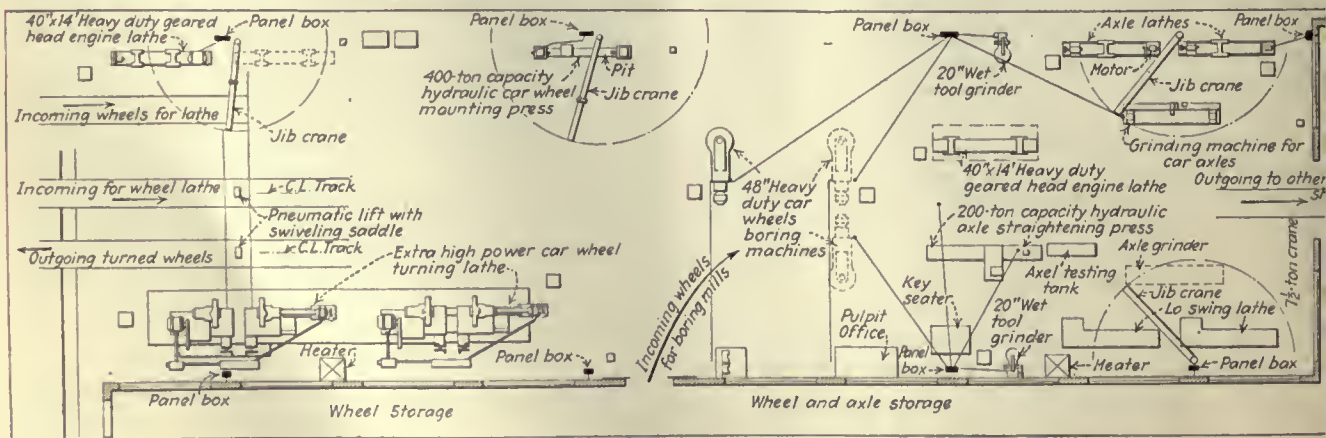
Subway motor axles have a seat for wheels $7\frac{5}{16}$ to $7\frac{1}{8}$ in. in diameter, and trailer axles have a wheel seat of $6\frac{1}{2}$ in. to $6\frac{3}{8}$ in. in diameter. Pressures for forcing wheels on must be not less than 75 tons nor more than 95 tons for motor axles, and between 70 and 90 tons for trailer axles. The wheel seat for a standard subway axle may vary 0.001 in. plus or minus. Wheels are bored 0.001 in. per inch of diameter smaller than the axle. The hydrograph gives a pressing-on pressure of from 10 to 12 tons per inch of diameter. Complete information regarding wheel and axle fits for the different equipment in operation, pressing-on pressures, mating of wheels, scrapping diameters, etc., is furnished the wheel and axle department in blueprint form.

Machine Tools for Wheel and Axle Section of Coney Island Shops

- Two extra high power wheel turning lathes.
- Three 48-in. heavy-duty wheel boring machines.
- One 400-ton hydraulic wheel-mounting press.
- One 200-ton hydraulic axle-straightening press.
- Three 40-in. x 14-ft. heavy-duty geared-head engine lathes.
- Four 8-in. LoSwing axle lathes.
- Two 12x96-in. grinding machines for axles.
- One external key seater.
- Two 20-in. wet tool grinders.
- One axle-testing stand with tanks.

In mounting wheels it is the practice to have both wheels on the same axle of the same tape size. A special type of gage is used for gaging wheels. This has one side for gaging new and newly turned wheels and the other for gaging partly worn wheels. New and newly turned wheels are gaged from throat to throat, while worn wheels are gaged from back to back.

As the wheels used on the rapid transit motor axles have diameters ranging from $30\frac{1}{4}$ in. to $34\frac{1}{4}$ in., and gear wheels have outside diameters of 25 in. to 27 in., it is possible to support the wheels at the rim for pressing off. A circular yoke has been supplied by the manufacturer of the press to go over the outside of the gear and fit between the rim of the wheel and the center frame of the press.



Layout of machine tools and equipment for the wheel and axle department of the Coney Island shops, Brooklyn-Manhattan Transit Lines

during the pressing. The yoke is suspended from a pipe framework with a roller support so it can be put into position or swung out of the way easily by the operator.

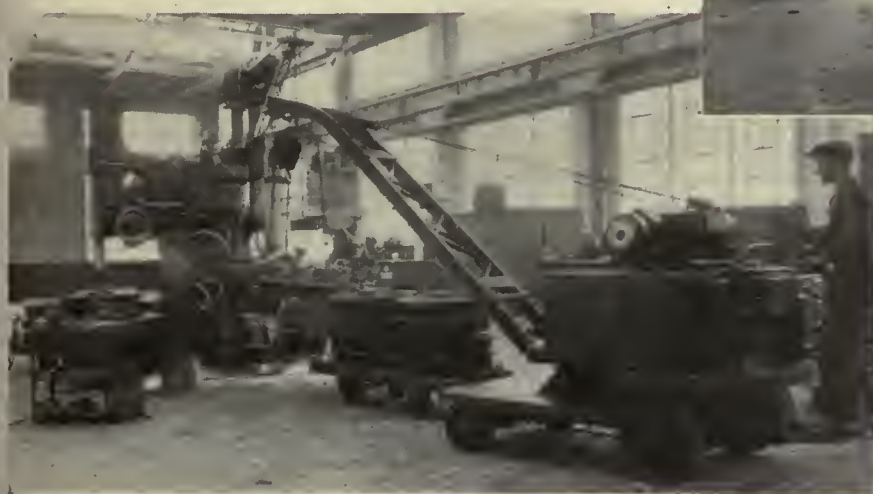
The Brooklyn system was a pioneer in the use of steel wheels for electric railway service, adopting them in 1905. Excellent results and substantial economies have been obtained. By concentrating all wheel and axle work at one point, under the direction of one man, every mile of service consistent with safety is obtained from the wheels.

CHECKING FOR WEAR SYSTEMATIZED

The different maintenance foremen are expected to see that the wheels are worn to, but not below, the various scrapping dimensions which are furnished them in blue-print form for their guidance. New wheels for subway motor axles are $34\frac{1}{4}$ in. in diameter and can be worn to $30\frac{1}{4}$ in. Subway trailer wheels are of 31 in. diameter when new and can be worn to 27 in. When the wheels removed from the trucks are received in the wheel shop, they are checked carefully with gages to ascertain dimensions and defects. An inspector also checks the axles carefully and measures them to determine whether truing up is needed and also to make certain that the bearing fits on the trued-up axles are above the scrapping limit. If a bearing fit will not true up above scrapping dimensions the inspector paints it red and the wheels and axle are

handling, sweeps up chips, oils the machine, takes wheel measurements and does other work necessary while the wheels are being turned.

The wheels are rolled directly into position in the lathe on a track. Crossing this at right angles are two tracks used for the incoming and outgoing mounted wheels. There are two pneumatic floor lifts, one in the center of each crossover. The helper rolls a mounted pair of wheels along the incoming track to the crossover, steps



At top—Boring out a subway wheel. The wheel suspended from the crane on the left is ready to be swung into position. A truck at the right receives wheels after they are bored. The crane at the right handles finished wheels

At left—A truck load of finished wheels being taken away from the boring mill by an electric crane truck

routed to the wheel press for removal of the wheels. The same inspector who inspects bearing fits also determines whether the wheels can be returned to service and indicates any work that is necessary. If it is found that the wheel will not true up to $\frac{1}{4}$ in. above the scrapping limit it is marked for removal.

For steel wheel maintenance work the wheel lathe is an important and busy tool. At present, one high-powered lathe is doing the work. This was supplied by William Sellers & Company, Philadelphia, Pa. Three pairs of wheels per hour are turned out, on an average. Handling of the wheels is speeded up considerably through the use of pneumatic floor lifts and a hoist which forms a part of the lathe. The lathe has two turret tool posts, each arranged to hold four tools. There is a roughing tool for the wheel tread, a flange roughing tool, a combined tread and flange finishing tool, and a chamfering tool. The lathe swing is 42 in. and a $\frac{3}{8}$ -in. cut can be made at high speed. Through the use of an efficient clamping arrangement, wheels can be removed and new ones put in place for turning in two minutes. Only one man and a helper are assigned to the lathe. The helper assists in wheel

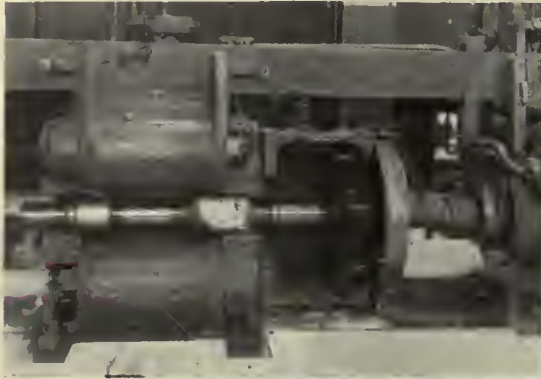
on a button controlling the valve to admit air to the hoist cylinder of the lift, and the plunger raises the wheels free of the track. The wheels are rotated a quarter turn and then are lowered to the track leading to the lathe. The action is reversed to remove a pair of wheels after turning. This has proved a very easy and quick method for serving the lathe.

Each axle is carefully inspected and tested to detect any minute cracks that would be liable to result in breaking later. The axle, with its wheels in position, is wet with a bath of kerosene while on a test stand. The axle is then wiped dry and is painted with a paint of lime in a solution of one-third alcohol and two-thirds water. The alcohol causes the mixture to dry quickly. After numerous tests, this proportion was found to give a smoother coating than any other combination or composition. A crack retains some of the kerosene. This penetrates the lime coating quickly and leaves a brown discoloration so that detection is easy. Axles without wheels are dipped in kerosene and then wiped dry and painted with the lime. An accompanying illustration shows a crack at the end of an axle that was detected by this method. To get

an idea of the depth of the crack the axle was turned down to the different diameters shown. Since this method of inspection was adopted no axles that have undergone this test have broken in service. It has been in use about $1\frac{1}{2}$ years. After testing, axles with wheels mounted are stored on racks to keep them off the floor until they are removed to other departments or shops for mounting in trucks. Wheel racks have four 3x4-in. angles arranged in pairs, each pair spaced wheel gage distance apart. The angles are fastened together by steel straps to form a rigid framework. Alternate pairs of wheels are staggered so as to take up a minimum amount of room. Each bearing seat has a protective covering, made of a number

turned and ground to accurate sizes in the wheel and department. For this work there are two groups of machines each. In each group there are two 8-in. L. Swing axle lathes and one 12x96-in. grinding machine. Bearing fits are turned in the lathe to a size 0.015 in. to 0.018 in. larger than standard. They then go to a grinding machine and are finished accurately to exact size. The Low-Swing lathes were furnished by the Soca Falls Machine Company to be used for axle and armature shaft turning. Their beds are 108 in. long. There are two carriages with three tool posts on each so that six tools can be used for cutting on the same part at one time. As a result of the use of these rapid production lathes the time necessary to finish axles has been reduced to one-fourth of that necessary with ordinary engine lathes.

An accompanying illustration shows one of these lathes



At top—A yoke fits between the inside of the wheel and the center frame of the press over the outside of the gear for pressing off wheels from the gear end of the axle.

Center view—Pressing a wheel on an axle at the 400-ton hydraulic wheel press.

At bottom—The yoke used in pressing off wheels at the gear end of the axle and other accessories used in the pressing operation are mounted at the back of the press so as to be swung into position easily by one man.



of wooden strips strung on small ropes. Each strip is about 1 in. square and of a length sufficient to cover the bearing surface. By tying the loose ends of the ropes together the covering is held securely.

Bearing seats which are worn tapered, out of round, cut or have rough fillets are turned in a gap lathe. For this work with wheels in position, two heavy duty American 24-in. by 14-ft. geared head engine lathes are used. The bed of the lathe has two gaps for the wheels, the swing in the gaps being 40 in. Each lathe has two carriages, one with two tool posts. With this equipment the two motor suspension axle bearings and one-truck journal bearing can be trued up at the same time.

New axles have bearing seats $\frac{1}{4}$ in. in the rough over size when received from the manufacturers. They are

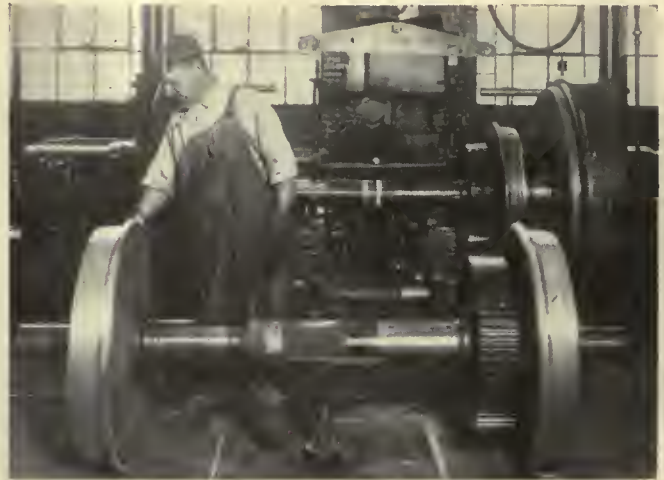
turning a large subway car axle. The various finished fits for this type of axle are, journals 5x9 in., dustguard surfaces $6\frac{1}{2}$ x2 in., wheel fits $7\frac{7}{16}$ x $6\frac{1}{2}$ in., gear seats $7\frac{1}{2}$ x $6\frac{1}{2}$ in., and axle bearings $6\frac{1}{2}$ x $12\frac{3}{4}$ in. The total length of the axle is 7 ft. 1 in. With the improved lathe equipment this size axle is turned ready for grinding in an average of three hours. With the single-tool lathe ordinarily used, the machining operations on an axle of this size would require at least three hours for rough finishing and an additional nine hours for finishing cuts. Previously two different lathes were used, one for roughing and the other for finishing, so it was necessary to change the axle from one to the other.

In addition to provisions for multiple tools cutting simultaneously, this type of lathe has a geared headstock

providing for six spindle speeds and a geared feed with nine changes. The geared headstock is rugged, so as to withstand the severe strain imposed upon it when several tools are taking heavy cuts. The clutch for starting and stopping the machine is on the driving pulley shaft and is operated by the shifter rod placed above the table. In order to obtain rigidity the tool holders are clamped directly to the carriage casting itself, which, in turn, bears directly on the bed of the lathe. This eliminates numerous intervening parts in the supports for the cutting tools and avoids possibility of vibration. The cutting tools do not extend across the bed of the lathe, so that the carriage can be run past the tailstock or back rest without moving the tools from their position. A geared pump built into the head of the lathe provides a continuous flow of cutting compound. The volume of axle work in the Coney Island shops permits the lathes to be kept busy continuously.

Finishing of axles by grinding, which is coming into quite extensive use, has been adopted in the Brooklyn shops. Landis 12x96-in. grinders are used. There is a saving of approximately 25 per cent in the time taken to finish axles as compared with that when they are finished in a lathe. There is also greater accuracy of dimensions and smoothness of finish, so that longer life of bearings results. Where wheels or gears are to be pressed on axles, the grinding finish produces more uniform pressure for the pressing and the grinding finish eliminates irregularities common with filing or rolling, so due to the smoother surface there is a better fit and more surface area in contact between the wheel bore and the axle. This method is also of advantage in producing a better fit of bearing so that the pressure per square inch is reduced. As the pressure employed in grinding is not great, there is little danger of particles of emery becoming embedded in the surface of the axle, and all loose particles are washed away with the heavy flush of water used. Axles without wheels that have surfaces to be trued up go to the grinding machine. Those with wheels mounted go to the gap lathes for truing.

The 200-ton hydraulic axle-straightening press forms an important part of the equipment for the axle section. Every axle without wheels that does not go to the grinder goes to this test machine to determine if it is bent. If

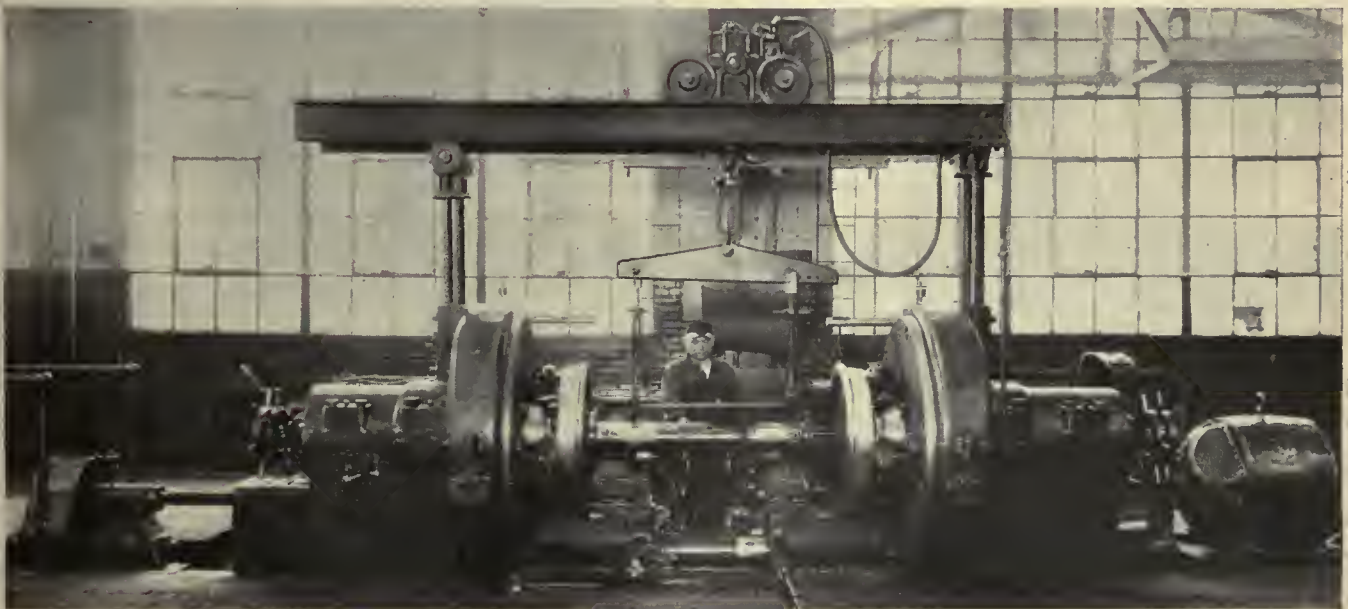


Pneumatic floor lifts provide a convenient means for turning wheels from the incoming and outgoing tracks to that serving the wheel lathe

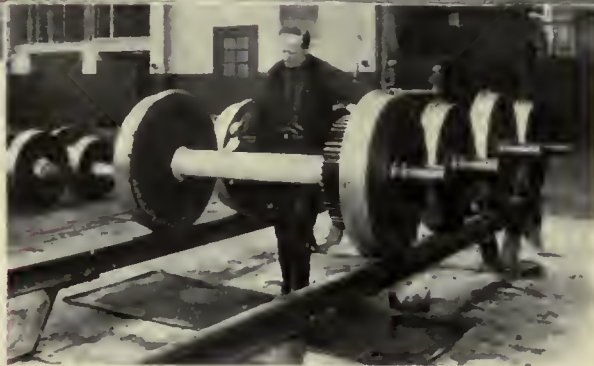
so, the straightening becomes an added part of the maintenance procedure.

Besides the machine tools, the axle section contains a large number of portable axle racks. Each will hold seven axles with gears mounted and they are placed at convenient locations so that the jib crane which serves one of the various machines can deposit an axle in one of these racks after it is turned and is waiting to go to the grinding machine. After grinding the same jib crane handles the axle to another rack, or an individual axle can be picked up by an overhead traveling crane and taken to another section as desired.

These axle racks are constructed of angles and channels. The ends form a triangle. Two 12-in. channels form the top portions of the ends. To these, 6-in. angles are riveted to form the support for the ends of the axles. To prevent injuries to the axles the faces of these angles are covered with $\frac{1}{8}$ -in. copper. Gusset plates strengthen the framework at all corners. The complete rack is 5 ft. wide and 8 ft. long. The bottom framework is constructed of 4-in. angles, with a plate at each corner. These are 6 in. wide and $\frac{1}{2}$ in. thick and have holes so that tackle can be fastened to lift the entire rack with load by



An average of three pairs of wheels per hour are turned in this wheel lathe



Rapid Transit Service Requires Careful Checking and Testing of Wheels and Axles



At top—All axles are tested carefully for cracks before being sent out from the wheel and axle department. The axle of the pair of wheels on the stand at the left has just received a bath of kerosene. Axles of mounted wheels on the track at the right have been painted with lime as the second operation of the test.

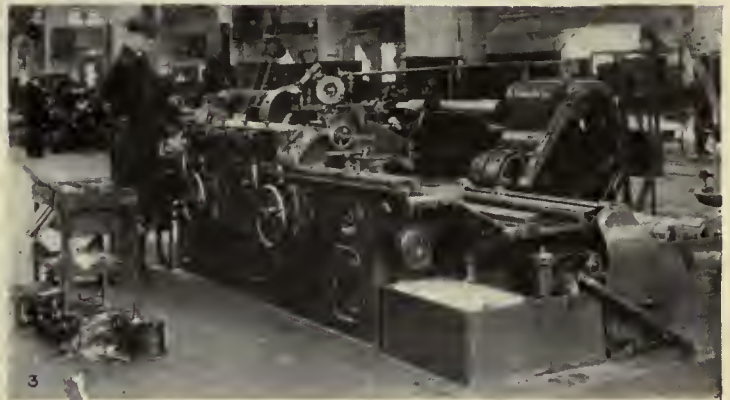
Second view—Painting the axles of mounted wheels with lime on the test stand.

Third view—Crack at the end of an axle. The turned sections show the depth and width of the crack at different depths.

The bearing fits of axles are protected by wooden strip coverings. These are shown at the right.

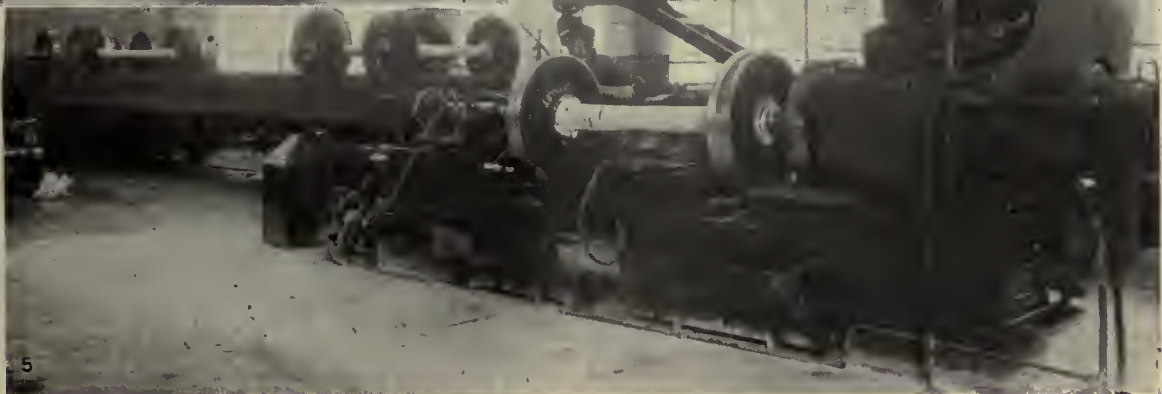
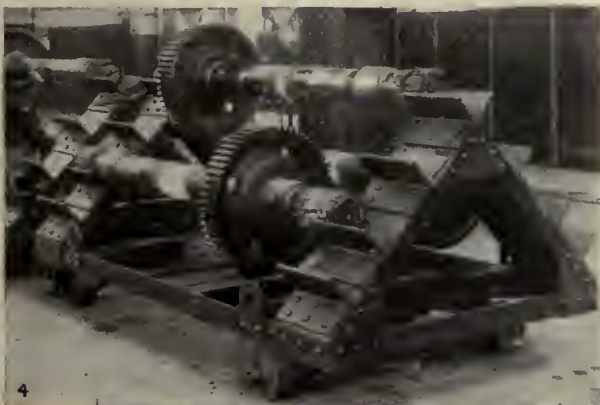
View at the bottom shows mounted wheels ready for service are placed on racks to keep them on the floor.

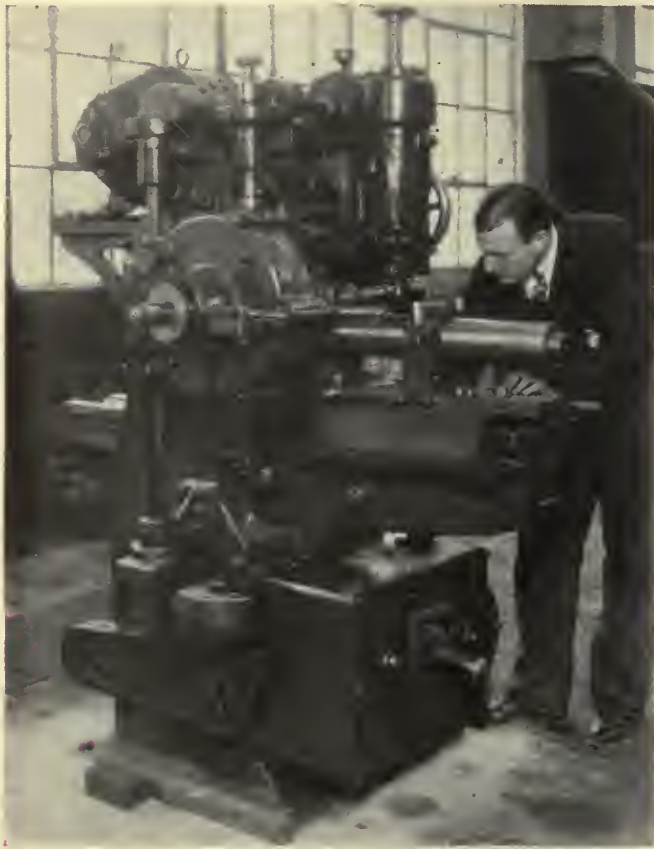




Equipment for Axle Work

1. One of the batteries of three machines used for finishing axles. Two Lo-Swing lathes are shown in the foreground and an axle grinding machine in the rear. Between these are axle racks to receive axles in various stages of completion.
2. Turning an axle in one of the 8-in. lathes with two carriages having multiple tool posts.
3. The finishing operation of axles is done in a grinding machine.
4. Portable axle racks provide a convenient means for storing axles.
5. High-power gap wheel turning lathes are used for turning axle bearing fits with wheels mounted. A supply car is shown at the left as it is being loaded with wheels to go to other shops of the system.





An external keyseater for armature shafts forms a part of the equipment of the wheel and axle department

an overhead traveling crane if desired. As the racks are fitted with wheels they can be moved with their load of axles. The wheels are of 8 in. diameter and have a 4-in. face. The front axle is constructed of a 4-in. I-beam and has a center bearing and circular side bearings so that it can swivel for turning sharp corners and moving about.

Maintenance work on wheels and axles for the entire B.-M.T. lines is done at the Coney Island shops. There are three other shops where wheels and axles are removed and installed. A wheel supply flat car makes daily trips to and from the shops. Handling of wheels mounted on axles at the Coney Island shops is facilitated by providing a track into the wheel and axle section so the car can be run inside and loading and unloading done with the overhead traveling crane. The top of the wheel supply flat car has wooden blocking bolted permanently in place to keep wheels from rolling while in transit.

The wheel and axle section also does the finishing work on new armature shafts. A Mitts & Merrill external key seater is used for cutting keyways in shafts.

Rails Replaced Without Disturbing Ties

By W. L. LEWIS
Engineer Erie Railways, Erie, Pa.

IN THE summer of 1927 the Erie Railways found that the rails on West 18th Street, Erie, Pa., needed replacing while ties, paving, etc., still remained in good condition. This track had been rebuilt in 1915 on a 5-in. solid concrete base with a new 4-in. wire-cut lug brick pavement. At that time all new material was installed except the rail, which was relaid after the ends were cut off. After considering cost of reconstructing this stretch of track it was decided to remove the old rail and lay other rail in its place on the existing substructure. Due to several small abandonments of track the company had some very good 7-in., 80-lb. plain girder relayer rail on hand which it decided to use.

The work as carried out consisted of first digging a trench on each side of the rail. The old rail was removed and all dirt was cleaned out. The ties were also



A convenient departmental storage for wheels and axles speeds up production. Material can be brought in on a car and unloaded by the overhead 7½-ton traveling crane. Wheels are loaded on small trucks and taken to the wheel and axle department by electric crane trucks

cleaned carefully and where mechanical wear showed at the joints they were adzed carefully to a true surface. Upon the clean ties 8x12x3-in. white oak blocks S-2-S were laid with staggered holes drilled for spiking, the staggering being reversed from the original. A special cut spike was used $8\frac{1}{2} \times \frac{5}{8}$ -in. instead of the $5\frac{1}{2} \times \frac{9}{16}$ -in. standard. This gave the same length of spike in the tie and as the ties were all in first-class condition and to a perfect surface the rail lined up advantageously.

After the track was lined up and spiked thoroughly amesite was tamped with bar tampers under the base of the rail between the ties. Then by the use of 2x6-in. forms to keep the concrete away from the rail, the excavated portion was filled in with concrete to within 5 in. of



Replaced rail laid and lined



Track on West 18th Street before reconstruction was started

the top of the rail except a portion about 7 in. wide, which was kept open to the base of the rail by the forms. This was filled in with amesite after the concrete had set and was bar-tamped thoroughly to the top of the rail. After this the whole top surface between the rails and to the pavement outside the rails was filled with amesite and rolled. The ties cut their own flangeway.

This job was watched closely during the past winter, which was exceptionally unfavorable for track construction, there being heavy snows with sudden thaws and freezes. Together with the adjoining pavement the work has stood up well and a considerable amount of this type of reconstruction is contemplated during the coming season. The accompanying table shows the cost of the reconstruction:

COST OF RECONSTRUCTING TRACK ON WEST 18th STREET, ERIE, PA.

Class of Work	Cost	Class of Work	Cost
Grading.....	\$403.34	Paving.....	1,379.59
Ties.....	268.32	Miscellaneous.....	21.20
Rails, etc.....	859.16		
Track labor.....	256.26	Total.....	\$3,187.87

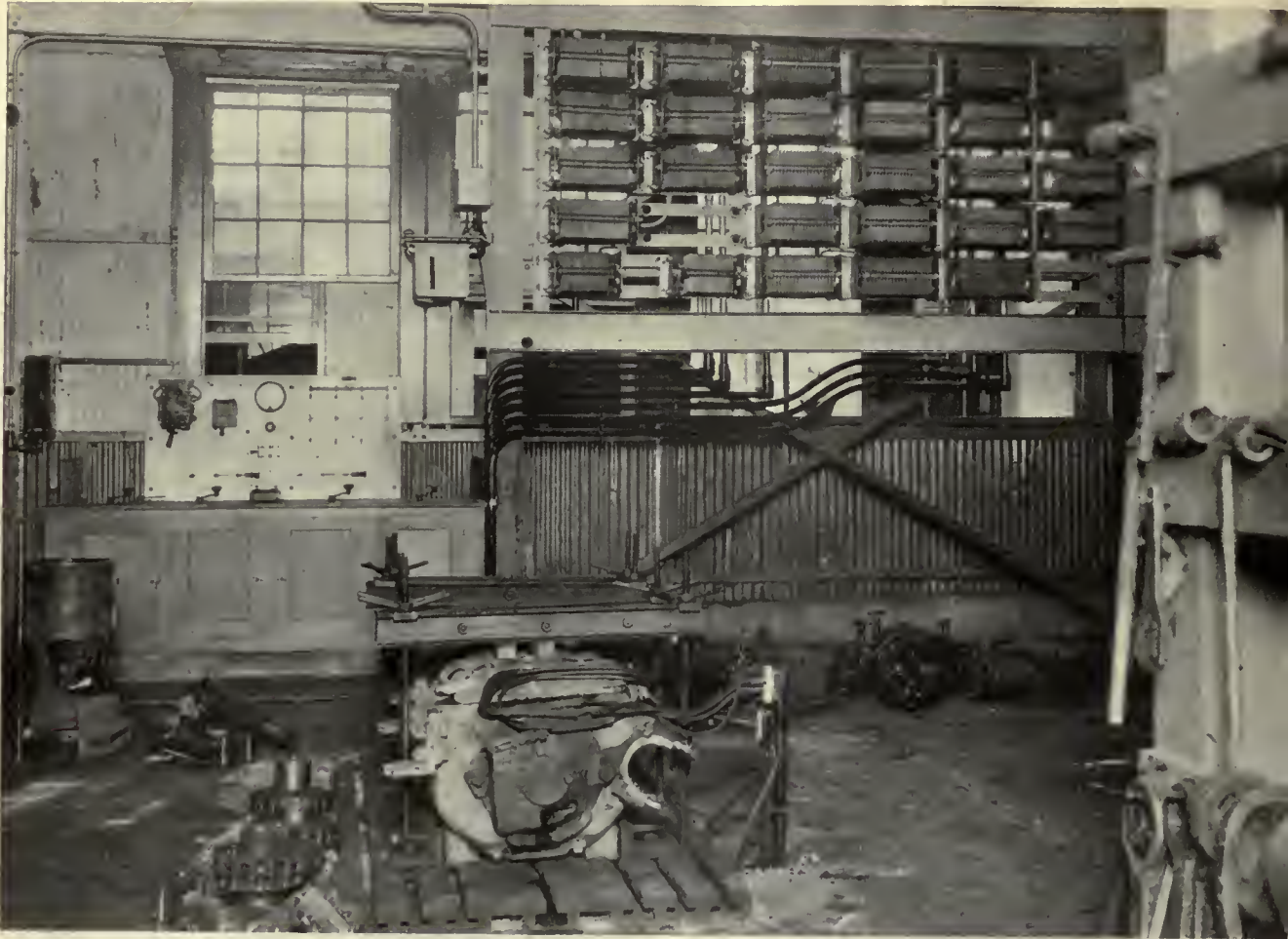
The item for paving in the table appears high. This is because the cost of the amesite used in tamping under the rail was charged to this account. Eight hundred and fifty feet was relaid with this type of construction by nineteen men and a foreman in nine days. The cost per lineal foot was \$3.75. While this is not exceptionally low for the job, it is felt that the cost is justified by the results achieved, as it is expected that at least ten years' additional life will be obtained.



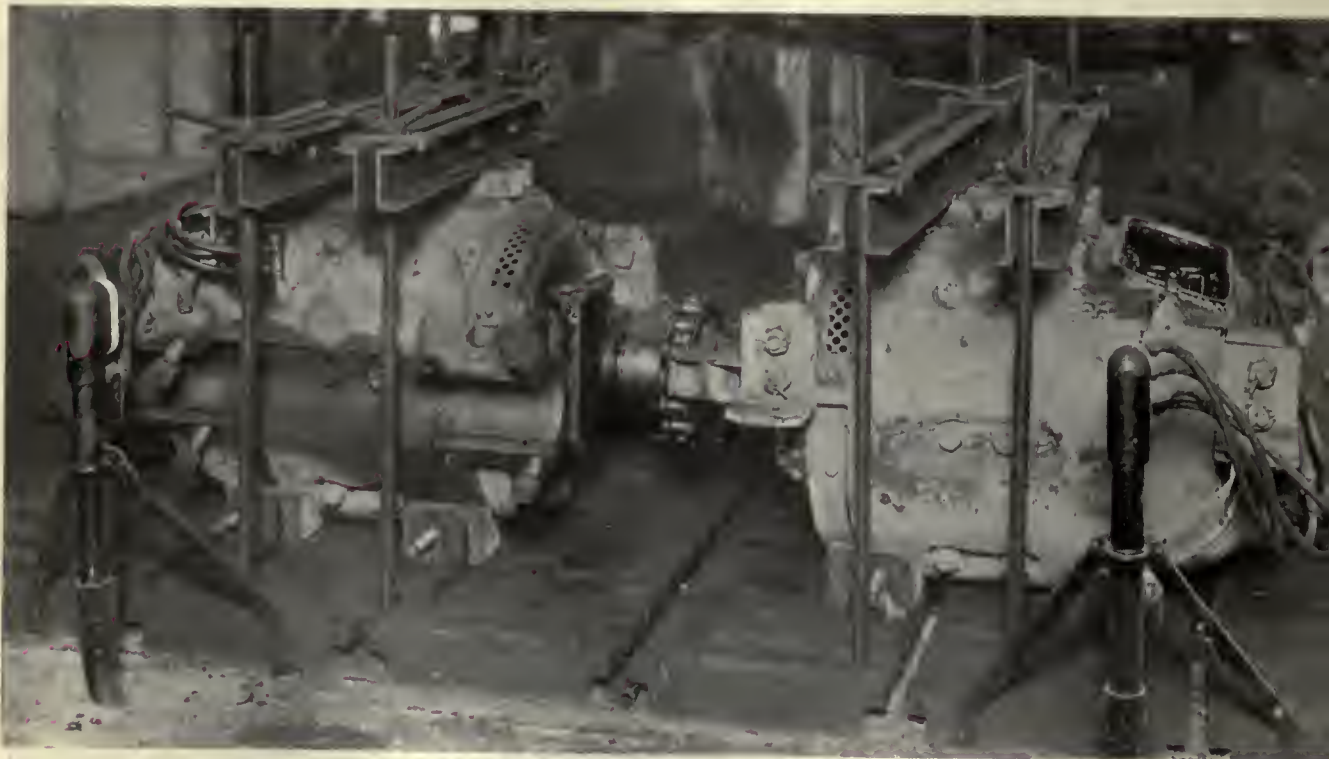
Changing and shimming the rail



Completed track taken at the same point as the first picture



The motors under test are shown in the foreground and the switchboard and load rheostat in the background



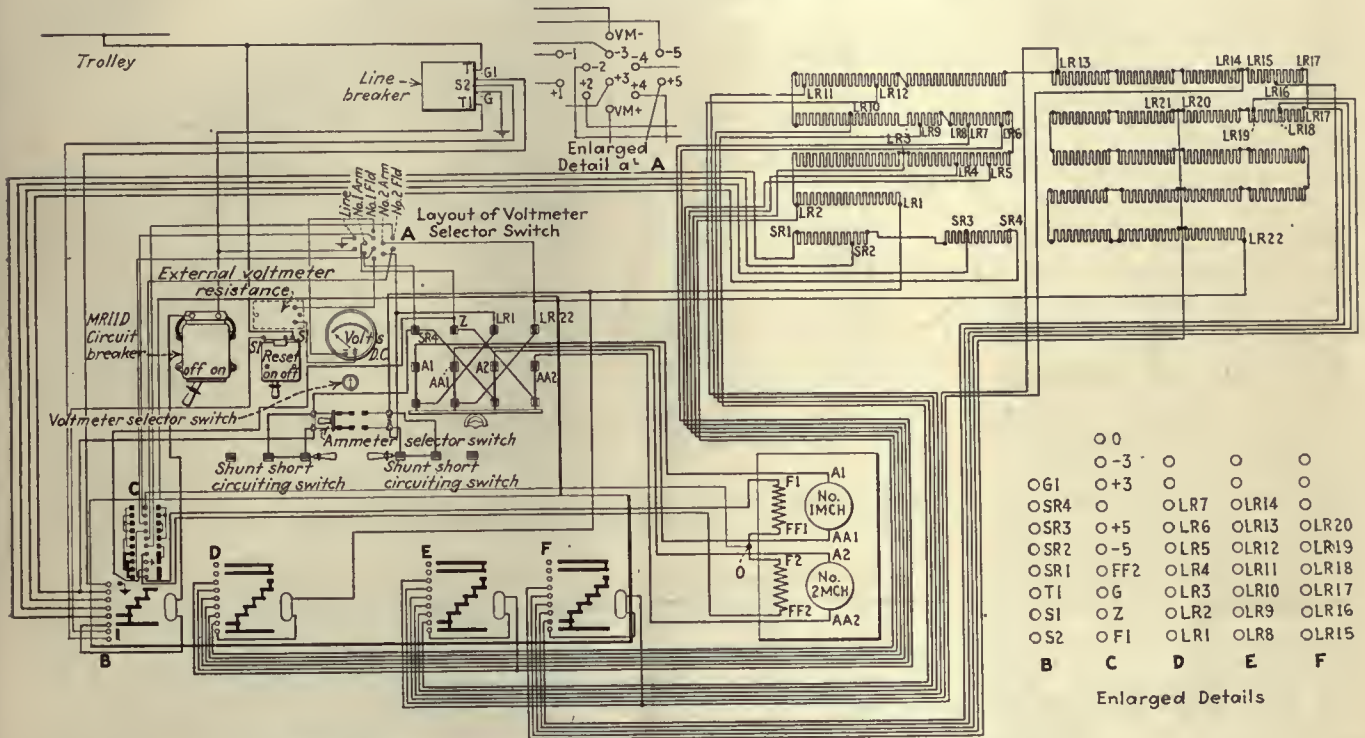
Two railway motors clamped in position on the bedplate ready for the load test

Railway Motor Load Testing Set

By A. J. NAQUIN

Equipment Engineer Rolling Stock and Shops Department,
New Orleans Public Service, Inc., New Orleans, La.

Motors are given a running test after overhauling. Tested in pairs, one motor drives the other as a generator and so provides for convenient adjustment of load



Wiring diagram for motor load test of the New Orleans Public Service, Inc.

RAILWAY motors overhauled in New Orleans are given a load test by use of a testing set designed by the railway engineering department of the New Orleans Public Service, Inc. Accompanying halftones show the general arrangement of the apparatus and a diagram shows connections. The load for the motor under test is furnished by having it drive another motor as a generator. Motors are tested in pairs and either motor can be used as a generator while the other unit is used as a motor to drive it. The direction of rotation of either unit may also be changed at will by the reversing switch of the control.

The motors are set up for the test on a bedplate which has convenient slots for bolting and clamping the motors in position. The pinion ends of the two motors are placed together and connected by a flexible coupling. In the illustration showing the controlling switchboard in the background the loading rheostats are in the upper right-hand corner. There are four controllers in the control cabinet, the one at the left being used for starting purposes. Three steps of resistance are cut while bringing the motor up to speed. The other three controllers determine the loading by cutting out units of resistance in the generator circuit. The controller at the extreme right is used for close adjustment; with it the motor and generator current is changed by increments of 3 amp. or less.

The current flowing through either the motor or generator is indicated on a portable ammeter by throwing a double-pole, double-throw switch to either the left or the right as desired.

The voltage from trolley to ground and across each motor may be read from the switchboard voltmeter by moving the selector switch beneath the voltmeter. A line breaker for opening the motor circuit is operated by either the control switch or the ratchet switch on the starting controller. A circuit breaker in series with the line circuit; the former being set at 50 amp. higher than the latter.

All overhauled motors having rewound armatures are tested on this set for thirty minutes at 150 per cent of the hourly rating, being run fifteen minutes in each direction of rotation. During the test, commutation is carefully checked. About 10 per cent of the motors whose armatures are dipped and baked but without other repairs are also tested. All testing is done during the regular overhauling period which is every 40,000 car-miles.

It is believed that if an overhauled motor satisfactorily passes the high current test described, and the high voltage test also given every overhauled motor, that it may be placed in service for another 40,000 car-miles without danger of failure.

Keeping Accurate Records of Car Wheels

RECORDS of car wheels kept by the Omaha & Council Bluffs Street Railway, Omaha, Neb., have been found so efficient that out of 3,528 wheels scrapped in a period of two years less than 5 per cent lacked a completely detailed report. When car wheels are received from the foundry a shipping list which includes the serial numbers is obtained from the storekeeper. The wheels also are checked in by serial number by the stores department. In this way a double check of these numbers is obtained.

When a pair of wheels is mounted on an axle, an axle gear-wheel tag is filled out. The numbers of the axle, the gear and the two wheels that have been mounted are recorded, giving size, bore, specification number, and manufacturer of the wheel. This tag is then tied to one of the wheels and stays with the mounted pair until it is installed in a car.

When the wheels go in service, the tag is removed and the serial numbers of the wheels removed from the car are entered in the "out" column provided for that purpose, giving the reason for removal, location, date and car number, thus completing the tag. After transferring the information into the records, the tag is filed according to car number.

The car record, a 3x5-in. card, shows at any time what wheels are on any car. These cards are filed by car numbers. The entries for wheels installed and removed are transferred to this card from the tag.

The individual wheel record, another 3x5-in. card, shows the date the wheel is put in service, the car number, location on car, date out of service, reason for removal, and mileage. The entries likewise are transferred from the tag.

The car mileage, figured by the transportation department at each division office, is sent to the mechanical department the first of each month. The sheets show

by cars the mileage by lines as well as miles per day for the month. The total mileage of each car is entered on cards which have monthly spaces sufficient for six years. These are filed numerically according to cars.

When a wheel is scrapped the wheel man reports it and an entry is made on the individual wheel card. The total mileage made by the wheel is then computed and entered on this card.

When wheels are scrapped and returned to the foundry

These forms are used for recording complete information on the receipt, handling reclaiming and final disposition of car wheels used on the Omaha property

1. Individual record made out for each wheel.
2. Car record showing placing and removal of all wheels.
3. This tag is attached to each mounted pair of wheels. When they are placed the

information regarding the wheels removed is entered on it.

4. Record of car wheels scrapped, giving for each classification and size of wheel the mileage and reason for removal for an entire order.

or sold, their serial numbers are reported by the stores department. The corresponding individual wheel cards are removed from the files and entries are made on the "car wheels scrapped" sheet. This gives the total mileage of each wheel and the reason for its removal. The

MILEAGE OBTAINED FROM CAST-IRON CAR WHEELS IN 1927—OMAHA & COUNCIL BLUFFS STREET RAILWAY

Diameter, Inches	Total Wheel Mileage		Mileage	Average	One-Wear Wheels			Two-Wear Wheels			Three-Wear Wheels			Miles per Wheel After Reclaiming		
	Number	Re-corded			Number	Mileage	Average	Number	Mileage	Average	Number	Mileage	Average		Two-Wear	Three-Wear
33	1,027	37	990	50,647,836	51,159	784	40,393,263	51,522	171	8,413,182	49,200	35	1,841,391	52,611	18,656	11,71
30	268	7	261	15,254,845	58,448	227	13,358,843	58,850	27	1,580,020	58,519	7	315,982	45,140	25,679	10,27
21	436	25	411	18,733,531	45,580	281	13,245,350	47,136	111	4,782,955	43,090	19	705,226	37,117	12,565	7,42
26	104	8	96	4,151,975	43,250	58	2,712,226	46,763	34	1,304,978	38,382	4	134,771	33,693	17,179	7,26
Weighted average	1,835	77	1,758	88,788,187	50,505	1,350	69,709,682	51,637	343	16,081,135	46,884	65	2,997,370	46,113	17,091	10,03

total mileage is computed for the entire shipment of each size of wheel.

A report is also made up each month from the tags, giving the number of wheels of each size removed from service, along with the causes of removal.

While the company at present is purchasing only steel car wheels, there are many cast-iron wheels in service on which a large mileage average has been obtained. The accompanying table gives the total mileage of car wheels which has been obtained from wheels of the several diameters used. As may be noted, in certain instances an average in excess of 60,000 miles has been secured.

Ventilated Room for Spray Painting

Two systems as used by the Leipsic Street Railways are described. One provides for a horizontal flow of air, the other for vertical flow to prevent fumes from spreading

SOME interesting provisions for spray painting adopted by the Leipsic Street Railways, Germany, were described in the Feb. 3 issue of *Verkehrstechnik*. The consolidation of two street railway companies, one with cars painted blue, the other red, brought about the necessity of repainting equipment. A uniform ivory color was adopted. To do this speedily and economically the spray method was used, since it was found that the

job. This simplified method was adopted in the belief that it is better to paint cars more frequently than had previously been the custom, since heavy street traffic and increased numbers of accidents made repainting necessary at least every two to three years.

Where cars were entirely repainted after the removal of the old paint, the time per car with the spray method was found to be 7½ hours as compared with 50 hours by the brush. Details appear in the accompanying table.

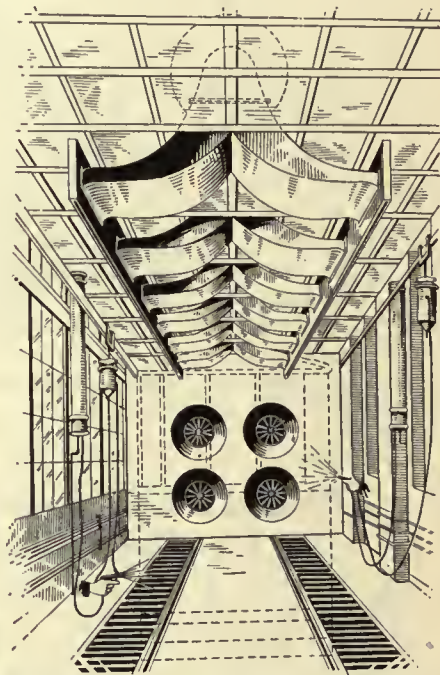
With an average wage of 42 cents per hour for the painting crew, the saving per car of average size amounted to \$18. The amount of paint used was found somewhat greater with the spray method than with the brush, but this depended somewhat on the quality of paint used and the skill of the workmen.

Wooden seats were repainted by the brush method as it was found that in order to do a satisfactory job by spraying, it was necessary both to remove the seats from the cars and to use more paint. Lettering is also done with brushes.

Added facilities were provided at the shop for spray painting. This included necessary piping for connecting to the compressed air supply. Air is used at a pres-



Room for spray painting arranged with horizontal air flow. Convenient connections for compressed air are installed



Spray room with exhaust openings in the floor for vertical air flow

brush method required more labor as well as greater space for an extensive job.

Nitro-cellulose lacquers were tried out first because they seemed especially suitable for spraying. Their durability did not prove entirely satisfactory and therefore an enamel system is now used.

Where the condition of the old paint is such that it is inadvisable to remove the ground coat, rusty spots are first rubbed with a wire brush and then two coats of ivory-colored zinc paint are applied. After this an ivory-colored rubbing varnish is sprayed on and after sandpapering this, a coat of varnish is sprayed to complete

sure of from 37 to 52 lb. It was found that with the higher pressure there was a better distribution of paint, but a slightly greater quantity of paint was used. To protect the workmen against fumes from the paint without the use of masks, a special room with forced ventilation was built by a German firm. This has proved satisfactory for exhausting the disagreeable fumes. The special paint room is 53 ft. long and 15 ft. wide, and was erected in one section of the paint shop. Cars are run in and out through an opening at one end of the room while on the opposite end there are four exhaust fans. Each has an exhaust opening of 27½ in. A sprinkling device is also installed which sprays water in front of the fan opening, so that the particles of paint mix with the water as they are drawn out and then fall into a settling basin below the floor. In this basin the paint is separated from the water by gravity and the water is again pumped through the spraying equipment. The air drawn from the room is purified before it is led back again. The purifying of the air from paint and water is done by means of filtering, after which it again enters the room at the end opposite to that where the fans are installed.

COMPARISON OF TIME NECESSARY TO PAINT A CAR BY THE SPRAY AND BRUSH METHODS

Class of Work	Time, Hours	
	Spray	Brush
Covering windows	1½	..
First coat of oil paint	12	10
Two coats of ivory-colored zinc paint	2½	20
One coat of rubbing varnish	1½	10½
One coat of lacquer	1	10
Removal of covers for windows	1	..
Total	7½	50½

With this method ample circulation of air is provided and the workmen are not subjected to drafts because the circulation is directed so as not to inconvenience them.

Some of the advantages found with this equipment are that the exhaust fans do not become clogged with paint and there is no danger of spontaneous combustion. Paint fumes which would be annoying if exhausted into the open air, are deposited in a form so that they can be removed without being spread through the neighborhood. The temperature of the room is easily kept constant since the air exhausted is used over again and so considerable loss of heat is avoided. The paint room has its own ventilation and forced air circulation, which is entirely separate from the surrounding shop, so the sucking up of metal and other dust from the shop is prevented. This is of importance in keeping slow-drying oil paints clean.

The compressed air system for the paint room is installed on rails so that it can be shifted as desired. It has an oil and water separating device. Separate valves permit renewal of the air in the room from the outside. This was found particularly desirable in the summer months when the air outside is warm.

At another location a spray painting room somewhat similar to this, but with some modifications, was used. This is shown in the second illustration. In this fresh air enters through nozzles at the ceiling and the mixture of air and paint fumes is exhausted through slots in the floor. A water sprinkling method is used in connection with this in order to prevent the fumes from spreading. An advantage of this system is that the fans can be placed so as not to obstruct the end of the room and thus both ends can be used and cars can be moved directly through if desired. Also, in painting trucks of cars this method proved of particular advantage.

Rhode Island System Installs Frequency Changer

WORK has been in progress the past few months on the installation of a frequency changer set at the power plant of the United Electric Railways, Providence, R. I. This machine allows the interchange of power between the railway power plant and the Narragansett Electric Lighting Company's plant and further, the New England Power Company's system. This work involves an expenditure of approximately \$450,000 to complete the connection. The set went into commercial operation on Feb. 14.

The frequency changer set is made up of two syn-

chronous machines with their individual exciters all on the same shaft. One of the machines, that for the railway end, operates on 25 cycles and the other machine is made to operate on 60 cycles.

With the installation of this interconnection, the railway will have the advantage of the larger power systems in case of accidents to the machinery in their plant and likewise the power systems will receive the advantage of the generating capacity of the railway plant in the event they have trouble. The stand-by capacity of both systems can now be used for extra capacity for either.

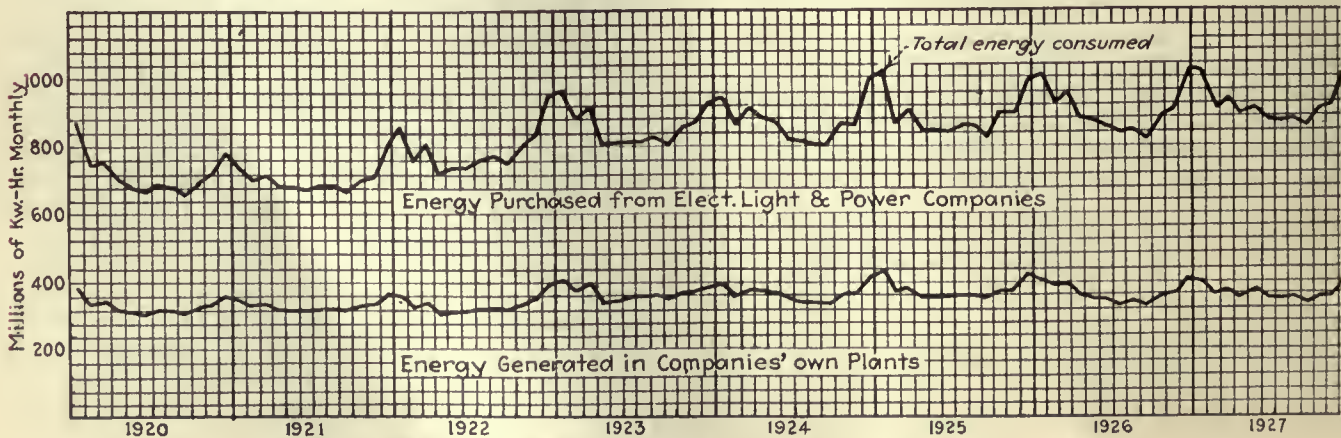
When passing power to the railway the 60-cycle energy is received through underground cables at 11,000 volts, three-phase, to the 60-cycle bus in the railway plant and thence to drive the frequency changer. This connection and the 60-cycle machine and switching equipment have a capacity of 21,000 kva. The 25-cycle machine of the frequency changer set then acts as a generator furnishing 11,000-volt, three-phase, 25-cycle energy direct to the 25-cycle buses of the railway system. This part of the connection has a capacity of 20,000 kw.

Energy Used by Railways Increases

DESPITE the use of buses, lighter rolling stock and improved apparatus, the monthly consumption of energy used by the railways is still on the upward trend. The accompanying chart shows the monthly consumption beginning with the year 1920. This is a continuation of the chart published with a résumé of energy consumption in the Aug. 20, 1927, issue of this paper.

The chart shows pronounced seasonal peaks with apparently erratic monthly fluctuations in addition. The latter entirely disappear, however, when the curve is replotted in terms of average daily energy consumption expressed as a per cent of the annual total. The seasonal variations are due primarily to such influences as car heating and snow removal.

Although the energy consumption for the first few months in 1927 was below that of 1926, the total for the year was greater. The total energy consumption for 1927 was 11,013,000,000 kw.-hr. against 10,970,000,000 kw.-hr. for 1926. The total energy generated in railway owned plants has decreased from 4,371,000,000 kw.-hr. in 1926 to 4,320,000,000 kw.-hr. in 1927, while the energy purchased from central station companies has increased from 6,599,000,000 kw.-hr. in 1926 to 6,693,000,000 kw.-hr. in 1927. For the last seven years the large portion of the steady increase in energy consumption for transportation purposes has been in the energy purchased from central-station companies.



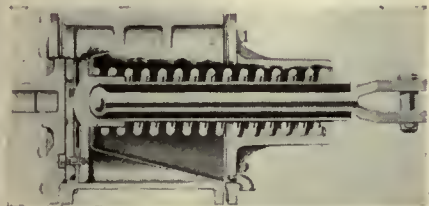
Monthly consumption of energy in millions of kilowatt hours by electric railways

Brake Cylinder Protector

DIRT and water, which may enter at the non-pressure side of the piston, cannot reach the cylinder walls and packing, it is claimed, by using a brake cylinder protector that has been developed by the Westinghouse Air Brake Company, Wilmerding,

Pa. The use of this protector should lengthen the life of packing cups, reduce leakage and decrease maintenance costs.

The protector consists of a conical-shaped, impregnated, canvas structure, devised so that at one end it is clamped between the cylinder body and the non-pressure head, where it functions as a gasket, while at the other end it is held in position against the piston by the release spring. Any dirt or water entering the cylinder is trapped by the protector, and the water is discharged through a drain opening provided in the non-pressure head. The protector, being flexible, collapses as the brake is applied.



Brake cylinder protector

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Motors for Dusty Atmospheres

BOTH alternating and direct-current motors, built for use where fumes, dust or explosive gases are present, are included in a line announced by the General Electric Company, Schenectady, N. Y. The motors bear the designation "Class BU Form JA" and are totally inclosed.

The object of the construction is to reduce the danger from transmission of heat generated inside the apparatus from any cause whatever, whether it be sparking or explosion, to the outside in such intensity as to ignite any gases surrounding the equipment. The two-piece, cast-iron exterior is heavy enough to withstand the pressures of an internal explosion and has flanged joints sufficiently wide to cool the flame of any such explosion. No gaskets are used, as it is not intended that the motors should be gastight.

The internal mechanical and electrical features follow standard Gen-

eral Electric design. The electrical characteristics are primarily the same as those of standard totally-inclosed motors. The alternating-current motors are available in single-phase ratings up to 3 hp. and, in polyphase ratings up to 15 hp., at standard voltages and the more popular speeds. The direct-current motors may be

either shunt or compound-wound types with the horsepower ratings from $\frac{3}{8}$ to 5 hp., also at the standard speeds and voltages.

All of these motors, either alternating or direct-current types, are designed to operate within a temperature rise of 55 deg. C., the standard for inclosed motors.

Dick Prescott Appoints an Assistant

and Surprises a Friend



DICK PRESCOTT, newly appointed superintendent of equipment of the Consolidated Railway & Light Company, finally found himself alone at the desk over which Tom Mullaney, retiring superintendent, had conducted the affairs of the Consolidated shop for many years. Mullaney's announcement of Dick's appointment as his successor had been gracious and helpful. Dick had managed, somehow, to respond to the congratulations and good wishes that were heaped upon him both by Mullaney and by the several foremen of the shop departments. Finally he was alone.

As Dick meditated for a few moments on the rapid succession of events during the past two days, he marvelled at the sudden turn with which the wheels of destiny had elevated him to a position of power and responsibility. Dick felt humble indeed as he thought of the group of foremen who had just pledged their support and co-operation. Some of them were many years his senior in age and in experience. Nevertheless, they had all recognized his leadership and his right to succeed Mullaney as head of the department.

After the foremen had left Dick consulted with Mullaney regarding an important matter which he had been turning over in his mind. Mullaney had approved heartily and Dick was now about to take his first official step as head of the depart-

ment. He meditated a few minutes longer as he sat alone in the superintendent's office. Then he smiled quietly to himself as he reached for the telephone and called Steve White, carpenter shop foreman under whom he had started his apprenticeship in the Consolidated shop. Dick asked Steve to come into his office, and in a few minutes his old friend was ushered in by Miss Stevens.

Dick smiled cordially as he pointed to a chair opposite him. As Steve accepted the invitation, his face reflected his delight and gratification at the success which had been won by his former apprentice.

"Gee! Dick," he exclaimed, "this is simply wonderful. Little did you think, when you struggled so hard to improve our methods and to put new enthusiasm into this shop, that recognition and reward would come so soon. You've earned every bit of it, Dick, and I'm delighted that the company recognized your merit."

"Thank you, Steve," replied Dick, "this came as a complete surprise and I'm having difficulty in getting adjusted to the change. However, I am about to issue my first order as superintendent of the department."

"Good, Dick. What's it going to be?"

"Effective tomorrow morning, Steve White is appointed assistant superintendent of this department!"

Steve sat stunned. For a moment he lost the power of speech entirely.

Frank B. Carpenter

Wins April Prize

Description of a fixture for boring journal bearings in a lathe, which is used in the shops of the Charleston Interurban Railroad, Charleston, W. Va., was awarded the monthly prize of \$25 for April in *Electric Railway Journal's* maintenance competition. Honorable mention was given by the judges to a split sleeve for protecting the ends of shafts while pressing into wheels, submitted by C. B. Hall of the Virginia Electric & Power Company, Norfolk, Va.



Frank B. Carpenter

BORING journal bearings for electric car trucks is a common operation and the fixture for doing this work in a lathe, as described by Frank B. Carpenter, master mechanic of the Charleston Interurban Railroad, Charleston, W. Va., in the April 21 issue of this paper, presents a simple and effective solution of the problem. This was awarded the \$25 monthly prize. The railway bores journal bearings in a lathe and the fixture fits to the rotating head while the boring bar is held stationary in the tool post. Two bearings are bored at one time. Clamps for holding and centering the bearings fit to beveled projections of the fixture so that the bearings are centered accurately as they are drawn down in the tightening operation. The split sleeve protection for the end of axles while being pressed into wheels, described by C. B. Hall, chief clerk of the mechanical department, Virginia Electric & Power Company, Norfolk, Va., was awarded honorable mention.

Ten Weeks More for Maintenance Contest

As announced in the April 21 issue, the time of closing the maintenance contest was extended three months. The time limit for submitting items, previously set as April 30, was extended up to and including July 31.

Those who still have material

that they wish to get in before the contest closes should send it in at once so articles can be arranged to better advantage. It is hoped that all maintenance men will take advantage of this opportunity to tell others of the good work they are doing. It is evident that articles published so far represent but a few of the advanced methods that can be found in most shops.

The following are revised conditions for submitting material in the contest:

1. Any employee of an electric railway or bus subsidiary may compete.
2. The author does not need to be the originator of the idea.
3. Articles may be submitted by several persons or by a department.
4. Any maintenance practice or device for electric railway or bus repairs may be submitted.
5. Articles should be 100 to 200 words long, with one illustration, and in no event longer than 400 words with two illustrations.
6. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."
7. Manuscripts should be mailed to the Editor of *ELECTRIC RAILWAY JOURNAL*, Tenth Avenue at 36th Street, New York, N. Y.
8. A prize of \$25 will be awarded each month for the best maintenance idea in the group published during that month. A mini-

who was awarded the monthly prize for April in *ELECTRIC RAILWAY JOURNAL's* maintenance contest, is master mechanic of the Charleston Interurban Railroad, Charleston, W. Va. He has occupied this position since November, 1926. Mr. Carpenter's first electric railway experience was with the Birmingham Railway, Light & Power Company, as master mechanic. He served in the United States Artillery Corps in 1899 at the artillery district of Key West, Fla., being on special duty as assistant to the artillery engineer. Later he was appointed to the school of submarine defense, Fort Totten, N. Y., and studied electrical engineering pertaining to coast defenses.

Mr. Carpenter has had broad experience in connection with various electrical equipment, having served in the capacity of chief electrician and electrical engineer for a number of electrical companies. He designed and supervised many power plants and substations in the coal fields of Alabama, Kentucky, Ohio, West Virginia and Pennsylvania. In his present position, Mr. Carpenter has built many labor-saving devices for use in the Charleston shops in connection with maintenance of equipment, and has corrected many old methods by substituting improved ones. He is particularly interested in everything pertaining to modern methods, and ways to make an electric railway efficient.

mum of \$5 will be paid for each article accepted for publication. Manuscripts will be received until July 31, 1928.

9. Announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the month in which the article was published.

10. Additional details were given in this paper, issue of April 16, 1927, pages 700-701.

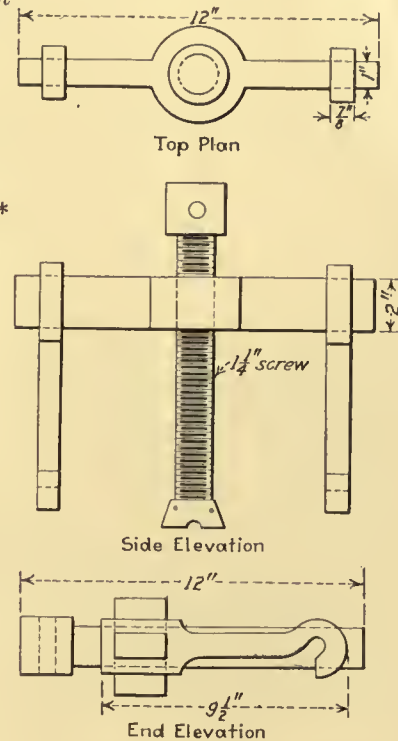
Electric Railway Journal Maintenance Data Sheet
ROLLING STOCK—TRUCKS—24

Device for Straightening Brake and Door Rods*

BY BENJAMIN H. HALL
 Shop Foreman West Penn Railways, McKeesport, Pa.

BRAKE rods sometimes bend when a car splits a switch, and door rods require straightening due to truck and automobile collisions. Usually these rods are less than 1 in. in diameter. The demand for a device to straighten this class of material led the West Penn Railways to construct a screw-straightening device in its McKeesport shop. Often the bent rods can be straightened in position without removing them from the car. Otherwise it is necessary to remove doors and miscellane-

ous equipment in order to have the rods straightened. The straightening device consists of a crosshead in the center of which is a 1½-in. screw. The top of this is arranged to take a round bar to act as a handle and the bottom has a block to fit over the rod to be straightened. The crosshead carries at each end two hooked pieces that extend down and hold the rod in position while the screw pressure is applied.



Convenient device for straightening rods without removing them from cars

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet
TRUCK AND WAY DEPARTMENT—26

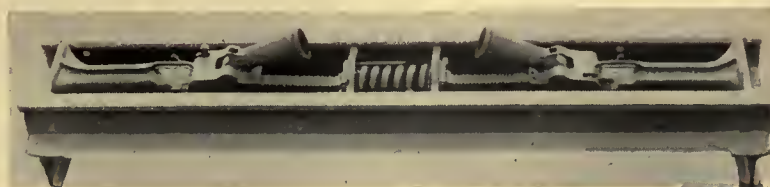
Testing Frame for Track Jacks*

BY W. J. MCCALLUM
 Foreman Frog Shop Way Department Toronto Transportation Commission,
 Toronto, Canada

WHEN lining special trackwork use is frequently made of track jacks in a horizontal position. Jacks that otherwise operate perfectly sometimes do not work so well when used horizontally. In order to check and adjust jacks for this defect, as well as for ordinary repairs, a frame, shown in the accompanying illustration, was designed by the way

department frog shop of the Toronto Transportation Commission, Toronto, Canada. The frame consists of two pieces of 7-in. T-rail welded to short cross arms. Between the side members is a sliding head made up of a seven-ton spring with one-inch plates on either side held together with ¾-in. bolts. The plates have a boss on one

side to hold the spring, and a corresponding socket on the other which retains the head of the jack. In testing, two jacks are placed in the frame. The ram of one is run in to the limit and the other is fully out. By working one jack against the other, the spring is compressed and each can be tested to the full length of stroke.



Framework used for testing jacks in a horizontal position

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—TRUCKS—25

Jig for Testing Bent Axles*

BY C. B. HALL

Chief Clerk Mechanical Department
Virginia Electric & Power Company, Norfolk, Va.

Testing an axle for eccentricity by means of a jig made in the Norfolk shop of the Virginia Electric & Power Company

FOR testing bent axles and the alignment of wheels a jig shown in the accompanying illustrations has been constructed in the machine shop of the Virginia Electric & Power Company, Norfolk, Va. An I-Beam forms the base, with an upright at either end made of 1x3-in. bar. Centers for the axle to be tested are fitted at the top of the uprights, one of which is arranged to slide to provide for different lengths of axles. There is a screw centering adjustment at one end. A movable truing pin is clamped to the center of the base. Adjustment of the pin as desired is made with a thumbscrew.

The accompanying illustration shows an axle in position for testing. Wheel alignment after wheels are pressed on axles is also tested by sliding and adjusting the truing gin to the wheel.

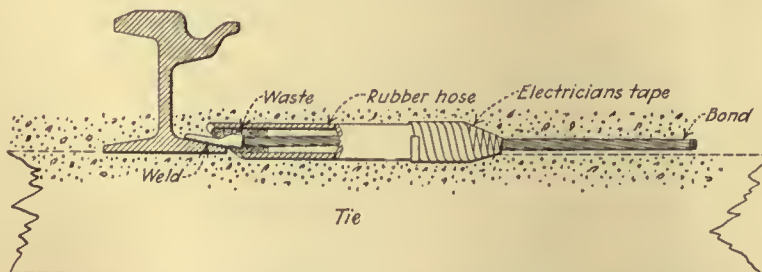
*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—27

Protection for Cross Bonding in Concrete*

BY R. J. FENNELL

Assistant Roadmaster Way Department Toronto Transportation Commission,
Toronto, Canada

Rubber hose is installed over a length of the cross bond cables to provide for movement

BREAKING of concrete-embedded cross bonds at the point where the cable enters the terminal, is prevented by the welding and bonding section of the Toronto Transportation Commission, Toronto, Canada,

by means of the scheme shown in the accompanying illustration.

Before the terminal is welded to the rail, a 12-in. length of scrap hose is slipped over the end of each bond. The opening at the terminal end is stuffed with waste and that at the cable end is closed by winding with electrician's tape. With this method of installation, if the rail becomes loose in the concrete bed, any movement is taken up in the free length of cable within the hose and the bond will not break at the junction of the steel terminal.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—32

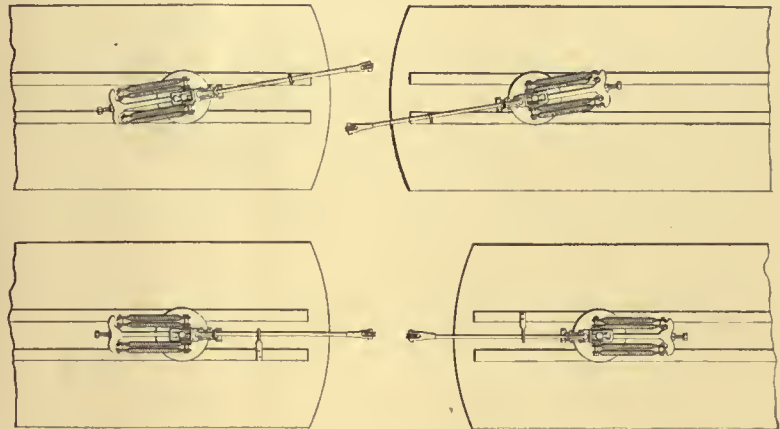
Staggered Trolley Hooks Permit Placing Cars Close Together*

BY FARRELL TIPTON

Electrician San Diego Electric Railway, San Diego, Cal.

MOST carhouses are handicapped for space in storing cars, so it is desirable to crowd them as closely together as possible. With some types of cars the trolley poles extend beyond the ends, and with the trolley hooks in the center, cars are kept a considerable distance apart in order to give clearance. This also is dangerous to workmen as the cars may be placed so close together that the trolley connections on one car will be energized by the car ahead.

To overcome these objections the San Diego Electric Railway, San Diego, Cal., staggers the trolley hooks, so that the poles will pass each other with the cars placed close together. This was accomplished with little cost by turning the hooks around from their former position and using the same installation holes.



Staggered trolley hooks permit storage of cars close together

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

POWER AND ELECTRICAL DEPARTMENT—1

Sectionalizing Switch Closed by Hand Lever

WITH the power layout of the Key System Transit Company it is oftentimes necessary to hold a sectionalizing switch closed for a moment or for a longer time, particularly on an isolated section of line where a short circuit has opened the sectionalizing switches at both ends. This happens when the substation feeding the section is shut down for inspection or other reasons. It is then necessary to close one of the sectionalizing switches after the short has been cleared before the other sectionalizing switch will pick up.

To effect the closure, a bracket is mounted on the main frame of the sectionalized switch solenoid. A right-angle lever at one corner



Device mounted on sectionalizing switch by which it is possible mechanically to close the contactor

throws over center a vertical lever which pulls the contactor of the switch up into the closed position. At the extreme upper end of the right-angle lever is a rod with an insulated joint which projects through a hole in the bottom of the switch box. The rod is not shown in the illustration. A lineman may pull down on this rod to close the switch. When the line is energized the switch will hold itself closed. The rod is then raised and the vertical lever thrown back off center into its original position. By means of a slot located in the lower end of the lever the rod can return to its original position without disengaging the switch contactor.

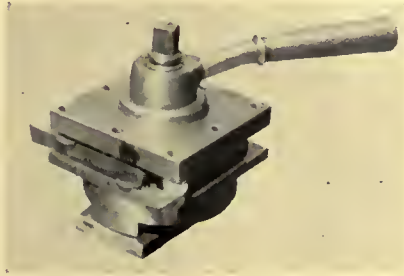
Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—33

Four-Way Tool Post

FOUR tools can be held in a tool post and rotated so as to bring each into working position in a handy device originated by workmen in the 39th Street repair shop of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. The base for this tool holder consists of two parts, a bottom bar which fits into the compound rest slide of the lathe carriage and an upper circular section. A screw which passes through these, clamps the tool holder to the lathe carriage in the same manner as with an ordinary tool post to hold it firmly in position.

The top of the four-way tool post holder is $4\frac{1}{2}$ in. square and the four tools are held in position by headless



Four-way tool-post holder for use on lathe

setscrews. The accompanying illustration shows cutting-off tools in position, but boring tools or outside turning tools can be used equally well. When the holder is rotated so as to bring a tool into position it is held firmly by a pawl in the lower portion. This pawl is forced into a hole in the top section by a spring. A lever in the lower section when pressed down disengages the pawl. By a quick turn of the clamping stud the holder is released and can be rotated so as to bring the desired tool into position. Another turn of the lever on the holder, clamps it securely so that there is no danger of loosening. The entire outfit is self-contained and there are no detached parts to lose.

Electric Railway Journal Maintenance Data Sheet

POWER AND ELECTRICAL DEPARTMENT—2

Automatic Shutters on Blowers for Air-Cooled Transformers*

BY M. D. SCHWEGLER

Superintendent of Power Toronto Transportation Commission, Toronto, Canada

ON AIR chambers where more than one blower operates in an air chamber of a substation considerable trouble was experienced by the Toronto Transportation Commission from broken shafts and couplings. The breakages were caused by operators closing the motor starting switch on the motor of a blower which was rotating backward due to the neglect of the substation attendant to close the cut-off shutter.



Fan shutter open in air chamber at Front Street substation of Toronto Transportation Commission

This trouble has been eliminated by installing a self-operated shutter. The vanes are counterweighted so that they are slightly off balance. The air from a running blower holds the shutter open, while the back pressure of the air chamber closes it and holds it closed when the blower is shut down. These shutters were installed about two years ago and since then no trouble has been experienced with any of the blowers.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

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10. It delivers the baked coils or armatures all ready for assembly.

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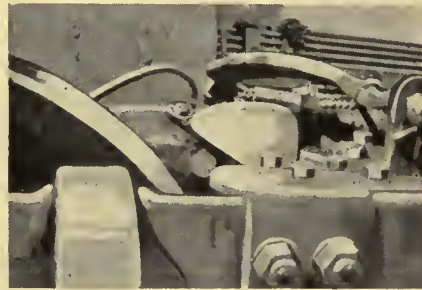
ROLLING STOCK—ELECTRICAL—46

Motor Intake Cover to Keep Out Snow*

By R. T. CHILES

Master Mechanic Cumberland County Power & Light Company, Portland, Me.

DURING the winter months, from the middle of December to the middle of April, the Cumberland County Power & Light Company, Portland, Me., is compelled to close up the ventilating intakes of its motors to prevent an accumulation of snow in them. The tying of canvas over the ventilating intakes was tried at first, but was found unsatisfactory. It also was expensive in material and labor. A light galvanized iron cover is now used, which fits over the ventilating intake. This costs 30 cents per cover and can be put on and removed easily. Its substantial construction



Galvanized-iron cover fits over ventilating intakes of motor

also will enable it to last several winters. The type of cover used is applicable to both the GE-201G and the GE-203A motors.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—48

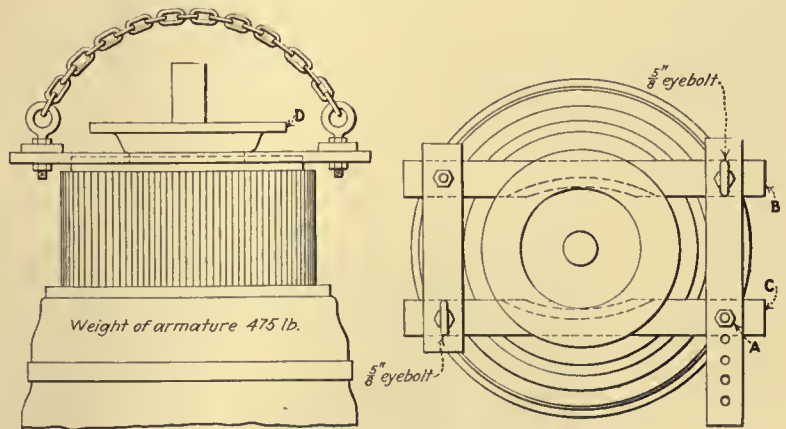
Attachment for Lifting Armatures Quickly*

By ARTHUR E. CLEGG

Foreman Electrical Department San Diego Electric Railway, San Diego, Cal.

WHERE armatures are dipped and baked a common method is to dip them with the commutator end up. For this a device for attaching the lifting hook, which can be fastened quickly and conveniently to the armature, is desirable. Such a device, used by the electrical department of the San Diego Electric Railway, is shown in the accompanying illustration. To attach it to the end of an armature, the bolt marked A is removed. This allows side pieces B and C to swing apart, giving clearance to place the device over the armature wiper ring D. The side pieces are cut out and beveled. By having several holes in the end cross-pieces, the sides can be adjusted so that they will fit snugly under the wiper ring. In the illustration, one of the end cross-pieces

is longer than the other, allowing the equipment together form a convenient means for attaching the lifting chain. The two eyebolts which fasten



Device for lifting armatures commutator end up

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

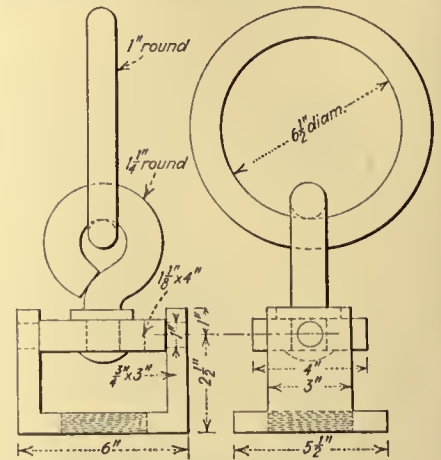
ROLLING STOCK—ELECTRICAL—47

Lifting Armatures by Pinion Nut Threads

TWO methods of lifting armatures are used in the shop of the New York, Westchester & Boston Railroad, Westchester, N. Y. In one of these the armature is horizontal and in the other it is vertical. The type of motor now in service is such that it was found cheaper and quicker to remove and install the armatures in a vertical position. The lifting nut shown in the sketch was developed for this purpose. This is made of a "U" bracket, rotating cross bar, swivel eyebolt and a ring. The "U" bracket is made from $\frac{3}{4} \times 5\frac{1}{2}$ -in. stock. The bottom is drilled and tapped to

fit the armature shaft pinion nut threads and the ends and sides are forged down to a width of 3 in. A $\frac{1}{2} \times 4$ -in. bar installed inside of this bracket swivels on axles of 1-in. diameter. An eyebolt made from 1 $\frac{1}{4}$ -in. round stock is riveted loosely to the center of the bar so that it is free to rotate. The lifting is done by a 6 $\frac{1}{2}$ -in. diameter ring made from 1-in. round material fastened to the eyebolt.

The horizontal lifting is done by means of a flat leather sling. Both of these lifting methods have proved entirely satisfactory.



Device used for lifting armatures by the end of shaft

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—49

Cutter for Dust Guard Holes

MOST electric railways make their own dust guards for journal bearings out of wood. The accompanying illustration shows a special cutting tool which has been developed in the 39th Street repair

shop of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for doing this work. The tool is arranged to fit in a drill press so that different sized holes can be cut. The lower end of the shank

carries a center point. This is held down against the piece of wood by a small spring inside the shank. As the cutting tools are fed into the work the center lifts to the extent that the tools sink into the work.



Convenient tool for cutting holes in dust guards

American Association News

Way and Structures Men Hold Spring Meeting in Atlanta

MEMBERS of the A.E.R.E.A. Way and Structures Division and guests numbering 52 gathered in Atlanta, Georgia, on Monday, May 7, for a series of meetings during that week. This was the largest meeting of the division ever held and among the guests were a number of way engineers from southern properties. The Georgia Power Company acted as host and arranged an interesting program of inspection and sight-seeing trips, including an inspection of the railway property in Atlanta. The committee on this trip had an opportunity to inspect the so-called beam type of track which for a number of years has been employed successfully in Atlanta with both steel and wood ties, and to observe the condition of this track and various types of paving which have been in service for a long period of time. The storage yard, creosoting plant and track machinery of the company were also of special interest. The delegates were guests of Frank L. Butler on Tuesday evening, at a dinner held at the East Lake Country Club. On Wednesday, the entire group was taken by automobile to the camp of the Georgia Power Company at Gainesville, where several of the committee meetings were held. Among the points of interest shown the delegates was Stone Mountain, just outside of Atlanta.

All of the meetings were unusually well attended and the discussion of the various subjects was participated in by the invited guests as well as by the committee members. At the close of the meetings a resolution was passed by the Way and Structures Division expressing the appreciation of the group for the many courtesies extended them by the Georgia Power Company. Also a resolution was passed thanking Frank L. Butler, C. A. Smith and H. L. Wills, who were in charge of the arrangements and who did everything possible to make the meetings and the trips successful and enjoyable.

Following are brief reports of the several meetings of committees in this division held during the week.

No. 2—Special Trackwork

SPECIAL way and structures committee No. 2 met in the directors' room of the Georgia Power Company on Monday, May 7, with more than 40 members and guests present. Some of the more important matters discussed and acted upon by the committee were as follows:

The shape of the opening in the switch body casting and the location and shape of the pocket for the several switches under consideration by the committee were agreed upon. The throw at the center line of the lug was increased to $1\frac{1}{2}$ in. for all of the

proposed standard switches and the location of the lug was changed accordingly on each switch. Agreement was reached to brand all switch tongues on the top at the heel with radius, hand and symbol of maker. In addition, the maker may, at his option, show the tongue pattern in depressed numbers on the underside of the tongue.

There was but a brief progress report on the subject of expansion joints. Action was taken on a report submitted by Mr. Bragg on rules for the maintenance of electric or spring switches. A design of double spring frog prepared by Mr. Peabody was discussed and certain modifications suggested. In accordance with the action taken at a meeting held on Dec. 30, 1927, Mr. Alden presented a revised design for split switches, which was approved.

The specification for iron bound, hard center special trackwork was considered in detail. Each of the railway representatives present spoke of his experiences with this type of construction and expressed his opinion regarding the necessity for modifications of the specification. Each manufacturer representative present expressed his opinion regarding the necessity for modifying the present specification. After some further discussion the meeting was adjourned and reconvened on Wednesday evening at the Georgia Power Company Camp. As a result of thorough discussion the following modifications were proposed and agreed upon by the committee:

Paragraph 412—A sentence is to be added to this paragraph reading, "When necessary between switches, mates, frogs and crossing intersections, a four-bolt joint on 7-in. special trackwork and an eight-bolt joint on 9-in. special trackwork may be used unless otherwise specified."

Paragraph 407 (a)—Omit the last sentence reading, "The minimum depth of the body portion shall be 8 in." and substitute for it the following, "The minimum depth of iron under 7-in. special trackwork to be 1 in. thick."

No. 12—Rail Corrugation

COMMITTEE No. 12 met also in the directors' room of the Georgia Power Company on Tuesday afternoon, following an inspection trip of the railway property in which particular attention was given to those sections of track on which corrugation has occurred. There were 32 members and guests present at this meeting. Secretary Ewing announced that data collected for six locations in Detroit had recently been received. He asked for suggestions regarding the analysis of the data now on hand from various properties. After discussion he was requested to submit, prior to the next meeting, analyses which in his opinion would be of the greatest value. Among the more important matters discussed by this committee may be mentioned the following:

Contributing causes of corrugation and allied subjects and causes; do corrugations occur alternately or opposite when both rails are affected?; car nosing, including

stresses set up in rails; analysis of rail stresses, including those set up by changes in temperature; tractive effort stresses; vertical and torsional vibrations of wheels; vertical vibration of rails; rail fatigue; area of wheel contact; rail deflection tests.

There was also a discussion of the corrugation observations taken on the inspection trip during the morning. A statement prepared by H. S. Williams of Detroit on "Stresses in Steel Rails Caused by Temperature Variation" was read and discussed. This statement was based on data obtained from the Department of Street Railways, Detroit.

The complexity and highly technical nature of the work assigned to this committee is evident from the list of subjects outlined above. It has been necessary for the committee in analyzing many of these problems to either devise new instruments or adapt existing scientific measuring devices to the particular tests at hand. The committee probably will not be in a position to make a final report for some time but at the conclusion of the meeting it was agreed that a progress report would be presented at the convention this year covering: (1) A brief statement of the previous consideration; (2) a record of meetings for the year and work done on each of the subdivisions of the assignment; (3) conclusions where any have been reached; (4) recommendations.

No. 5—Wood Preservation

WAY and structures committee No. 5 held a brief meeting at the Georgia Power Company Camp on Thursday. Due to the fact that the work of this committee had not progressed very far the attendance was small and the meeting was quite informal. A tentative report was presented by Mr. Swayze on preservatives other than creosote. Several suggestions were made for elaborating certain phases of the report and Mr. Swayze agreed to carry out these suggestions and present another report prior to the next meeting.

Mr. Smith announced that Mr. White had presented a report on wood preservatives having resistance to fire. He announced that the other three subjects—Review of Manual, Treatment of Poles and Timber in Place and Economy in use of Treated Timber were not yet ready for presentation.

In a general discussion two matters were brought up for consideration; (1) How can the committee best stimulate interest in the use of wood preservatives? (2) To what extent is it desirable to duplicate in the Manual existing specifications of the American Wood Preservers' Association or the American Society for Testing Materials? Both of these questions will be discussed at the next meeting of the committee which will be held just prior to the next meeting of the standing committee on way and structures.

Standing Committee on Way and Structures

FOLLOWING these sessions of special committees, a meeting of the Standing committee on way and structures was held at the Georgia Power Company Camp on Friday, May 11, with 34 members and guests present. Eleven of the thirteen

members of the standing committee were represented and in addition five of the seven special committee chairmen, who are not members of the standing committee, were represented.

T. H. Newbold, representing W. R. Dunham, Jr., presented the progress report of special committee No. 1 containing a number of recommendations to advance existing recommended specifications or designs to standards. The committee recommended also that Manual section W101-15 be referred to a proper committee for study and that if no revisions are required it be advanced to standard. A recommendation was also made to combine Manual section W111-25 with W13-24, making the combined section a standard. It was voted to put a footnote on Manual section W113-23 calling attention to the revised serial designations of Manual sections referred to by number in this specification. It was voted also to withdraw section W200-23 from the Manual and substitute a single page reference calling attention to the withdrawal and stating that the text may be found in the Engineering Proceedings. All of the above matters will be submitted for letter ballot to the entire standing committee.

Mr. Ryder reported briefly on the work of way and structures special committee No. 2 and stated that a written report would be prepared and submitted for consideration at a later date.

Mr. Baker stated that his committee had sent out a questionnaire to a selected list of 41 member companies, 32 of which had replied to date. He reported that this committee met on March 7 in Chicago. Mr. Baker expects to obtain replies from the nine companies that have not yet answered the questionnaire after which his committee will analyze the data and prepare a report.

Mr. Smith reported on the meeting held by his committee, No. 5, on May 10. There was some discussion of the desirability of adopting certain wood preservation specifications by reference only where they were identical with those of the American Wood Preservers' Association or the American Society for Testing Materials. The difficulty and expense of the frequent revisions of these specifications was stressed and the committee instructed to give serious consideration to this matter in its report. In connection with the matter of stimulating interest in the use of wood preservatives the general opinion seemed to be that more attention would be devoted to the economies to be obtained with wood preservatives.

Mr. Merker, representing Chairman Gailor of way and structures committee No. 6, reported that his committee had been expanded to include additional manufacturers and railway engineers and that the hearty co-operation of the American Welding Society was now being obtained through the committee appointed by President Farmer of that organization. Attention was called to the decision of the committee to change the title of the welding rod specification from "Specification for Welding Rods" to "Specification for Bare Electrodes." A specification is also being prepared covering the so-called flame test which has recently been developed and is believed to be a simple yet very practicable test for determining the welding properties of the electrodes. Mr. Merker further stated that, owing to the delay in expanding the committee and in arranging for the co-operation of the American Welding Society, it would not be possible to present more than a progress report this year.

Mr. Spencer reported in considerable detail on the work to date in investigating alloy steels other than manganese for special trackwork. He announced the results

of some welding tests on both chrome nickel and manganese steel which had been made by the Canadian Steel Foundries on specimens welded by the Montreal Tramways. He also announced the results of the tests made by the Lorain Steel Company on test specimens which they themselves made up. In view of the fact that there are a number of variables entering into such tests it is not surprising that there were some inconsistencies in the results of the two sets of tests. Mr. Spencer hopes to arrange with each of the manufacturers to submit test pieces, all of which

will be welded in the presence of the committee with the same types of electrodes and by the same welder. It is his plan then to have the welded specimens tested in the laboratory in the presence of the committee members. He stated that one more meeting of the committee would be held this year, but that it was not likely that a final report would be presented at the convention.

Mr. Harvey presented a copy of a tentative report of his committee which was read and discussed. Comment was made on the use of T-rails in the cross-sections of track construction used as illustrations and it was pointed out that the committee had simply followed out the procedure adopted by previous committees on this subject. It was suggested that except in the case of pavement contours suitable only for T-rail sections the association's 7-in. grooved girder rail be shown in the illustrations.

Owing to the importance of this subject and the fact that the report had not been studied by the members of the standing committee, the chairman asked each member to review the report promptly on his return home and forward to Mr. Harvey a written discussion, sending copies of the discussion to all members of the standing committee. With this information Mr. Harvey's committee will then be in a position to prepare a final draft of the report for consideration.

Mr. Hughes, chairman of the committee on bus garages, was not present and no report was submitted. Mr. Hecker submitted a copy of the advance report of the National Fire Protection Association garage committee and called attention to the modifications which had been made in the original draft through the efforts of the A.E.R.E.A. representatives. He stated that copies of this report had been submitted to way and structures committee No. 9 for comment and criticism and that during the coming year the report would again be reviewed by the National Fire Protection Association garage committee with the view of making any necessary revisions and submitting it in 1929 for final adoption. He reported also that at a recent meeting the committee had analyzed its several subject assignments and agreed upon a program of carrying out the work for the year.

Mr. Hawkins, reporting as chairman of the committee on track construction, stated that it did not desire to make any recommendations this year. Due to the interlocking membership on the corresponding committee of the American Society for Municipal Improvements, and the harmonious relationship existing between the two committees Mr. Hawkins did not believe anything should be done by the way and structures division which would in any way disturb the present satisfactory situation.

Mr. Wysor reviewed briefly the work of the committee on rail corrugation, calling attention to the meeting held earlier in the week and outlining the status of the various matters under consideration. He stated that his committee would present only a progress report covering the work accomplished during the year.

Chairman Eckroad of way and structures committee No. 13, joint railway and bus terminals, was not present nor was any report presented for the committee. Mr. George stated that he had seen no correspondence of this committee since its organization but attributed this to the fact that the committee was organized rather late in the year. Chairman Eckroad is urged to make a special effort to have at least a progress report for the convention.

COMING MEETINGS

OF

Electric Railway and Allied Associations

May 22-24—Indiana Public Utilities Association, Columbia Club, Indianapolis, Ind.

May 24—New England Street Railway Club, annual meeting, Boston, Mass.

May 28-31—National Association Purchasing Agents, annual convention and exhibit, American Royal Building, Kansas City, Mo.

June 4-6—Midwest Electric Railway Association, Hotel Baltimore, Kansas City, Mo.

June 4-8—National Electric Light Association, Atlantic City, N. J.

June 6-8—Canadian Electric Railway Association, annual convention and exhibit, Toronto, Canada.

June 12-13—American Wood Preservers' Association, Chattanooga, Tenn.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 13—A.E.R.E.A. Executive Committee, New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

Mr. George reported that way and structures committee No. 14, rails, had submitted a final report on branding which had been sent to the standing committee for letter ballot, ten votes having been cast. This report was prepared after joint consideration by way and structures committee No. 14 and representatives of the track committee of the A.R.E.A. Mr. George announced that in two of the votes cast, one disapproved the recommendation and the other made certain suggestions for an alternate rail designation. Following a discussion both of those members withdrew their original votes and approved the report as submitted. The remaining two members were asked to submit their votes as promptly as possible. It was requested by Chairman Alden of this committee that the submission of the report to the general secretary be withheld until action had been taken by the A.R.E.A. track committee on May 30.

Mr. Clark submitted for special committee No. 15, drawings of a full size for a track checking gage and wheel checking gage. This gage is so designed as to permit readings on a scale of the actual gage of either track or wheels.

Mr. Ryder questioned the effect of the curved-head rails on the location of the gaging points on the rail and of the need for considering this in the design of a measuring device. He also called attention to the fact that the committee had apparently not considered the second half of its assignment, viz., "Check gaging point on rails and wheels to determine if present practice is correct." After some discussion it was voted that the drawing be referred back to special committee No. 15 and that it be requested to complete its assignment. In the discussion of the gage submitted Mr. Flowers and Mr. Ewing both stressed the importance of wheel coning on the centering of the wheels on the rails.

Chairman L. A. Mitchell of special committee No. 16 was not present at the meeting and no report was submitted. This committee was organized late in the year, which probably accounts for the delay in getting the work started. Chairman Mitchell is urged to make a special effort to at least present a progress report at the convention.

Chairman George then called attention to a suggestion of Mr. Smith that a study be made of the desirability of modifying the heads of the Association's standard girder guard rails to conform to the curved heads of the standard grooved girder rails. Mr. Smith moved that the matter be referred to special committee No. 14 for consideration and report. The motion was duly seconded and approved.

Those in attendance at the several committee meetings were: C. A. Alden, F. L. Butler, S. Clay Baker, B. R. Brown, David Berman, E. B. Bloom, J. A. Campbell, B. R. Chestney, Charles H. Clark, T. H. David, E. B. Entwisle, L. O. Eiffert, D. D. Ewing, H. Fort Flowers, H. H. George, C. L. Hawkins, W. H. Hayes, H. F. Heyl, A. E. Harvey, J. H. Haylow, G. C. Hecker,

C. R. Kinnear, W. M. Kingston, T. J. Lavan, J. R. McKay, A. D. McWhorter, W. H. McAloney, R. F. Marion, J. T. Moore, H. F. Merker, C. L. Moses, T. N. Newbold, A. M. Nardini, E. S. Olmsted, R. M. O'Brien, M. L. Rahner, A. T. Spen-

cer, J. H. Sundmaker, H. F. Swayze, C. A. Smith, E. M. T. Ryder, E. R. Rath, C. R. Seybold, R. E. Tafel, A. Taurman, H. J. Tippet, J. B. Tinnon, H. S. Williams, W. W. Wysor, A. S. Wentworth, A. J. Yauger, W. S. Yeates.

News of Other Associations

Central Master Mechanics Hold Two-Day Session

EIGHTY maintenance men attended the Erie meeting of the Central Electric Railway Master Mechanics' Association on May 9 and 10. This approximated the record established at the Pittsburgh meeting a year ago, which at that time was credited with being the largest in the history of the association. The two days spent in Erie were crowded to the limit with a business session and inspection trips. During the business session which occupied the morning of the first day and a part of the afternoon the reports of a number of standing committees were presented, discussed in considerable detail and adopted with some modifications.

Further progress was made in determining equipment standards for freight cars in interchange service and for the completion of a revised list of uniform charges and standards. Standardization details relating to grab bars were discussed and the recommendations of the committee accepted. Chairman A. J. Challeen of the committee on revision of uniform charges presented a report outlining a new basis for standardizing prices of truck and car parts. The system of credits is eliminated and an allowance for the salvage value of scrapped parts made in fixing the new prices for replacements. Before the adoption of this report, however, considerable discussion was aroused. In the rules governing the condition and repair of freight cars for interchange service as adopted by the association May 11, 1927, and published in *ELECTRIC RAILWAY JOURNAL* for May 28, 1927, and Jan. 7, 1928, the objection was raised to the "plus 15 per cent" which rule 38 authorized to be made over and above the cost for material and labor in making repairs to foreign cars.

The committee appointed to write a set of instructions covering the proper use of cards and forms used in the inter-

change of equipment in cases involving damage to cars recommended the use of four forms only; a defect card, bad order card, repair card, and a uniform foreign defect and repair report. The committee stated that while it is true that several additional cards have been adopted by the association, it was the consensus of opinion that there should be published at present only the four forms mentioned, and that the members of the association should see that their foremen, inspectors and repair men become thoroughly familiar with the use of the cards. Detailed instructions for their use were incorporated in the report and the whole accepted.

The meeting voted to incorporate all existing standards, uniform charges and forms used in the conduct of interchange business in a handbook to be published by the association as soon as possible.

Following the completion of committee reports the session was thrown open for a consideration of questions relating to mechanical practices which had been previously prepared and sent to the members. Lively differences of opinion developed.

In addition to entertaining the master mechanics at luncheons on Wednesday and Thursday the General Electric Company was the host at a banquet given them Wednesday evening at the Lawrence Hotel, Erie. The dinner was made the occasion for informal remarks from F. E. Case, railway engineer of the General Electric Company, who was called on by F. J. Foote, president of the association.

Thursday was given over to an inspection tour of the Erie works of the General Electric Company, and for those who especially wished it a trip was arranged between Erie and Northeast, Pa., on a magnetic-brake equipped car belonging to the Buffalo & Erie Railway. Results of the initial tests were published in this paper for July 17, 1926 and Aug. 21, 1926. At the Thursday luncheon the place of the fall meeting was selected as Cleveland, Ohio.



Central Electric Railway Master Mechanics at Erie Works of the General Electric Company, Erie, Pa., May 10, 1928

Using Power and Light Ideas in Selling Rides*

BY WALTER JACKSON

Fares and Motor Bus Consultant, Mount Vernon, N. Y.

GAS and electric utilities are not faced by the competition of home-manufactured products, and have the further advantage of knowing precisely how much the customers buy. Contrast this with the plight of the purveyor of public transportation, who is faced by a serious competitor, the private automobile, and who has no first-hand knowledge as to the riding habits—in time, frequency, distance—of the individual patron. No matter how many costly surveys he may make of passenger movement, the answer is a mass and not an individual one. He learns that a certain number of persons ride a given line on a given day, leave at a certain corner and disperse in a certain neighborhood. For this reason, it is much more difficult for the electric railway and bus operator to set up a proper schedule of rates such as will combine greatest revenue to the company with greatest usefulness to the public.

The gas and electric utility man has been so successful in selling at differential rates to build up an all-day load factor that he has actually reversed the original situation. Formerly, a daily load curve had the same peak aspect that the electric railway load curve has to this very day. Now, the heaviest load comes in the morning hours when industry is busiest. The gas and electric utility man has been guided by two principles in developing his variety of rates and rate structures; that of granting a lower rate in accordance with quantity purchased, and that of granting a lower rate to those who purchase when the maker has an unavoidable surplus. Furthermore, the two principles are modified by the competition factor.

Purveyors of local transport, as a class, have done very little with lower rates for wholesale use, the first principle. A cash fare for all, regardless of the distance traveled, is in use as well as a ticket rate—sometimes two such rates—which grants a lower fare to persons who invest in more than one fare at a time. However, those who pay more than one fare are not necessarily wholesale users of the service and the wholesale rate is granted without proof of consistent patronage. As to the second principle—lower rates to those who buy when the maker has a surplus—local transportation companies have made practically no move. The rate for a long ride in a crowded car is as much as that for a short off-peak ride in a car with many empty seats.

The competition factor which modifies the rate adjustments for gas and

electric utilities should be considered more seriously by electric railway men than it is. Walking is a serious competitor, as are the telephone and the radio, but the overwhelming competitor is the privately operated automobile. Although the average automobile owner has little interest in detail cost, it does not follow that he will pay no attention to public transport rates that are lower and more convenient. In many cities, the use of a personal machine for travel to and from the business district has lost its savour, and transport concerns are having less difficulty in holding or gaining rush-hour business in proportion to the growth of industry.

Although wages, materials, taxes, etc., are higher now than they were a decade ago, the transport in competition with the bus and the trolley has been growing cheaper. Continuance of old rate-making practices, therefore, means that we are trying to get more money from a diminishing clientele. Transport men should not be fatalistic about the decline of off-peak traffic when it is borne in mind that there are more persons outside the store and factory and office than there are in them. In other words, the traffic to and from the job does not have to be the major traffic. It is not reasonable to complain about the loss of off-peak traffic, or failure to gain such traffic, if no use is being made of differential rates.

FARES THAT CLASSIFY THE PATRONS

City transport systems have no way of determining the amount of riding, the hourly distribution and the length of riding done by individual customers. However, there are available certain classes of rates that at least reveal the habits of riders by groups. These rates are made possible by the use of special cards, as the permit card, weekly pass, Sunday-holiday pass, and the week-end pass.

Closest to the practice of gas and electric utilities is the use of a permit card. The purchaser pays a fee of 25 cents or more a week for a card which permits him to travel for 5 cents additional per ride. The principle has proved a success on properties securing increases to 10 cents from cash fares as low as 6 cents and 7 cents, and to token rates like 8.33 cents. It has been less successful, or even a reducer of revenue, where the increase in other fares was little or nothing. Unquestionably, the permit card in its more liberal weekly, transferable form, is a better way of producing more revenue than a straight increase in fares; but as it does not do much to encourage off-peak travel, it falls short in respect to the main problem.

More widely used is the type of rate

called the unlimited ride, weekly pass. The flat rate for riding has proved practicable; first, because unlimited riding in theory is closely limited in practice, and, second, because almost all extra riding with a pass comes in the non-rush hours. The most likely buyer of a pass is a person who is already a peak-hour customer. Hence, it makes no difference whether he or someone else uses his pass rides also at other times. The weekly pass is deliberately priced to bring out whatever off-peak riding is possible among its buyers. It generally costs four to six more fares than the twelve compulsory rides each week between home and job, so that the purchaser is either a person with some off-peak riding or one who feels that this type of rate will encourage him to become an off-peak rider. The pass has been most successful on medium and large properties with a large market.

OFF-PEAK PASSES ALSO ENCOURAGE RIDING

While the weekly pass, through its cheapness for the off-peak extra rides and its avoidance of change-making, transfers and identification checks, is a popular institution, it still falls short of building up the off-peak loads and revenues sufficiently. For this reason it is advisable to use an off-peak pass which could be sold for one-half or two-thirds of the standard pass cost to persons who ride less frequently than the worker who must ride twelve times a week. It has been estimated that the standard weekly pass produces good off-peak riding from one-third of the customers. It is possible that an off-peak pass would produce similar results with another third of the patrons.

Pittsburgh, Cincinnati, San Francisco and St. Louis, in the order named, are the metropolitan centers which have adopted the pass principle for the encouragement of Sunday-holiday riding. On these days, little of the traffic is compulsory. Therefore, it is logical that we should offer a more attractive rate. The Sunday-holiday pass also has been used successfully by short inter-urban lines, particularly on those entering some terminal city with many entertainment objectives.

Other variations of the pass are the week-end or the Saturday-Sunday pass, being used by a railway which serves a large terminal city, and an evening pass, being used by one railway during the summer months. A few railways have considered nickel fares for short rides within a fair-sized neighborhood center. This is a rather delicate discrimination, because any rate of fare that seems to favor a given neighborhood will be opposed by other districts. Another way of building up off-peak service is offered by the sale of single or round-trip tickets at lower rates if used between certain hours, as from 10 to 4. This plan has been effective on the trolley lines of London. Differential rates as used by gas and electric utilities are being used in other forms by electric railways, but those mentioned are the most popular for merchandising rides.

*Abstract of a paper presented before the annual convention of the Missouri Association of Public Utilities, held at Jefferson City, Mo., April 26-28, 1928.

News of the Industry

Seven-Cent Fare Suggested in Dayton

Expert wants railway to carry out \$1,000,000 program as part of general traffic improvement scheme

ROSS W. HARRIS, Madison, Wis., has reported on proposed traffic changes in Dayton, Ohio. He suggests rerouting of street cars, coupled with higher fares and better service, parallel parking only, faster signal lights, traffic lanes for automobiles and two new thoroughfares.

By making changes which he suggests Mr. Harris feels certain that automobile speed can be increased 40 per cent in the business district and street car movements downtown can be accelerated materially.

Four street car tickets for a quarter and a cash fare of 7 cents is advised to enable the companies to effect the required routing changes and make necessary improvements in service. Immediate relief of congestion and provision for future traffic needs are both inextricably linked with the street car situation, the report says.

Diagonal parking would be virtually abolished under provisions of the report and downtown thoroughfares, would have double lanes of traffic, moving at 19 m.p.h., in each direction, with the green light showing for fourteen seconds during each cycle instead of for 17½ seconds as it does at present.

STUDY COVERED A PERIOD OF YEAR

On Main Street parallel parking would in turn be discontinued when the need required and that thoroughfare opened for three lanes of automobile traffic in each direction.

Mr. Harris would overcome many of the common forms of automobile and street car delay in the business section by merely speeding up the lights. He says this plan would give users of both types of transportation great relief, without inconvenience to pedestrians. Opening of Second and Fourth Streets as thoroughfares, to widen the neck of the downtown traffic bottle, is recommended.

Mr. Harris was employed jointly by the city and the electric railways early in 1927 to work out the answer to present traffic problems and provide for future traffic needs of the city's rapidly increasing population. It was felt that experienced and constructive assistance was needed to insure a program that would afford immediate relief and insure citizens against future traffic entanglements.

The official report contains 750 pages and represents nine months' work on the part of Mr. Harris and an organization

staff. It is supplemented with a voluminous appendix of maps and charts.

Philip H. Worman, representing the companies, estimates the expenditure of more than \$1,000,000 on the part of the local railways will be necessary permanently to establish the improved service required in the Harris traffic report. New cars alone would cost the companies about \$500,000 and improvements in tracks will require the expenditure of a still larger sum.

To maintain permanently the kind of

service called for in the Harris report, the City Railway would have to spend \$150,000 for new cars. Likewise to comply with provisions of the report, the Peoples Railway would need twenty new cars at a cost of \$200,000 and the Dayton Street Railway would have to make an outlay of \$77,500. Since cars of the Cincinnati, Hamilton & Dayton Railway are the last word in car equipment, no changes of any sort would be necessary in handling the passengers on this line.

Commission Reversed in Baltimore Case

Prohibited from limiting rate of fare to be charged. Court regards 8 per cent return as none too liberal

IN A sweeping decision by Judge Joseph N. Ulman in Circuit Court No. 2, Baltimore, an injunction is granted under which the Public Service Commission is prohibited from limiting the fare rate to be charged by the United Railways & Electric Company, Baltimore. The court holds, however, that earnings of the company will be limited to 8 per cent on all the railway's property. No sooner had the court handed down its order than attorneys for the commission announced that the case would be taken to the Maryland Court of Appeals.

Under the action of the court there is nothing which would interfere with the United increasing its fare rate immediately, but Charles D. Emmons, president of the company, announced that no such action will be taken until the Court of Appeals decides the case.

The case grew out of the United's plea to be permitted to charge a straight 10-cent fare. In this action the commission refused to grant the full increase, but allowed a fare of 9 cents or three tokens for 25 cents. Up to that time the fare had been 7½ cents. The company then sought an injunction to restrain the commission from preventing it from charging 10 cents. At the same time two other petitions were filed, one by the People's Corporation and the other by the Socialist Party, each seeking a return to the 7½-cent rate.

SOME OF THE BACKGROUND

Judge Ulman spent several days in hearing the United case and then handed down his sweeping decision. Under this decision the case was to be remanded to the Public Service Commission for the purpose of taking additional action on the subject of annual depreciation allowance. It was held by the court that the rate fixed by the commission was unreasonable and illegal and that less than 7½ per cent earnings were confiscatory. It also held that an annual

depreciation allowance fixed by the commission was based on erroneous and illegal standards. Instead of agreeing to resume the case and take up the questions cited by the court the commission elected to have the subject go direct to the Court of Appeals and notice of appeal was filed.

Harold E. West, chairman of the commission, said that under the ruling of the court it is to be assumed that the commission has no right to fix the rate of fare for the company.

The court said:

This cause having been set down for hearing and coming on to be heard on the pleadings and the transcript of papers and proceedings, including evidence in the case before the Public Service Commission, and having been argued by counsel for the parties, and the court being of the opinion, for the reasons stated in its opinion filed in this case, that the rates fixed by order No. 12,639 of the Public Service Commission passed on Feb. 10, 1928, and said order and prior orders limiting rates charged by the plaintiff (the United) are unconstitutional, unlawful and unreasonable and fail to allow to the plaintiff a fair return on the fair value of its property; and the defendants constituting the Public Service Commission of Maryland having elected not to have this cause remanded to them for further proceedings upon the lines suggested in the courts opinion, but to have the final decree or order entered forthwith.

It is thereupon, by the Circuit Court No. 2 of Baltimore City, judged, ordered and decreed that said order No. 12,639 of the commission be and the same is hereby vacated and set aside in so far as the same purports to limit the rates of the plaintiff; except, however, as to that portion of said order which extended the first fare zone on the Halethorpe line to the terminus of said line at Halethorpe, as to which latter provision in said order the bill of the plaintiff is hereby dismissed.

And it is further adjudged, ordered and decreed that the defendants and their successors in office be and they are hereby perpetually enjoined and prohibited against enforcing against the plaintiff the provi-

sions or order No. 12,639 in so far as the same limit or purport to limit the rates of fare to be charged by the plaintiff, and also against enforcing against the plaintiff the provisions of any prior orders of the commission limiting or purporting to limit the rates of fare to be charged by the plaintiff.

And it is further ordered that the costs in this case be paid by the defendants.

From this action on the part of the court it can be seen that the commission was upheld on only one point—that dealing with the fare to Halethorpe, and that the commission is prohibited from enforcing not only the recent order upon which the court acted but also any orders passed previously.

In the commission's original order an allowance of \$883,000 was made for annual depreciation and retirement of the company's property, while the United held it should be \$2,200,000, based on present value. It was held by the court that the method used by the commission in arriving at the amount it set was illegal and erroneous. It was decided by the commission that 6.26 per cent was a reasonable return. The court, however, held that the company should be allowed to earn from 7½ to 8 per cent.

Need of Community Confidence Reiterated at Port Arthur

On the occasion of a "red letter" day in Port Arthur, Tex., namely April 21, 1928, when the Eastern Texas Electric Company installed a new railway and bus service J. G. Holtzclaw, manager, made the following statement:

If a public utility is to survive and fulfill its mission, which is the rendering of good service, it must have community confidence. This confidence, this feeling of trust which is so necessary to success, is won, not by promises made, but by promises kept. This we consider a fair price and again we pay it gladly. When we took over the railway system of Port Arthur we promised new service within three months. The three months have passed quickly. Bad weather at times has threatened delay. Failure of material to arrive on schedule has resulted in temporary setbacks. But at last we can happily and proudly say that again we have fulfilled our pledge!

Parade in Commemoration of Hocker Line Revival

Eight cars were paraded over the Kansas City, Merriam & Shawnee Electric Railway, the rehabilitated Hocker Line, on May 12, officially opening the interurban road to service. The cars carried officials and patrons of the line, officials of the Kansas City Public Service Company, 200 Kansas City business men and the Kansas City Public Service Company band of 30 pieces. They left Ninth and Wyandotte Streets at 2 o'clock and traversed the line to Rosehill, Kan., its suburban terminal.

Following the parade a barbecue and picnic was held in Shawnee Park, at which M. A. Summermour, Mayor of Shawnee and chairman of the board of directors of the reorganized railway,

and other officials spoke. Service on the road was resumed Sunday morning, May 13, after a ten-months suspension.

I.C.C. Against Johnson Measure

Chairman of regulatory body sees need for clarifying bill so as to remove need for commission to take jurisdiction

IN A report to the House committee made public on the so-called Johnson electric railway bill, John L. Esch, chairman of the Interstate Commerce Commission, concedes the need for clarifying the status of electric railways before the commission, but objects to the methods proposed in the bill. In brief, this bill, introduced by Representative Johnson of Indiana, proposes to classify as "commercial electric railways" all lines that approach steam railway practice in magnitude and method of operation and to subject these to the full provisions of the interstate act. Mr. Esch reports:

As a general statement it may be said that the provisions of the interstate commerce act applicable to steam railways are also applicable, with few exceptions, to electric railways. Thus the general provisions relating to the duties and obligations of the carriers, the filing and observance of rates, the joint use of terminals, acquisition of control and consolidations, the pooling of freight, the observance of the long and short haul provisions, the observance of accounting regulations, and the filing of reports, are all as applicable to such electric railways as to steam lines.

In the provisions covering the construction or abandonment of lines, through routing and joint classification, and in the general rate scheme, including the recapture clause, Mr. Esch, however, agrees that exceptions are made in the cases of electric railways. Instead of making general definitions of electric railways to be excluded from this proposed stricter ruling as is done in the bill, Mr. Esch contends that it would be better to define only the included class and to make it incumbent upon the rest to prove their right of exclusion. Mr. Esch writes as follows:

It is, of course, not an easy matter to define such a class of electric railways, and we do not believe that it could be done with sufficient accuracy without providing for the individual consideration of particular cases by the commission. The best plan that we are able to suggest is to provide that all electric railways having certain characteristics capable of accurate definition shall be included within the class, unless upon public hearing we shall find that particular electric railways coming within the definition are not as a matter of fact affected with an important national interest so far as the purposes in question are concerned.

In arriving at a proper general definition, we think we can start with the premise that participation in general freight service, rather than passenger service, is the thing that brings electric railways within the range of national interest. The next step is that only electric railways which interchange standard freight equipment in interstate commerce, with connecting steam lines, are affected by such an in-

terest. A further step is that only such electric railways as participate in joint interstate freight rates with connecting steam lines need be included; for it seems to us that those whose service is rendered merely by switching or which are content with combination rates on through traffic, are not of such national concern.

Mr. Esch feels, however, that this definition would probably be too broad in practical operation and would include various electric railways which, in fact, are not of national concern for the purposes in these sections. To obviate this difficulty, it seems to him that provision should be made for appeal to the commission which would permit that body, after public hearing, also to exclude until further order such specified electric railways, coming within the broad definition, as are found after taking evidence, not be affected with an important national interest. In conclusion he says:

This would, it seems to us, put the burden of proving their right to exclusion upon the electric railways where it belongs, instead of reversing the process as this bill proposes and putting the burden on us of combing the entire electric railway field and discovering the particular electric railways which the public interest requires to be classified as "commercial electric railways."

New Traffic Code Recommended for Boston

A revision of many of the present traffic regulations in Boston, Mass., is recommended in a new traffic code compiled by Prof. Miller McClintock, director of Mayor Nichols' traffic survey. The new code contains most of the regular provisions of the present standard code. It also definitely establishes certain arbitrary definitions and standardizes many regulations.

One of the recommendations is that there should be a co-ordinated system of automatic traffic signals operating under progressive timing for various sections of the city. These systems have been worked out and prepared by the survey, which has also worked out special automatic traffic control plans for immediate installation in Governor Square and at the intersection of Cambridge and Charles Streets. The report recommends the designation of certain "through streets" where all vehicles would be required to come to a full stop before crossing unless otherwise directed by traffic lights or a police officer. A new division is recommended in the street commission for the special handling of traffic matters. This would be under the direction of traffic engineer. Reorganization is also suggested in the police traffic division.

Unrestricted parking is permitted in certain sections of the city and no parking is recommended in other sections within an area indicated by official signs. The delivery of goods and the collection of waste materials between 8:30 a.m. and 5:30 p.m. are forbidden except by emergency permit of the street commissioners on specified congested parts of the streets.

Legislature in Session

Illinois body takes up home rule measures and bills intended to afford means of settlement in Chicago

THE Illinois General Assembly, in special session, has under consideration three bills prepared by the city and intended to give Chicago home rule over public utilities. The special session was called primarily for this purpose and to settle the railway situation there. It convened on May 15 with a large number of members absent, and it seems doubtful whether the session will accomplish anything, owing to the fact that it is called by Governor Small following his defeat in the primary and at a time when members who have been renominated are preparing for their fall campaigns and those who have not been renominated are no longer interested in legislation.

Opponents of the Governor point out that this is the first real attempt he has made in eight years to secure legislation to provide home rule and stress the point that the legislation is sponsored by Mayor Thompson, who backed Small in the recent primary.

At the opening session Mayor Thompson and members of the local transportation committee of the City Council were present. The city's bills were introduced simultaneously in the House and the Senate after the Governor had completed the reading of a message in which he argued for home rule for Chicago and declared himself unalterably opposed to a terminable permit or any other franchise without a fixed term. The bills authorize Chicago to create a regulatory commission vested with the same power as the State Commerce Commission to govern utilities operating in the city. They also repeal the twenty-year limitation on franchises and give the Council the right to grant a franchise for any fixed period.

Two other bills are to be introduced later providing for a consolidation of the surface and elevated lines and authorizing the construction of subways by special assessment.

No Seven-Cent Fare in Detroit Now

No need exists at present to increase fares on the Detroit Municipal Railway, Detroit, Mich. This is the opinion of the Street Railway Commission, although two members of the three-man board believe an advance in fares would justify itself. Ogden Ellis, chairman of the commission, is quoted as follows:

While an increase in fare would benefit the city by allowing the department to make developments, there is no probability of an immediate raise. I am not sure that there would not be a certain amount of opposition in some quarters to boosting fares. I haven't inquired. Of course if an increase were necessary the commission has the power to act. The fact of the matter is, the fare is going to stay at 6 cents for the time being at least.

John J. Barlum, another commissioner, had much the same to say.

While he is of the opinion that it would be wise to establish a 7-cent fare and maintain it for two years, for the purposes of providing service for outlying districts, purchasing new equipment and repairing old and making adequate payments into the sinking fund, there will be no change in fare before fall, he declared. He is said to feel that if the 7-cent fare could obtain over a two-year period there could be a 5-cent fare.

Enterprising Scheme to Boost Railway in Clarksville

An ingenious plan and a co-operative spirit have spelled salvation for the Citizen's Railway operating in Clarksville, Tenn. Twenty-one individuals with "interested" citizens have composed a



Natty appearance of railway employees in East St. Louis in their new uniforms

committee which is to investigate the public sentiment and possibility of substituting buses for the two cars which operate on approximately 3 miles of line and haul about 125,000 people annually. The committee is to have a month for its investigation and recommendations and during that time the 21 citizens and firms will contribute \$5 each for maintenance of the system against its daily operating deficit. They even pledged a continuance of the contributions if the report is not ready at the end of the month.

One of the pledgees stated that he would be willing to donate \$250 annually to help defray any deficit provided W. E. Beach, who served without compensation as president since 1916, would continue in office. The president suggested that the service be discontinued for a period of 30 days, following the close of the city schools.

Contest in Cincinnati Extended

An extension of time up to June 30, 1928, has been allowed for the contest open to every member of the Cincinnati Street Railway, Cincinnati, Ohio, covering ideas on selling rides. In the May issue of the *News*, the official paper of the company, readers are told that their ideas might be worth \$10 and that they should be sent in to the Contest Editor, 804 Dixie Terminal.

New Uniforms for East St. Louis Employees

A departure from the usual in electric railway apparel is seen in the new uniforms being worn by all platform men and supervisors of the East St. Louis Railway and Belleville division of the East St. Louis & Suburban Railway, East St. Louis, Ill. Instead of the dark serge material the new toggerly is made of the popular and durable olive-drab whipcord cloth. The caps are of the semi-military style with the operator's badge on each side instead of across the front, as formerly was the custom. Four-button cutaway is the style of the coats. All buttons bear the nickeled monogram of the affiliated East Side Electric System.

A distinctive feature of the new uni-

forms is the service star worn on the left sleeve. Each silver star worn represents five years' service with the company, the five-star-cluster indicating that the wearer is a member of the company's Twenty-five Year Club.

Judah Street Extension in San Francisco Under Way

After a year's delay work has been started and is being pushed by contractors on the Judah Street extension of the San Francisco Municipal Railway, San Francisco, Cal. It is expected that cars may be running by Jan. 1. The plea of Reuben Hunts, "A taxpayer," for an injunction was denied by the California Supreme Court, the court ruling that the work could be financed out of city moneys on bond. The Municipal Railway was declared to be a unit and not a group of operating lines as contended by Mr. Hunt. Further litigation was avoided by a conference between attorneys for Mr. Hunt and City Attorney O'Toole, as a result of which it was announced that no other legal action would be brought to impede the work.

Judah Street will be paved from Forty-first to Forty-eighth Avenues. Some of the trackage has already been laid. The extension will serve the newly built Sunset district.

Electrification at New York Plan Report

Electrification of all railroad lines in New York City and its suburbs, elimination of grade crossings at the intersection of railroads and main highways, and unified management and operation of railroad transportation in the environs of New York, are some of the outstanding needs cited in the report on "Transit and Transportation" prepared by the Regional Plan of New York and Its Environs as the result of six years' study, the second section of which was made public May 14. The report says:

One of the plans calls for a new subway system for the exclusive handling of package freight, coal, building materials and waste products. This plan proposes the use of small cars of about 10-ton capacity, with demountable bodies which could be transferred from the subway chassis to motor truck chassis for short hauls on the street surface.

The second plan for freight distribution would create a system of inland freight stations in combination with industrial terminal buildings, such as have been proposed by the Port of New York Authority, and toward the carrying out of which considerable progress has been made. It is expected that these would release much of the water front of Manhattan and New Jersey for the development of steamship terminals.

The third plan calls for the construction of double-deck piers, containing two float bridges, and connected at the second story level with freight terminal buildings on the inland side of waterfront streets.

The fourth proposal suggests the establishment of a large terminal on the west water front of Manhattan, which would connect through a fleet of rapid-scheduled motor floats with all the New Jersey railroads and the New York Central Railroad.

The regional planning body does not indicate which of these proposals it considers most desirable, but definite recommendations on the subject will be contained in the regional plan itself, which is to be drafted next fall.

100 New Cars for Cincinnati

Telegraphic advices from Cincinnati on May 18 report an order placed with the Cincinnati Car Company for 100 cars to be delivered to the Cincinnati Street Railway next fall to cost \$1,300,000.

Old Scale Accepted in New York State

Motormen and conductors on the Syracuse, Rochester and Utica divisions of the New York State Railways accepted the proposal of the company that the existing wage contract be renewed for another year. The contract is in contrast with an increase of 8 cents an hour asked by the men. The company claimed it was unable to meet the requested increase because of paving

costs and increased competition from automobiles.

More than 2,000 men are affected by the agreement. The so-called working terms of the new contract will differ only slightly from the ones in force the last two years.

Lower Fares in Massachusetts

Trustees of the Eastern Massachusetts Street Railway have announced a reduction of fares on part of its lines in Melrose, Mass., through the issuance of thirteen-ride tickets to cost \$1. The lower fares will be effective on May 23. Aldermen of Melrose recently petitioned the company for reduced fares and also asked for lower fares on two other lines with transfer privileges. These two reductions with the transfer privileges the railway management did not see its way clear to grant.

Both Sides in Fort Wayne Wage Issue

Attorneys for the Indiana Service Corporation, Fort Wayne, Ind., at a recent hearing before the Indiana Public Service Commission, said that higher fares would follow higher wages. They opposed a wage increase which had been sought by employees. Attorneys for the employees said they should be granted the wage increase regardless of the financial condition of the company. Men are seeking a scale of 65, 67½ and 70 cents an hour.

Arbitration in St. Louis

Mayor Victor J. Miller of St. Louis, Mo., on May 16 induced representatives of the St. Louis Public Service Company and the Amalgamated Association to agree to submit their differences to the Missouri Public Service Commission for arbitration. The directors of the railway must also ratify the action of the company officials at the Mayor's conference. This will be done immediately. Briefly the agreement provides:

The city, union and company will submit the wage scale to the Missouri Public Service Commission for arbitration.

Railway officials will ask the directors to authorize them to extend the present contract with the union indefinitely.

The city agreed to intervene as an interested third party and request a speedy and satisfactory settlement of the controversy.

In the meantime the existing wage scale will prevail and any award made by the state commission shall be retroactive as of June 2.

In page advertisements inserted in all of the St. Louis newspapers on May 14 the company stated its position and defended its action in demanding that the workers accept an 8.4 per cent average reduction in wages to be put into effect on June 3.

It is believed that the Missouri Public Service Commission will decide prior to June 1 the question of raising fares in St. Louis to 8 cents flat from the present rate of 8 cents cash with two tokens for 15 cents.

Rapid Transit Survey in St. Louis Approved

The ways and means and a special rapid transit committee of the St. Louis, Mo., Board of Aldermen approved May 11 Mayor Victor J. Miller's bill for a rapid transit survey at a cost of \$50,000. The vote was twelve to one. The bill provides for a Transportation Survey Commission to include the Mayor, comptroller, presidents of Board of Aldermen and the Board of Public Service, a representative each of the Missouri Public Service Commission, the St. Louis Public Service Company, City Plan Commission, the director of streets and sewers and seven private citizens.

Franchise Negotiations in Jacksonville Suspended

Negotiations between the City Council and the Jacksonville Traction Company, Jacksonville, Fla., for a new franchise covering operation of the railway system have been suspended pending further investigation of the valuation and other matters by a committee of the Council.

Councilman Hamphill had introduced figures stating that the valuation of the company in 1924 had been placed at \$4,136,180 in the hearing to determine whether the company was entitled to a higher rate of fare, that the citizens' committee of Jacksonville had valued the property at \$4,557,132 and that the statement of the company to the state of Massachusetts placed the assets of the company at \$4,783,611.

At a previous session Mr. Knight had said that the company would accept a valuation for rate-making purposes on its property of \$5,900,000 and desire authority to earn 9 per cent on that investment. He followed with a review of the action of the Railroad Commission in 1918 in allowing a 7-cent fare after the company had gone into receivership and stated that the valuation reached by the commission and the company differed only \$58,000. Despite the aid given by the commission then and in 1924 in allowing increased fares, the company has not paid dividends on its common stock since 1914 and preferred stock since 1916 and lost \$32,000 last year, he said.

New Office Quarters for Brooklyn Companies

New offices of the Brooklyn-Manhattan Transit Corporation and Brooklyn City Railroad were established May 14 at 385 Flatbush Avenue, the latter company occupying the third and fourth floors and the B.-M. T. the six floors from the fifth to the eleventh in the Paramount Building. Formerly the two companies occupied two interconnecting buildings at Clinton and Montague Streets. The offices of the B.-M. T. had been established at 85 Clinton Street since 1905. The Brooklyn City Railroad occupied the building at 168 Montague Street since 1892.

Joint Consolidation of Harbor Operations in Los Angeles

The railroads and railways serving Los Angeles, Cal., harbor joined in applying to the Interstate Commerce Commission on May 9 for permission to consolidate their water front operations. The Los Angeles Harbor Commission will participate in the project. Under the amendment the Southern Pacific, Santa Fe, Pacific Electric and Los Angeles and Salt Lake systems will organize the Harbor Belt Line Railroad. The application explained that an expenditure of \$145,000 would be necessary for the construction of new switch tracks and connections. The balance of the belt line property will be made up of contributions of line from the other railroads and the utilization of tracks owned by the harbor commission. Reference to the planning of this line was made in *ELECTRIC RAILWAY JOURNAL*, issue of March 3, 1928, page 373.

Stations Located for North Jersey Line

Twenty-four stations along a 16-mile right-of-way have been tentatively named by the North Jersey Transit Commission in making known further plans for a rapid transit line proposed along the Palisades ridge from Bergen Point to Fort Lee.

Four stations are proposed for Bayonne, eight for Jersey City, five for Union City and two each for West New York, North Bergen, Fairview, Cliffside Park and Fort Lee. Guttenberg, which occupies a narrow strip of territory between West New York and North Bergen, will be served by a station in West New York five blocks from the city line, and one in North Bergen three blocks from the city line. Joint stations serving two communities are planned at the Jersey City-Union City, Union City-West New York and North Bergen-Fairview city lines.

The route is planned as a subway for almost its entire length. It is laid out so as to serve an area of 20.7 square miles containing a population of approximately 500,000 persons.

Massachusetts Governor Insists on Elevated Legislation

Governor Fuller of Massachusetts is understood to be preparing to send a special message to the Legislature requesting that every effort be made to enact Boston Elevated Railway legislation at the present session, and outlining his views for consideration by the House and Senate. Since the Legislature killed all Elevated legislation in the House the Governor has declined to make his plans public, but he has much to say on the subject in speeches he has made about the need for settling the matter of whether public control of the road shall continue.

In speeches last year and early this year the Governor has threatened to keep the Legislature in session until some Elevated legislation reaches him. He has also said that if the Legislature failed to pass a bill he might feel himself forced to run for a third term as Governor, as he felt he should not leave the office until the Elevated problem is settled.

Transit—A Factor in Community Development

Supervisor of public relations at Buffalo explains company's plan for community development through helpful co-operation

A CAMPAIGN to help the city develop along sound lines through a knowledge of its advantages and a unity of thought and action has been running in cars and buses of the International Railway, Buffalo, N. Y., for several weeks. The purpose is to develop a better understanding of mutual interests in the prosperity of the community and to promote unified effort toward advancement of all interest on the Niagara frontier.

Still more recently the railway has taken another step in this campaign, soliciting the co-operation of moving picture theatres, radio stations and newspapers. As a result the Buffalo Theatre and the Hippodrome in Buffalo are displaying one of these messages at each performance. The Buffalo Evening Times is using daily one of these slogans on its front page and station WMAK is signing off nightly with the same message. In these latter developments the railway does not appear at all, the message simply being signed by the organization sponsoring it.

THREE-SIDED RESPONSIBILITY

Thus did Walter McCausland, supervisor of public relations of the railway, explain in part the program of his company for community betterment in a recent address before the Niagara Falls Rotary Club. Among other things he said:

The railway's place in the community may be more clearly visualized when I inform you that this last year the high-speed line between Buffalo and Niagara Falls carried 2,500,000 passengers while the new de luxe limited bus line carried 60,000 more. The International Railway also operates the local service in Niagara Falls and welcomes your comments and suggestions regarding this feature of its work.

As taxpayers you will be interested in the fact that we pay to Niagara Falls in school, county and state taxes \$46,000. Last year your city was beautified and traffic conditions were greatly improved by the additional facilities supplied at the American end of Falls View Bridge. Similar improvements are now being completed at the Canadian end of the bridge.

The employees as well as the management have expressed their desire to participate in the activities of the community. Last year we made up a special fund for the organized charitable drives in the com-

munities served by the company. The management matched their contributions dollar for dollar, and the first check drawn from the new fund was for the Niagara Falls community chest.

The speaker mentioned these things not to tell how good the company is, but merely to emphasize the mutual interest. He said further:

It may surprise many to learn that the International Railway carries daily 500,000 passengers on cars and buses of the Niagara frontier. To put the figure another way this is practically equivalent to the population of Buffalo or in the course of a year $1\frac{1}{2}$ times the population of the United States.

Of this tremendous throng of daily riders, more than one-half ride within two hours in the morning and two hours in the evening.

Mr. McCausland then discussed the facilities of the company for coping with the physical problems before it.

Speaking along somewhat similar lines Mr. McCausland addressed the Mercer Club on "Some Human Aspects of the Transit Business." He referred to the \$375,000 track and paving program and to the safety record of the Broadway carhouse. In concluding his address he said that International Railway Company men and management pledge themselves to the following policy:

To the Public—

To furnish an adequate system of transportation, operated by efficient and courteous employees, and to improve service to the fullest extent that such improvement can be supported by the fare collected.

To the Employees—

To pay wages adequate to the necessities of life and comfort, and sufficient to permit of reasonable savings. To provide opportunity for participation in increased earnings made possible by the increased effort of the employees, and to encourage the investment of this added compensation in such a way as to make the employees owners as well as workers.

To the Owners—

To pay a reasonable return on the actual value of International Railway Company property, in justice to those who made the company possible in the first place, and in order to keep its credit at a point which will assure the continuance of a high standard of public service.

Ten-Cent Fare Asked in Hamilton

Fares of 10 cents or three tickets for 25 cents on street cars and 15 cents on buses or two tickets for 25 cents are the rates which the Hamilton Street Railway, Hamilton, Ont., will ask when its application for an increase in fares is considered by the Ontario Railway Board. The company will also request that children's fares, at present rating at ten for 25 cents, be changed to six tickets for 25 cents. The present fare in Hamilton is 5 cents, being the only city in Canada with a 5-cent fare. Civic officials are said to appreciate the fact that the company is entitled to redress through an increase in fare, but are understood to feel that a rate of 10 cents is too high.

Recent Bus Developments

Bus Program Ahead in St. Joseph

The ordinance introduced before the City Council of St. Joseph, Mo., at the instigation of the St. Joseph Railway, Light, Heat & Power Company making it possible for the company to use buses as co-ordinate units of the railway system was passed recently. At the same time the Council repealed the ordinance against buses passed in the days of the jitney.

C. A. Semrad, general manager of the company, said that if this ordinance and one to repeal the ordinance regulating self-propelled vehicles carrying passengers for line, so as to prevent the operation of such vehicles paralleling car lines, were passed the company would establish a temporary bus line on Grand Avenue to replace the railway within two weeks after the passage of the bills.

Four buses, to cost \$25,000, will take the place of the three cars which now run on the line, the shortest of the system. It is proposed so to route the buses that the tracks will be followed only from the downtown district to Tenth and Powell Streets.

Mr. Semrad declares motor vehicles as substitutes for cars on the Union line is impracticable, because of the long distance to be traveled, and the large number of passengers. The present Union line is 7 miles in length, with one smaller line at the north end and two at the south end.

Only one bus line is operated in St. Joseph at present, between the end of the Frederick Avenue car line and the state hospital. An extra charge is made for transfers.

Line in Lowell Approved

A vote allowing the Eastern Massachusetts Street Railway to operate a bus line through Andover Street to the City line has been taken by the city of Lowell, Mass. A hearing was set for May 15 on the railway's petition to run buses to the Billerica line.

Co-operating With Plane Service in Detroit

During the all-American Aircraft Show held in Detroit, Mich., from April 14 to April 21 a special bus service was established between the Airport and Convention Hall on Woodward Avenue, a distance of about 13 miles, by the Department of Street Railways. The service, which was supplemental to the regular de luxe coach operation, which the department has been operating between the hotel district and the Ford Airport for the past year, was well patronized by out-of-town visitors to the show who desired to inspect the airport. Another de luxe type coach to handle the increased volume of traffic that the Department of Street Railways

is transporting to the airport was recently purchased. These two units maintain an hourly schedule for the accommodation of passengers traveling the route of the Stout Air Services, Inc., on their regularly scheduled planes between Detroit and Cleveland.

City Suggests Buses on Denver Line

The city of Denver, Colo., has asked the Denver Tramway to substitute buses for its electric railway cars on the Globeville suburban line. This suggestion followed a protest by the company of the request by the city for a contributor to the expense involved in the work of building a new viaduct leading to Globeville.

Joint Coach Service Effected in Los Angeles

A change in coach service was effective May 4, when the operation of the Wilshire Boulevard and La Brea Avenue Motor Lines was taken over by the Los Angeles Motor Coach Company, in which the Los Angeles Railway and the Pacific Electric Railway are each one-half owners. At that time the Wilshire line was extended from Fairfax Avenue along Wilshire Boulevard to Santa Monica Boulevard, in Beverly Hills. Eight new double-deck coaches, costing approximately \$100,000, are being provided by the Pacific Electric Railway and the Los Angeles Railway to take care of the additional service. All of the Los Angeles Railway double-deck coaches will be used on the Wilshire Line.

Application for this joint service was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 28, 1928, page 711.

One System Suggested for Knoxville

Experts retained by city frown upon any plan that would contemplate competition provided local railway is willing to put on four suggested bus routes

CO-ORDINATION of the city's transit facilities is recommended for Knoxville, Tenn., in the report of Harland Bartholomew & Associates. The report really is the outcome of the situation created by the desire of the Knoxville Rapid Transit Company to secure operating right for local bus lines, some of which would be competitive with the railway lines of the Knoxville Power & Light Company. The Council was not disposed to proceed in the matter, however, until it had the benefit of outside suggestions. Hence the report now presented.

The report will be placed by the Council bus committee before Power-Light officials to ascertain if the company will agree to put on the bus lines recommended for immediate installation. If Power-Light will not agree to put on four lines recommended for immediate installation, the report suggests that an independent system be enfranchised by the city.

The four lines recommended extend into the Beaumont section; into Lonsdale; out Sevierville Pike, and northward from the terminus of the Sixth Avenue car line to Whittle Springs.

The Bartholomew report outlines and recommends nine bus lines for an independent system, in case a co-ordinated bus system can not be agreed on.

The report finds in the repeated eliminations of competing lines in Knoxville's transportation history through numerous consolidations a "striking example of the experience of nearly every city where electric railways are now in operation." The report says:

Cities have come to realize that the electric railway is a natural monopoly subject

to reasonable regulations. The economic problems that brought about the unification of gas, water, electric and telephone services are identical with those supplying urban transportation. The city must be served as a unit if duplication of effort is to be avoided and convenient and efficient service provided at a minimum cost. Competition among local utility companies adds to the cost of operation and makes it impossible for the competing companies to earn sufficient revenue to keep their properties in good operating condition.

DANGER IN COMPETITION

As evidence of the economic results that might be expected should an independent bus system be enfranchised in Knoxville, the report gives the number of passengers carried on the various Power-Light lines a day and the number of seats available:

Seats	Passengers	Excess Seats	Per Cent Vacant
83,803	45,490	38,113	46

The maps in the report show that the six bus lines proposed by the Rapid Transit Company duplicate some lines for their entire length. Yale and Highland lines are the only two where duplication in whole or in part does not occur.

In order to extend transportation service into areas now needing service and not now served, the report recommends installation of six supplemental bus routes, and declares four are needed immediately.

The report recommends that the inter-urban bus lines carry local passengers within the city on certain routes outlined. It recommends that the terminal location of these lines be changed from State Street to a point west of Gay

Street, and somewhere in the square bounded by Main, Union, Walnut and Henley. All interurban buses then could be eliminated from Gay Street.

As stated before, the report suggests that if no agreement with Power-Light for installation of bus lines can be reached, a franchise be given to an independent company. In this connection nine routes are traced out, based on the maximum service, economy of distance and time, and grade and street conditions. It is proposed to permit buses on these routes to traverse Gay Street until Henley Street is widened and opened and the Henley Street bridge is built. It is proposed, too, to have buses on these routes follow certain loopings in the business section, so that no route will extend through the business section to an objective on the opposite side.

The railway company applied on April 23 for a charter for the Knoxville Motor Coach Company which would be the name of a subsidiary bus operating organization if the Council gives the necessary franchise.

Conference on Substitution by Bus in Ohio Territory

A committee to confer with the Buckeye Stages, Inc., on a franchise for Columbus-Westerville, Ohio, bus service has been appointed by the Westerville Council, which voted for substitution of bus for street car service. Service at present is being supplied by the Columbus Railway, Power & Light Company, but no franchise between this company and Westerville has existed since 1915. Westerville is 14 miles north of Columbus. The matter will be placed before the Ohio Public Utilities Commission.

California Commission Explains Denial of Petitions

The California Railroad Commission has denied various petitions for rehearing the application of the Key System Transit Company for a certificate to operate bus service from the City Hall in Oakland to Alameda. In so doing, however, the commission ordered that when application was made by the utility for a supplemental order approving the routes of the proposed bus service in Oakland and Alameda the matter would be re-opened for further hearing.

Would Increase Feeder Lines in Chicago

Extension of surface lines by the establishment of feeder bus routes was urged by the Chicago City Council committee on transportation at a recent meeting attended by a group of business men from the northwest side who have been petitioning the committee for some time to establish routes. Installation of four routes has been ordered by the Illinois Commerce Commission. The form of the ordinance was approved by Harry P. Weber, attorney for the Chicago Surface Lines, and James W. Breen, assistant corporation counsel.

Replacement in Atchison

Story of a Kansas town in which change-over was deemed desirable
—Eleven miles of route

BUSES have relegated to oblivion the thread-bare and derided railway system operated at Atchison, Kan., by the Kansas Power & Light Company. Whether the buses are enjoying present popularity because they represent progress in transportation or novelty remains a matter for conjecture. The old mule cars in Atchison enjoyed similar public acclaim in the beginning and then became the handy butts for comedians' jokes just as the street cars have been for several years.

Thirty-four years ago Atchison held promise of stepping alongside Kansas City in population and the coming of the railway was believed to herald great things for the future, and it did. The memory of those early days caused some display of sentiment among the older residents but the buses are new and shiny temptations to ride.

Probably the private auto can be blamed for the death-blow. When a considerable portion of the population became owners of motor cars, electric railway patronage went into a tail-spin that was fatal. Decreases in revenue were accompanied by an increase or at the least a standstill in operation costs.

Officials of the company were loath to spend money. Service and patronage became a game in which each kicked the other farther down the hill. At last it became necessary to make wholesale replacements or abandon the entire system. Company officials are believed to have decided on the replacement because it entailed less initial outlay than would have been needed to rehabilitate the railway.

Slightly less than two years ago two electric lines into north Atchison were

abandoned, the tracks torn out and replacement made with buses. One bus was made to serve the combined territories of the two car lines by extending its route. Last summer another line was replaced with a bus. This spring the three remaining electric lines were abandoned and their territory covered by two bus routes, each bus extending its territory. The equipment of the railway was junked wholly.

The fare remains at 10 cents just as it was for the street cars, but the buses are enjoying greater patronage. They are Yellow Coaches, type X, with a capacity of 21 passengers each. Four are kept in active service while a fifth is held for emergencies. The buses cover an entire route of 11 miles on a fifteen-minute schedule.

Two of the former motormen were retired on account of their length of service, and the others were drafted as bus drivers. L. M. ("Curly") Bliss, one of the retired motormen, had been driving a street car since the system was started 34 years ago.

Additional Service in Rensselaer

The Public Service Commission has amended the certificate of the Capitol District Transportation Company, Inc., subsidiary of United Traction Company, governing its operations in Rensselaer, N. Y., by authorizing the company to establish bus service on certain additional streets in that city. The service was requested by the Mayor of Rensselaer because of growth in the section to be served.

Ruling Awaited on Muncie Buses

Final hearing in the suit of the Equitable Trust Company, New York, trustee for the holders of mortgage bonds of the Union Traction Company of Indiana, Anderson, Ind., seeking an injunction against Sumner B. Denney and others operating bus lines in Muncie, Ind., in competition with buses owned and operated by the railway has just been concluded in Federal Court in Indianapolis. The suit was heard by Judge Baltzell some time ago and he returned a decision that the federal court had no jurisdiction in the matter. On appeal to the Circuit Court of Appeals at Chicago by the complainant, the higher court held that the issue was within the jurisdiction of the district court and remanded the case for trial.

Occupation Tax on Interstate Bus Not Valid

Municipalities may not impose a license tax on buses operating in interstate commerce, the United States Supreme Court ruled on May 14 in the case of Otis Sprout, bus operator, against the city of South Bend, Ind. This decision reverses the findings of the State Supreme Court of Indiana. Sprout, who operates a bus between

Interstate Legislation Goes Over Till Fall

FURTHER consideration of the Parker interstate bus bill will be postponed until Congress meets again next December. The interstate and foreign commerce committee of the House so decided in executive session May 15. In explaining this action, Representative Parker of New York, chairman of the committee, stated that there are too many conflicting ideas in the committee on the subject to achieve any harmony of opinion this session. "We can get much more satisfactory action next fall," he said. He also pointed out that even if the House passed the bill this session, the Senate would probably not be able to do anything about it as the committees of that body which are to conduct hearings on the subject have been tied up with other bills.

South Bend, Ind., and Niles, Mich., paid the state registration fee but refused to apply for the city ordinance. The Supreme Court says:

Exaction of the license fee cannot be sustained either as an inspection fee or as an excise for the use of the streets of the city. It remains to consider whether it can be sustained as an occupation tax. A state may, by appropriate legislation, require payment of an occupation tax from one engaged in both interstate and intrastate commerce and it may delegate a part of that power to a municipality.

But in order that the fee or tax should be valid, it must appear that it is imposed solely on account of the intrastate business; that the amount exacted is not required because of the interstate business done; and that one engaged exclusively in interstate commerce would not be subject to the imposition. The Supreme Court of Indiana, far from construing the ordinance as applicable solely to buses engaged in intrastate business, assumed that it applied to buses engaged exclusively in interstate business and that Sprout was so engaged. The privilege of engaging in such commerce is one that a state cannot deny. A state is equally inhibited from conditioning its exercise on the payment of an occupation tax.

Discontinuance of Line in Santa Barbara Approved

The Santa Barbara & Suburban Railway has been authorized by the California Railroad Commission to discontinue operation of its State Street bus line in Santa Barbara on five days notice to the public.

Bus Line Proposed in Amsterdam

A hearing was held before the Public Service Commission May 15 on the application of the Fonda, Johnstown & Gloversville Railroad to reopen the case for consent to abandon the Vrooman Avenue line in Amsterdam, N. Y. The commission approved the former application of the company for abandonment in an order on Sept. 1, 1926, but this order was rescinded on Nov. 10, 1926, when the commission permitted the company to increase its passenger fares in Amsterdam from 8 to 10 cents. The commission held at that time that the company should continue to operate the Vrooman Avenue line for a time under the new rates to ascertain whether further operation would be profitable.

At the latest hearing the company presented figures indicating that there was an operating loss on all of its lines in 1927 of \$33,493, notwithstanding the increased fares, and that the revenues on its Vrooman Avenue line decreased from \$32,338 in 1925 under the 8-cent fare to \$30,314 in 1927 under the 10-cent fare. According to the company's figures, 715,780 fewer passengers were carried on all of its railway lines in 1927 than in 1926.

It was stated by J. Ledlie Hees, president of the company, that an application would be made to the city authorities for consent to operate a bus line in the territory where abandonment is now proposed.

Financial and Corporate

Reorganization of Massachusetts Line Underway

Milford & Uxbridge Street Railway changes name under new management. Extensive rehabilitation plans projected

AREJUVENATED era in rapid transit by both electric car and bus is hopefully looked for by residents in the vicinity of Milford, Framingham, Hopedale and Uxbridge, Mass., as the result of the reorganizing under new management this month of the old Milford & Uxbridge Street Railway, which has been authorized by the State Board of Public Utilities to assume the name of the Milford, Framingham, Hopedale & Uxbridge Street Railway.

The property of the company was sold in February in the Massachusetts Supreme Judicial Court to the Citron-Byer Company. The old Milford & Uxbridge lines had been in a receiver's hands since early in 1926 and while it often appeared that another old New England electric railway would abandon service it now has every appearance of becoming a successful venture once more.

On May 1 the lines were taken over by the new owners and almost immediately a petition was filed to change the name. Under the reorganization plan the new owners were authorized to issue first mortgage bonds of a par value of \$125,000 and common stock valued at \$125,000, giving the new owners an opportunity to realize new capital of \$250,000 for the improvements planned. Walter L. Adams, receiver of the company, was named president of the new company. He will also act as general manager. Israel Citron is treasurer. Mr. Adams is a resident of Milford who has long been interested in putting the line on its feet financially.

One of the officers speaking of the reorganization said:

We are interested in putting this service back on a firm foundation not only from a personal financial standpoint but from a community's standpoint. Today a community without rapid transit is lost. While bus operation is successful in some ways it cannot take the place of trolleys in cheap, fast, mass transportation. The new name was decided upon as it gives each of the principal communities in which it operates, equal recognition. All that we need now is the co-operation of the public.

Incidental to the reorganizing of the railway the new owners have organized the Milford, Framingham & Uxbridge Coach Company. It is capitalized at present for \$50,000. Through motor coaches the company hopes to coordinate with railway service feeding the railway lines and succeeding rail service where it is found necessary to abandon it. Mr. Adams is president of this concern and Attorney Frank P. Ryan, Worcester, is secretary-treasurer.

While loss of patronage forced the old

management to increase fares in several zones the new company has already taken steps to effect a universal 10-cent fare with transfer privileges. It hopes that the volume of business will overcome the loss where a 13-cent fare has been in effect. The company, it was pointed out, has an annual payroll of about \$100,000.

In general the new owners have discontinued several round trips, added others at different hours, speeded up the time, perfected timetables and are planning modern roadbed improvements and equipment economies. All lines taken over by the new company are being operated and a survey during the next few months will determine the policy in maintaining them further. Purchase of new cars is under consideration.

Merger in Ohio Declared Operative

The merger of the Penn-Ohio Edison Company and the Northern Ohio Power Company was declared effective on May 15. Under the plan, each share of Northern Ohio capital stock was exchangeable for two-thirds of a share of Penn-Ohio common plus an option to purchase one-third of a share of the latter company on a sliding price scale. Stockholders who have deposited may exchange deposit receipts at the office of the Bankers Trust Company for Penn-Ohio stock and options. Other stockholders have until June 11 to make the exchange.

New Preferred Offered by Illinois Power & Light Corporation

A new offering of 364,740 shares of Illinois Power & Light Corporation, Chicago, \$6 cumulative preferred stock was announced on May 3 by a Chicago syndicate headed by Blyth, Witter & Company, and including Field, Gloré & Company, Utility Securities Company and E. H. Rollins & Sons. Of the total shares offered, the Illinois Power & Light Corporation has reserved 74,740 shares for exchange or sale directly by the corporation. Proceeds from the sale will be used to retire the \$33,000,000 7 per cent cumulative preferred stock.

Lincoln Road Returned to City

The Illinois Public Utilities Company, operating the electric railway service in Lincoln, Ill., the last three years, has given notice that it will turn the property back to the city. C. E. Steinfort, manager, told the Council that the line had been losing money constantly and that the company had decided to relinquish the property to the municipality. The Council has not indicated what action it will take.

Sale of Indiana Road at Foreclosure Protested

Protest against the manner in which the property of the Indianapolis & Cincinnati Traction Company, Rushville, Ind., was sold at the receiver's auction and a request for the Public Service Commission to disapprove the transfer were contained in a petition filed with the commission on May 10 by George A. Voight, Jeffersonville, Ind., holder of the \$17,000 in bonds. He alleged that the sale of the property was advertised improperly and to the disadvantage of persons interested; that the price received was much less than a fair value of the cost of replacement, and that the lines actually are in good condition. Sale of the lines without the approval of the commission made the transaction void, he asserted. He wants operation stopped until an investigation has been made by the commission.

Service Abandoned on Nebraska Interurban

Acting on authority of the Nebraska Railway Commission, the Omaha, Lincoln & Beatrice Railway abandoned its service May 12. Junking of its rails will not be completed, however, until the Interstate Commerce Commission permits abandonment of the service on a part of its rails to the steam railroad companies for handling freight to and from industry tracks. Originally planned as an interurban to connect the three cities named in its corporate title, the road was never built beyond the suburbs of University Place and Bethany, out of Lincoln. In its decision the commission found that it was without authority and unreasonable to require the company to operate at a loss.

Authority was given the Lincoln

Traction Company to serve that portion of the vacated territory it did not previously reach by adding three new buses. These will be used to give extended service in the agricultural college line, for another mile, and to reach all portions of Bethany by extending its bus service from the south section to the northern limits.

New Haven Optimistic

Earning capacity of Springfield and Worcester systems is expected to improve as a result of rehabilitation

CO-ORDINATION will give the best service at the lowest cost and result in the most net revenue. This opinion is expressed in the report of the New York, New Haven & Hartford Railroad for the year ended Dec. 31, 1927, by E. J. Pearson, president. He said that earnest consideration had been and was being currently given to the operation of the electric railway properties and to the changing conditions of highway transportation by automobiles and buses which might affect the earning power of the electric railways. It seemed fairly clear that electric railways were still the most efficient and economical method of handling the peak-hour travel in cities and that buses were better adapted to the handling of suburban traffic—into, out of and between cities.

The effort of the managements of the railways had been directed toward coordinating city operation by street cars with suburban operation by buses and the whole with the bus operation of the New England Transportation Company and the rail operation of the New York, New Haven & Hartford Railroad.

During the year, the Springfield Street Railway, the Worcester Consolidated Street Railway and the Berkshire Street Railway had caused to be

refunded a part of their respective bonded indebtedness. Material economies had been effected by the electric railways through increased use of one-man safety cars of the latest design, equipped with front entrances and automatic rear exits. These cars were lighter than the old type of two-man cars, consequently used less power and through a modern device of automatic exits reduced delays to a minimum.

Operating revenues from rail service of the Connecticut Company, one of the largest subsidiaries, decreased in 1927 more than \$650,000, due largely to the favorable weather conditions for continued use of privately owned automobiles during the winter months; this was offset in part by an increase in revenues from bus operations of approximately \$200,000. Economies in operation resulted in practically the same net income as last year.

On the lines of the New York, Westchester & Boston Railway 13,032,323 passengers were carried during the year, an increase of 1,346,301. An extension of the road from Mamaroneck to Harrison, a distance of 1.76 miles, was opened for business on July 3, 1927. Extension of the road to Rye, a distance of 1.9 road-miles, is under construction, and will be opened for business about July 1, 1928.

Beginning in April, 1927, the New York & Stamford Railway gradually discontinued service on all of its lines. In September, 1927, operation had been suspended on all except one line, which was discontinued as of Dec. 31, 1927. Motor coaches are now being operated by the County Transportation Company, a subsidiary, in place of terminated trolley service.

No additional shares of the Worcester Consolidated Street Railway's first preferred stock have been exchanged for preferred shares of the New England

INCOME ACCOUNTS, ELECTRIC RAILWAY SUBSIDIARIES OF NEW YORK, NEW HAVEN & HARTFORD RAILROAD

	Connecticut Company		Berkshire Street Railway		New York, Westchester & Boston		New York & Stamford		Springfield Street Railway		Worcester Consolidated Street Railway	
	Year 1927	Com- pari- son with 1926 Increase or Decrease	Year 1927	Com- pari- son with 1926 Increase or Decrease	Year 1927	Com- pari- son with 1926 Increase or Decrease	Year 1927	Com- pari- son with 1926 Increase or Decrease	Year 1927	Com- pari- son with 1926 Increase or Decrease	Year 1927	Com- pari- son with 1926 Increase or Decrease
Operating revenues:												
Passenger.....	\$13,500,927	\$431,063	\$765,442	\$44,945	\$1,975,293	\$235,950	\$204,167	\$219,400	\$2,826,272	\$304,175	\$3,069,922	\$57,021
Other.....	684,107	33,583	33,253	7,018	176,134	3,772	2,747	792	65,158	45,472	119,119	92,481
Total.....	\$14,185,034	\$464,647	\$798,695	\$51,964	\$2,151,427	\$239,722	\$206,914	\$220,192	\$2,891,431	\$349,648	\$3,189,041	\$149,502
Operating expenses:												
Maintenance of way and structures.....	1,791,498	186,402	107,643	36,911	197,106	67,895	37,212	29,862	255,747	84,697	255,234	109,923
Maintenance of equipment.....	1,990,985	9,296	180,837	51,781	290,204	37,632	67,539	67,267	398,782	7,635	504,574	14,932
Transportation.....	6,559,397	214,373	378,919	40,976	714,859	108,779	97,568	86,223	1,443,567	101,812	1,543,813	113,033
Other.....	1,221,284	55,719	82,379	24,912	296,801	37,366	76,124	4,892	316,750	25,546	434,714	72,501
Total.....	\$11,563,166	\$354,351	\$749,779	\$1,193	\$1,498,972	\$251,674	\$278,444	\$178,460	\$2,414,846	\$304,420	\$2,738,337	\$165,988
Net operating revenue.....	\$2,621,868	\$110,295	\$48,915	\$50,770	\$652,455	\$11,951	\$71,530	\$41,731	\$476,584	\$45,227	\$450,704	\$15,885
Tax accruals.....	698,934	91,897	31,022	3,608	229,149	8,292	15,243	1,495	57,611	14,653	\$85,980	2,946
Operating income.....	\$1,922,934	\$18,397	\$17,893	\$47,161	\$423,305	\$3,658	\$56,287	\$39,236	\$418,972	\$30,569	\$364,723	\$18,849
Non-operating income.....	56,984	14,669	2,239	585	15,186	5,708	35,018	32,739	15,116	7,830	25,066	1,399
Gross income.....	\$1,979,918	\$33,067	\$20,133	\$46,575	\$438,492	\$2,050	\$91,305	\$71,975	\$434,088	\$38,400	\$389,789	\$20,248
Deductions from gross income.....	1,451,900	25,620	*313,569	10,987	*2,303,492	108,802	*107,168	7,825	242,738	21,830	387,881	23,611
Net income.....	\$528,017	\$7,446	†\$293,435	\$57,563	†\$1,864,999	\$106,752	†\$158,924	\$6,328	\$191,349	\$44,569	\$1,908	\$5,362

Italics denote decreases.

†Deficit.

*Berkshire Street Railway—deductions from gross income include \$210,724 interest accruing to New York, New Haven & Hartford Railroad but not included in income account.

New York, Westchester & Boston—deductions from gross income include \$1,215,594 interest accruing to New York, New Haven & Hartford Railroad but not included in income account.

New York & Stamford—deductions from gross income include \$53,033 interest accruing to New York, New Haven & Hartford Railroad but not included in income account.

Investment and Security Company since last year's report. The New Haven guaranty is on 1,115 shares of par value \$111,500 of which the New York, New Haven & Hartford Railroad owns 279 shares of a par value of \$27,900, leaving the guaranty on \$83,600 in the hands of the public. The New England Investment has been unable to earn and pay interest on its gold notes owned by the New Haven road.

The improvement of the Springfield property has progressed during the year, 50 new cars and nine motor coaches having been purchased. The former freight station at Bond Street, Springfield, has been remodeled into an up-to-date coach garage, and a new garage has been constructed at Palmer, Mass. Heavy expenditures have been made for track improvements and construction of new track. Other expenditures have been made which will result in efficiency and economy in operation.

The rehabilitation of the Worcester property mentioned in last year's report has progressed during the year. Fifty new cars and twenty motor coaches have been acquired and twenty-one cars have been converted for one-man operation. A new carhouse and new motor coach garage have been constructed at Worcester. Large amounts have been expended for track changes and new track construction.

While the benefits of these improvements in Worcester and Springfield are not fully reflected during 1927, when the rehabilitation is complete they should result in restoring earning capacity.

Sale of New York Road Under Foreclosure Rescinded

The sale of the property of the Second Avenue Railroad, New York, for \$500,000 to Arthur W. Hutchins, representing the holders of \$3,116,000 of receiver's certificates, has been rescinded under an agreement that the bid could be withdrawn if the Transit Commission refused to approve the Second Avenue reorganization plan. This was disclosed in a report filed recently in the Supreme Court by John C. Clark, appointed referee in 1921 to sell the railroad upon the foreclosure of the receivership certificate liens. He said that approval had been denied in February.

The foreclosure suit was brought by the committee of certificate holders who obtained the decree of sale after the court held that their liens were superior to those of the holders of \$5,000,000 in bonds. To initiate the reorganization plan the committee offered \$500,000 for the property, of which \$230,000 was to pay accident and other claims and \$270,000 the expenses of the proceedings.

The reorganization plan, which failed of endorsement by the Transit Commission, provided for the formation of two companies, one to hold the realty, consisting of the carhouse property bounded by 96th and 97th Streets and First and Second Avenues, and the other to operate the road. Each was to have

a financial structure of \$750,000 in bonds and 31,400 shares of no-par value stock, ten shares of the latter going to the certificate holders for each \$1,000 of certificates. The last report of the road mentioned in the referee's statement was for the year ended June 30, 1926, when the net receipts were \$1,650,680 and the net profits \$53,318.

Committee Approves Washington Merger

Companies would consolidate as Capital Transit Company on basis of \$50,000,000 valuation

THE House Committee on the District of Columbia on May 14, voted a favorable report on the resolution to authorize the merger of railway and bus corporations operating in the District of Columbia. The vote was eight to five, several members of the committee reserving the right to change their votes on the floor of the House when the bill comes up for debate.

Representative Gibson offered an amendment providing that the Capital Transit Company, the new corporation provided for in the unification agreement between the Washington Railway & Electric Company, the Capital Traction Company and the Washington Rapid Transit Company be incorporated by an act of Congress, rather than under the provisions of subchapter four, chapter eighteen, of the code of laws of the District of Columbia, as specified in the resolution and in the agreement.

Representative Combs said that no amendment could be incorporated in the agreement by the committee because the committee had only the right to approve or disapprove the agreement. He said that if the committee amended the agreement its four weeks' work would be "scrapped" and it would be necessary to hold the hearings over again. The committee voted the amendment in, then moved to reconsider, and ended by voting out the resolution unamended.

Under the provisions of the resolution the Capital Transit Company, the new company, would acquire properties and stocks or securities and succeed to the powers and obligations of the Capital Traction Company and the powers and obligations of the Washington Railway & Electric Company directly connected with, or relating to, the operation of electric railways, buses and other forms of public transportation.

Provisions of the law making it incumbent upon the railways to bear the expense of crossing policemen, the laying of new pavement, the making of permanent improvements, renewals, or repair to streets and bridges over which street cars operate would be repealed. The Capital Transit Company, however, would be called upon to bear the entire cost of paving repairs, etc., incident to track repairs, etc., and one-fourth of the cost of paving, repaving and maintenance of paving between tracks and for 2 ft. outside the outer rails, and the excess cost of public bridges due to the existence of tracks thereon.

The agreement provides that a valuation of \$50,000,000 be placed upon the properties of rate-making purposes.

Traffic, Fare and Wage Figures

The number of revenue passengers, including bus passengers, reported by 210 companies to the American Electric Railway Association for March, 1928, compared with March, 1927, is as follows:

March, 1928.....	850,090,214
March, 1927.....	862,218,344
Decrease, per cent.....	1.41

The rate of decrease is smaller than has been reported in recent months and indicates that traffic conditions are improving.

Average cash fares in cities of 25,000 population and over were:

	Cents
April 1, 1928.....	8.1186
March 1, 1928.....	8.1186
April 1, 1927.....	7.9403

There was no change in the average basic fare in American cities during the month of March.

The average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

Month	Average Rate Cents	Index Number 1913=100 Per Cent
April 1, 1928.....	57.38	210.57
March 1, 1928.....	57.38	210.57
April 1, 1927.....	56.97	209.06

No changes in wages were reported during March.

Suit to Sell Ohio Interurban Right-of-Way

Suit to sell the right-of-way of the old Cincinnati, Milford & Loveland Traction Company in Madeira, Ohio, has been filed in the Common Pleas Court at Cincinnati. The action was brought for alleged non-payment of taxes on the right-of-way.

Increase in Net Income on Brooklyn System

For the nine months ended March 31, 1928, the total operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., were \$35,404,376 against \$34,732,911 for a similar period last year. Operating expenses increased from \$22,477,848 to \$22,906,048 in the 1928 period. After the consideration of income deductions, the net income for this year's period was \$4,764,700 compared with \$4,686,588 last year.

Massachusetts Line Being Scrapped

The lines of the New Bedford & Onset Street Railway, New Bedford, Mass., are being scrapped. The property was sold in the summer of 1927 and ceased operations Sept. 30, 1927. At the time of the sale it was stated that the new owners, whose identity was not revealed, had planned to continue operation of the line.

Personal Items

H. H. George in Cleveland

Official long connected with New Jersey company accepts new post of superintendent of research in Ohio city

HOWARD H. GEORGE, assistant to the chief engineer of the Public Service Production Company, Newark, N. J., has been appointed superintendent of research of the Cleveland Railway, and has taken up his new duties with that company. Mr. George is well known in the industry, particularly among engineers. For years he has been active in American Electric Railway Engineering Association work, and for the past five years has served as chairman of the committee on way and structures. He has represented the American Electric Railway Association



H. H. George

sectional committee on tie specifications of the American Engineering Standards Committee, and also that on specifications for special trackwork materials. Until the time of his transfer from the Public Service Railway of New Jersey to the Public Service Production Company, an affiliated company, he was one of the representatives of the American Society of Civil Engineers on the welded rail joint committee. He is also a member of the committee of judges of the ELECTRIC RAILWAY JOURNAL's maintenance contest and of the A.E.R.E.A. rules revision committee.

Mr. George began his career in the electric railway industry in 1906 with the Public Service Railway. Thereafter until June, 1925, he served that company successively as field engineer, division engineer, assistant to chief engineer and engineer of maintenance of way. In this capacity he was in charge of all engineering and supervision on new construction on bridges, buildings, track and ferries. In 1925 he was transferred to the Public Service Production Company, the construction subsidiary of the Public Service Corporation. The first year he served as superintendent of commercial construction, but for the last

two years he has held the position of assistant to the chief engineer, in responsible charge of several large construction projects, among them the construction of the Federal Trust Building and the East Park Street extension to the Newark Terminal Building, and Route 1 extension, Section 2 of the New Jersey State Highway in Jersey City, N. J.

During the World War Mr. George served as a first lieutenant and as captain in the Engineer Corps, first with the 305th Engineers, 80th Division, and later with the 55th Engineers, during which latter service he was engineer officer in charge of building construction on the Chateaux storage depot project. Just prior to the signing of the armistice, he was transferred to Base Section No. 4 at Havre as engineer officer in charge of railroad construction.

A. L. Drum to Head Detroit United Successor

A. L. Drum, who has been operating manager of the properties of the Detroit United Railway, Detroit, Mich., for the past three years under the receivership of the U. S. District Court, will be president of the new successor company under the reorganization, to be known as the Eastern Michigan Railways, to be formed to operate the rail and bus properties. It is planned to turn over the property to the new company about Aug. 1. The foreclosure sale will, it is stated, be made to discharge the lien of the bondholders, and will provide for the claims which are found by the court to rank prior to the bondholders' lien.

Ample provision will be made for working capital and financial credit to enable the new company to acquire new cars, extend track and secure additional buses to serve the traveling public in the greater Detroit metropolitan district. This includes the interurban rail and bus service to Toledo, Port Huron, Pontiac, Flint, Lansing and Grand Rapids, and the local railway and city bus systems in Pontiac and Flint.

Mr. Drum as manager and receiver and his representatives have applied themselves intensively to the problems of the Detroit United since their entrance into the situation there. And they have built constructively and well. The plan they have laid out gives promise for the future, since it is based not only on the wide experience of Mr. Drum in his general practice as consultant but on the experience had with this particular property.

To the work on the Detroit United Mr. Drum brought a splendid knowledge of engineering and management built up over a long period of years. More recently he has been engaged as a consultant in business for himself as head of A. L. Drum & Company, but

his entrance into electric railway work dates back to the period following immediately after he was graduated from the Massachusetts Institute of Technology. His first work was in the power station of the Boston Electric Light Company. Later he engaged for a time in journalism, but his real flair was for engineering and so he returned to the utility field as manager of the Middleboro gas and electric plant in Middleboro, Mass. But the Middle West beckoned and Mr. Drum became general manager and construction engineer for the Indiana Union Traction Company. Then followed a succession of important posts too numerous to mention, but among them the position of general manager and construction engineer for the Chicago & Milwaukee Electric Railroad, which ultimately led to the formation of A. L. Drum & Company with offices at Chicago, and the participation of that firm and of Mr. Drum as experts in some of the most important construction and engineering projects carried out in recent years in the United



A. L. Drum

States, many of which connections contemplated the retention of the firm in valuation cases and other similar proceedings in which expert engineering, financial and management knowledge was a requisite.

R. H. Wyatt Made Officer of Louisville & Interurban

Richard H. Wyatt, who has served as acting manager of the company since 1925, has been elected vice-president and general manager of the Louisville & Interurban Company, a subsidiary of the Louisville Railway, Louisville, Ky.

The office is a newly created executive position, according to the announcement, and it was desired to have an executive in direct charge of the road's operations. Samuel Riddle and Frank H. Miller, vice-presidents of the Louisville Railway, served in a similar capacity for the interurban until their terms expired in February. Mr. Riddle is now secretary of the interurban.

Mr. Wyatt entered the service of the Louisville Railway as a boy 45 years ago, and has held many positions since that time. When the interurban system

was started in 1904 he was appointed general express agent and, after a few years, general freight and passenger agent. He was promoted to the office of general superintendent in 1921, and to his recent place of acting manager in 1925.

Obituary

Raymond B. Keating

Raymond B. Keating died on May 12 at the West Penn Hospital after a brief illness. He was vice-president of the West Penn Electric Company, West Penn Railways, and the West Penn Power Company, as well as their subsidiaries, including the Wheeling Traction Company. He was also a director and vice-president of the Monongahela-West Penn Public Service Company of Fairmont, W. Va.

In 1907 he became assistant secretary of the Electric Properties Company, New York. Subsequently he was made secretary, treasurer and director of the Lackawanna & Wyoming Valley Railroad and its subsidiaries. He served in these capacities throughout the reorganization of the group of companies and the formation of the Scranton & Wilkes Barre Traction Corporation. Concurrently he was secretary and treasurer of the Electric Powers Security, Niagara Falls, N. Y. During this period he served as secretary and treasurer of the Merchants & Manufacturers Exchange, New York City.

In 1914 Mr. Keating became vice-president of the West Penn System at its New York offices and in August, 1915, returned to Pittsburgh to continue his active duties with this company.

Mr. Keating began his business career about 1900, being connected with public utility concerns affiliated with the Philadelphia Company.

JOHN CONNOR, familiarly termed "Johnny" throughout the organization of the Philadelphia Rapid Transit Company and pretty broadly in the city of Philadelphia itself, died on May 11. At the time of his death he was traffic manager of the Yellow Cab Company, now under the control of the Philadelphia Rapid Transit Company. Mr. Connor started life in the coal regions and went to Philadelphia when a youngster to become a messenger boy. He joined the Quaker City Cab Company in 1909 as a telephone operator. Six years ago he became identified with the Yellow Cab Company.

J. H. McWHORTER, brother of A. D. McWhorter, general superintendent of the Memphis Street Railway, Memphis, Tenn., died on April 29. He had been connected with the Galena Signal Oil Company, Atlanta office, as lubricating engineer for the past ten years. Previous to that time, he was in the mechanical department of the Georgia Power Company. Mr. McWhorter had many friends in the railway industry. He leaves a widow.

Manufactures and the Markets

Boston, Revere Beach & Lynn Electrifies

Complete electrification is now in progress on the Boston, Revere Beach & Lynn Railroad. Complete plans for the electrification and how it is being financed were published in *ELECTRIC RAILWAY JOURNAL* on December 10, 1927. Electric equipment for the change-over will be furnished by the General Electric Company. Sixty-two two-motor equipments will be installed on the passenger cars, and four-motor equipments will drive the work cars.

Each of the passenger car equipments will consist of two 60-hp., 600-volt motors with light-weight multiple control. Each work car will be equipped with four motors of the same type but with platform type control. Electric headlights will be used on all cars. Air brake equipment will be of the double-end, electro-pneumatic type. The electric equipment will be installed on the present coaches and the work will be done in the railroad's shops. Meanwhile, the use of electricity will be extended to the waiting rooms where electric turnstiles will be placed in service without waiting for electric train operation.

Two of the electric substations will be fully automatic, one containing a 1,000-kw. synchronous converter and the other, two synchronous converters of the same size. The third substation will be of the portable type, carrying a 1,000-kw. manually-controlled converter. Power will be purchased from local power companies and distribution will be made over a 600-volt catenary line. Simple, direct suspension will be used

in the yards and sidings. Under the direction of the engineering and management organization of Hemple & Wells, numerous other improvements will be made, including the remodeling of the stations and the modernization of all equipment.

Largest Portable Substation for Brazil

Designs have been completed on the world's largest portable railway substation, which is being constructed by the Westinghouse Electric and Manufacturing Company for the Paulista Railroad, Brazil. This station will be used on the 150-mile electrified line between Jundiahy and Rancoao. When completed, the station will include two cars with a total weight of approximately 150 tons and its capacity will be 2,000 kw. It will draw power at 88,000 volts from a transmission line and will supply 3,000 volts direct current to the trolley wire.

New Equipment for Indianapolis & Cincinnati Traction

Reorganization plans providing for the separation of the Indianapolis & Cincinnati Traction Company into two corporations, one devoted to transportation and the other to light and power distribution, have been announced by Charles T. DeHore, Cincinnati, and Teroy E. Eastman, Toledo, who bought the property at receiver's sale in Rushville.

The Shelbyville-Greensburg and the Rushville-Connersville lines will be known as the Indianapolis & Southeastern Railway, while the light and power business will be incorporated as the Southeastern Indiana Power Company.

The new operators plan an outlay of \$250,000 for freight cars, station facilities, motor stock cars, stock pens, improvement of high-tension lines and extension of light and power business. Twelve freight trailers will be purchased in addition to a like number now in operation, and freight motors will be increased from four to six.

Good Year for Westinghouse— Bookings Off Slightly

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports for the year ended March 31, 1928, consolidated net income of \$15,639,172 after depreciation, taxes and interest, equivalent to \$6.59 a share on the 2,370,063 combined preferred and common shares (\$50 par). This compares with \$16,138,441, or \$6.81 a share on the combined preferred and common shares in the preceding fiscal year. The reduced volume of new business offering during the year, as compared with the

Exhibitograph No. 9

EXTRA!

Space for A.E.R.A. Show Assigned

The goal set by the Exhibit Committee has been reached.

At its meeting on May 16 the committee assigned 99,170 sq. ft. space to 175 exhibitors.

With four months still to go and with new applications arriving all summer, the exhibit feature of the convention promises to be

BIGGER AND BETTER

than ever before.

There is still desirable space available. If you wish to show this year, Mr. Manufacturer, don't delay your application. Get in touch with A.E.R.A. Headquarters, 292 Madison Avenue, New York City.

preceding year, and reduced sales prices for many products, are reflected in the reduction in sales billed. These two factors contributed to reduce the net manufacturing profit for the year. The value of unfilled orders at the close of the year, after adjustments, was \$47,742,204 compared with \$55,298,890 at the close of the preceding year. During the year inventories were reduced \$11,072,535. Expenditures for new plants and for additions and extensions to existing plants during the past six years aggregate \$39,715,000.

The consolidated income account of the company and proprietary companies compares as follows:

	1928	1927
Sales billed.....	\$175,456,815	\$185,543,087
*Cost of sales.....	161,347,357	169,764,086
Net manufacturing profit.....	\$14,109,459	\$15,779,001
Other income.....	3,031,704	2,585,614
Gross income.....	\$17,141,163	\$18,364,615
Interest charges.....	1,501,991	2,226,174
Net income.....	\$15,639,172	\$16,138,441
Preferred dividends.....	319,896	319,896
Common dividends.....	9,156,152	9,156,952
Surplus.....	\$6,163,124	\$6,662,588
Previous surplus.....	\$54,161,834	\$51,715,396
Total surplus.....	\$60,324,958	\$58,377,985
Miscellaneous credits.....		
Additional reserves for federal tax, 1917-21.....		
Pittsburgh Meter surplus, May 19, 1926.....		786,247
†Premiums and discounts.....		2,787,786
Miscellaneous debits.....		642,118
‡Reserve for possible adjustment, book value.....	1,770,975	
Patents, charters, franchises, etc., written down to nominal value.....	4,621,784	
Add balance of reserve previously appropriated for federal tax not required.....	3,000,000	
Final surplus.....	\$56,932,198	\$54,161,834

*Factory cost, including depreciation of property and plant and all distributions, administration and general expenses and taxes.
 †In connection with redemption of 7 per cent and 6 per cent bonds of Westinghouse Machine Company and issue of new 5 per cent bonds.
 ‡Of investments in affiliated companies, for pension, and for notes and accounts receivable and miscellaneous charges, less profit realized on the same of certain investments.

Standard Coal Contract Perfected

As a result of a recent joint meeting of representatives of the National Association of Purchasing Agents and the National Coal Association, buyers and sellers of coal will shortly be able to use a standard contract form that should prove mutually satisfactory. The new form is a revision of the standard coal contract form developed by the National Association of Purchasing Agents and which had been in use for some time.

Truscon Buys Hydraulic Pressed Steel

Hydraulic Pressed Steel Company, Cleveland, Ohio, has been purchased by the Truscon Steel Company, Youngstown, Ohio, and will be operated as its pressed steel division. The entire plant is being completely modernized, giving the Truscon Steel Company one of the largest capacities for furnishing pressed and deep drawn steel of every description. Full productive capacity will be available shortly.

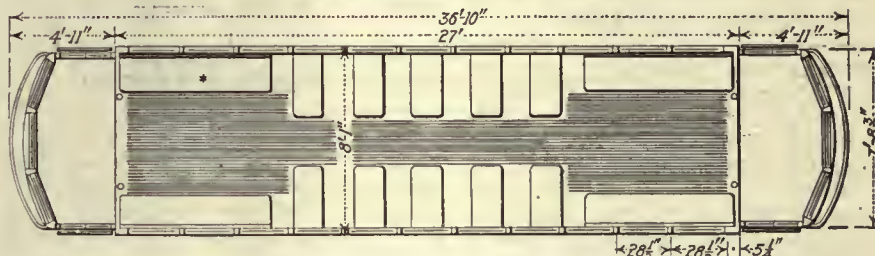
Two Cars for Fitchburg & Leominster

Recently two interurban, one-man, two-man cars were delivered to the Fitchburg & Leominster Street Railway, Fitchburg, Mass., from the Wason Manufacturing Company, Springfield, Mass. These cars are duplicates of the four furnished by the same company in

April, 1927. The length of the cars is 36 ft. 10 in. and the width is 8 ft. 2 1/2 in. They are of the semi-steel construction with arch roofs and end doors. There are seats for 44 passengers in each car. Complete specifications are given in the table below.



One of the Fitchburg & Leominster Street Railway cars recently completed by Wason Manufacturing Company



Floor plan of Fitchburg & Leominster cars

Type of unit.....	One-man, two-man; motor; passenger; interurban; double end; double truck	Destination signs.....	Hunter illuminated
Number of seats.....	44	Fare boxes.....	Railway's standard
Builder of car body.....	Wason Mfg. Co., Springfield, Mass.	Floor covering.....	Wood mat
Date of order.....	12-27	Glass.....	DTA
Date of delivery.....	3-28	Hand brakes.....	Peacock
Bolster centers.....	17 ft. 8 in.	Hand straps.....	Buffalo light metal
Length over all.....	36 ft. 10 in.	Heaters.....	Gold Car Heating & Lighting Co.
Length over body posts.....	27 ft. 0 in.	Headlights.....	Golden Glow RM-96
Truck wheelbase.....	5 ft. 4 in.	Headlining.....	1/4-in. Agasote
Width over all.....	8 ft. 2 1/2 in.	Interior trim.....	Statuary bronze
Window post spacing.....	28 1/2 in.	Journal bearings.....	Plain
Body.....	Semi-steel	Journal boxes.....	Brill
Roof.....	Arch, canvas-covered	Lamp fixtures.....	Electric Service Supplies Co.
Doors.....	End, folding, hand operated	Motors.....	Four GE-265A, inside hung
Air brakes.....	General Electric	Registers.....	Railway's standard
Axles.....	A.E.R.E.A. standard	Sash fixtures.....	J. L. Howard
Car signal system.....	Faraday high voltage	Seats.....	Brill 201-B reversible
Compressors.....	CP-27-B	Seat spacing.....	2 ft. 4 1/2 in.
Conduit.....	Flexible metal	Seating material.....	Genuine brown Spanish leather
Control.....	K-35-KK, double end	Steps.....	Folding
Couplers.....	Metropolitan	Step treads.....	Kass safety
Curtain Fixtures.....	Curtain Supply Co.	Trolley catchers.....	Ohio Brass
Curtain material.....	Double-faced Fahrikoid	Trolley base.....	US-20
		Trucks.....	Brill 177-EI-X
		Ventilators.....	Brill exhaust
		Wheels.....	Rolled steel, 27 in. diameter

ROLLING STOCK

DETROIT DEPARTMENT OF STREET RAILWAYS, Detroit, Mich., has received one urban Twin Coach.

WASHINGTON RAILWAY & ELECTRIC COMPANY, Washington, D. C., has obtained permission from the Utility Commission of the District of Columbia to purchase five new X type motor buses from the Yellow Coach Manufacturing Company.

LINCOLN TRACTION COMPANY, a subsidiary of the Lincoln Gas & Electric Light Company, Lincoln, Neb., has accepted delivery of three Mack four-cylinder city type buses of 29-passenger capacity.

COMMUNITY TRACTION COMPANY, Toledo, Ohio, is submitting to the City Council on May 21, a plan which will permit the company to purchase 100 to 125 additional motor coaches. If the plan is approved it will also give the company a practical monopoly of both bus and street railway service.

CHICAGO & JOLIET ELECTRIC RAILWAY, Joliet, Ill., has added a Mack four-cylinder 25-passenger city type bus to its fleet.

PITTSBURGH MOTOR COACH COMPANY, Pittsburgh, Pa., has received seven suburban express model Twin Coaches.

LOS ANGELES RAILWAY, Los Angeles, Cal., has received four mechanical drive urban coaches and one parlor coach from the Twin Coach Corporation.

SPRINGFIELD STREET RAILWAY, Springfield, Mass., has ordered six new Yellow buses, 33-passenger capacity, to be used on the Springfield-Palmer line and on the Bircham Bend line. The trolley service on these two lines will be abandoned just as soon as the new buses are delivered.

LEHIGH VALLEY TRANSIT COMPANY, Allentown, Pa., has received one Mack six-cylinder 29-passenger bus equipped with a special body.

SEATTLE MUNICIPAL STREET RAILWAY, Seattle, Wash., has ordered five Mack, 29-passenger buses and seven Studebaker, 21-passenger buses.

TRACK AND LINE

SPOKANE UNITED RAILWAYS, Spokane, Wash., will rebuild 1,000 ft. of track on East Third Street for the East Fifth Street line. The north end of the Astor line will also be replaced. The railway has under consideration the proposed paving of Seventeenth Street, Rockwood to Ray, where its Lincoln Park line is affected. The company is still obtaining estimates of cost to see if the job can be included in this year's work.

OREGON ELECTRIC RAILWAY, Portland, Ore., will soon take bids to build 68½ miles of track between Albany and Milwaukee, Ore., at an approximate cost of \$1,000,000.

READING TRANSIT COMPANY, Reading, Pa., is completely rebuilding 1,350 ft. of double track on Carsonia Avenue in the borough of Mount Penn. Aside from the installation of new rails and ties, the poles will be moved from the center of the avenue to the curb and the entire street area will be covered with a bituminous-bound macadam.

SHOPS AND BUILDINGS

COLUMBUS ELECTRIC & POWER COMPANY, Columbus, Ga., plans a 40,000-hp. hydro-electric project on the Chattahoochee River. The cost will be \$700,000.

BOSTON ELEVATED RAILWAY, Boston, Mass., plans a substation on Warren Street to cost approximately \$40,000.

BOSTON & MAINE RAILROAD, Boston, Mass., will make improvements in its car repair shops at Keene, N. H., to cost about \$175,000.

WISCONSIN POWER & LIGHT COMPANY, Madison, Wis., plans a power plant to cost \$250,000.

ELECTRIC RAILWAY MATERIAL PRICES—MAY 15, 1928

Metals—New York	
Copper, electrolytic, cents per lb.	14.1625
Lead, cents per lb.	6.10
Nickel, cents per lb.	35.00
Zinc, cents per lb.	6.40
Fin. straits, cents per lb.	52.625
Aluminum, 98 or 99 per cent, cents per lb.	23.90
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	53.00
General service	31.50
Bituminous Coal	
Smokeless Mine Run, f.o.b. vessel, Hampton Roads, gross tons	4.175
Somerset mine run, f.o.b. mines, net tons	1.875
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago	1.65
Central, Ill., screenings, Chicago	1.575
Kansas screenings, Kansas City	2.50
Track Materials—Pittsburgh	
Standard steel rails, gross ton	\$43.00
Railroad spikes, drive, ½ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.15
Angle bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.875
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	\$1.10
Hardware—Pittsburgh	
Wire nails, base per keg	2.65
Sheet iron (24 gage), cents per lb.	2.825
Sheet iron, galvanized (24 gage), cents per lb.	3.625
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	3.10
Waste—New York	
Waste, wool, cents per lb.	16-20
Waste, cotton (100 lb. bale), cents per lb.:	
White	16-19.50
Colored	11-16

Paints, Putty and Glass—New York	
Linseed oil (5 bbl. lots), cents per lb.	10.7
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	\$0.575
Putty, 100 lb. tins, cents per lb.	5.50
Wire—New York	
Copper wire, cents per lb.	16.125
Rubber-covered wire, No. 14, per 1,000 ft.	5.40
Weatherproof wire base, cents per lb.	16.75
Paving Materials	
Paving stone, granite, 5 in., f.o.b. New York—Grade 1, per thousand	\$150
Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd., f.o.b.	\$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	51.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, 2-in., carload lots, N. Y., per cu. yd., delivered	3.375
Cement, Chicago consumers' net prices, without bags, f.o.b.	2.05
Gravel, 2-in., cu. yd., delivered	3.375
Sand, cu. yd., delivered	.125
Old Metals—New York and Chicago	
Heavy copper, cents per lb.	11.875
Light copper, cents per lb.	10.375
Heavy yellow brass, cents per lb.	7.125
Zinc, old scrap, cents per lb.	3.25
Lead, cents per lb. (heavy)	4.875
Steel car axles, Chicago, net ton	\$16.25
Cast iron car wheels, Chicago, gross ton	13.75
Rails (short), Chicago, gross ton	15.25
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	27.50
Machine turnings, Chicago, gross ton	7.25

TRADE NOTES

NATIONAL BRONZE COMPANY, Montreal, Canada, has been purchased outright by the Robert Mitchell Company, Montreal. The purchase involves no new financing for the Robert Mitchell Company.

HASKELITE MANUFACTURING CORPORATION, recently moved to larger quarters at 120 South LaSalle Street, Chicago, Ill. Its new offices are now on the same floor as the Vitrolite Company, and other Meyercord interests.

WESTERN RED CEDAR ASSOCIATION, Minneapolis, Minn., has appointed John P. Wentling director of its research division. His wide experience and extensive training will be available to all users of wood poles. As incoming director of the research division, he urges pole users to avail themselves of the services of this division in helping to work out any of their pole problems.

CELORON COMPANY, Bridgeport, Pa., announces the appointment of R. W. Wales as factory representative on molding powders and resins.

LINDE AIR PRODUCTS COMPANY, New York, N. Y., has opened a district sales office at 48 West McLemore Avenue in Memphis, Tenn. H. N. Smith will be district manager in charge.

NATIONAL INDUSTRIAL ADVERTISERS' ASSOCIATION will hold its annual conference at the Hotel Chase, St. Louis, Mo., on June 11, 12 and 13.

ANCHOR POST FENCE COMPANY, Baltimore, Md., has elected W. F. Brannon president, succeeding the late Herbert G. Thomson.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has elected as a director Henry C. McEldowney, president of the Union Savings Bank and the Union Trust Company, Pittsburgh, Pa.

INTERNATIONAL GENERAL ELECTRIC COMPANY has elected as vice-presidents, R. Arthur Baldwin, European manager, and Otto Pruessman, vice-president of the Tokio Electric Company, Tokio, Japan.

ADVERTISING LITERATURE

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY has issued a folder on the subject "A 'Tool' of Modern Railroad Efficiency," which elaborates on the advantages of gas-electric car equipment and goes into considerable detail on the latest achievement in this field—the Westinghouse torque governor control which is a successful means for utilizing the full power of the engine at all speeds. Complete details on this may be found in D.M.F.-5073.

TRICO FUSE MANUFACTURING COMPANY, Milwaukee, Wis., has announced bulletin 206-B describing Trico powder-packed renewable fuses. It contains data and tests on overload time-lag and watt-loss saving.

MARTINDALE ELECTRIC COMPANY, Cleveland, Ohio, has issued a folder announcing a 27 per cent average price reduction on commutator stones.

OHIO BRASS COMPANY, Mansfield, Ohio, has published a 33-page supplement Number 1 to catalog Number 20. It includes the listings of all new O-B devices brought out since the issuing of Catalog 20.



When the Fire Truck Swings 'round the corner

*that's a time your
motorman needs a*

PEACOCK Staffless Brake

Who-oo-oo! Up and down the scale a siren wails—people scurry right and left—autos crowd out the way—and the fire truck whirls around the corner.

Your car is on a slight grade—there is considerable slack in your air brake rigging—perhaps the power is off. What then? It's a tense situation.

If your motorman has a Peacock Staffless he can set his brakes, even if the shoes are well worn and there is unusual slack to be taken up, for a Peacock Staffless has a winding capacity of 12 feet of chain. It has three times the braking capacity of the ordinary hand brake. It can be relied on in emergency.

The Peacock Staffless is standard equipment on practically all modern cars. Is it on yours? Remember installation and maintenance costs are small.



The
Peacock
Staffless

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canada:—Lyman Tube & Supply Co., Ltd., Montreal



Outline route map of Public Service Coordinated Transport, serving more than 230 communities in New Jersey; photographic inset of Goodyear Pneumatic Cord Bus Tire, exclusive tire equipment on this Company's fleet of more than 1400 buses.



GOODYEAR

FOUR MILLION MILES *every month for* PUBLIC SERVICE

One of the largest utility enterprises in America is the Public Service group operating in New Jersey.

It provides electricity for 650,000 users in 207 municipalities, and gas to about 700,000 users. It operates street cars, ferries, and buses.

Buses operated by Public Service Coordinated Transport are equipped 100% with Goodyear Pneumatic Cord Bus Tires.

* * *

Public Service Coordinated Transport has been using Goodyear Tires for nearly four years now.

Its more than 1400 buses average more than 4,000,000 bus tire miles per month on Goodyear Tires.

"With extremely satisfactory results," says the latest report on this Goodyear Bus Tire installation.

* * *

Goodyear tires are extremely satisfactory for safety—because Goodyear Bus Tires have the All-Weather Tread, the deep-cut, sharp-edged, diamond-shaped blocks that grip fast and hold hard on wet, slimy, slippery

pavements, resisting side-slip and skidding.

Extremely satisfactory for traction—because the All-Weather Tread takes hold in any going, carrying forward full distance at every turn of the wheel.

Extremely satisfactory for wear—because of the tough, slow-wearing Goodyear compound in the tread and sidewalls and SUPERTWIST cord fabric in the casing— that extra-durable, extra-elastic material discovered and developed by Goodyear for Goodyear Pneumatic Cord Tires.

* * *

Extremely satisfactory for economy, too, because Goodyear Bus Tires, made of SUPERTWIST and made with the All-Weather Tread, give maximum safety, traction, and cushioning qualities over a long, long mileage of dependable, trouble-free, uninterrupted revenue miles.

Because Goodyear Pneumatic Cord Bus Tires give this economical, efficient performance in every motorbus service, you, too, should equip 100% with Goodyear.

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

BUS TIRES

Put
the battery job
up to
WILLARDS



Extra strength in every part—accurate workmanship—careful testing of every bit of material—the experience of 25 years of battery building—these are features that fit the Willard for the hard job of bus service.



There are no easy days—no easy miles—in the life of the bus battery. Here's a job that needs weight, reliability, long life—the qualities you get in the Willard Threaded Rubber Battery.

With its heavy plates and long-lived Threaded Rubber Insulation, this battery has built a world-wide reputation for bringing every bus in on time—every trip, and for saving money both by the *month* and by the *mile*.

**Willard
Batteries**

TALK ABOUT YOUR PASSENGER COMFORT

look here



THEY say that a story in pictures leaves nothing untold.

Then glance at these photographs of one of the buses operated out of Muskogee, Oklahoma, by Wardway, Inc.

A Bender Body, of course. Seats 31 passengers. Note the folding aisle seats. And every seat comfortable as a Morris chair. We make them ourselves. No cramped positions. No uneasy shifting about for comfortable sitting posture. Full observation bay in rear. Unusual amount of baggage

loading space. Easy to put baggage away. Easy to get it down.

Note the card and reading tables provided in rear. Complete lavatory. Ice cold water installation. Even refrigerator and buffet equipment for serving hot or cold sandwiches and drinks!

Does a bus body like this mean more new passengers? A more friendly feeling with steady ones? More of that intangible thing they call good will?

Ask Wardway, Inc.

Standard bodies and special bodies built to specifications. We shall gladly send our representative to discuss your needs and then design and build exactly to your order.

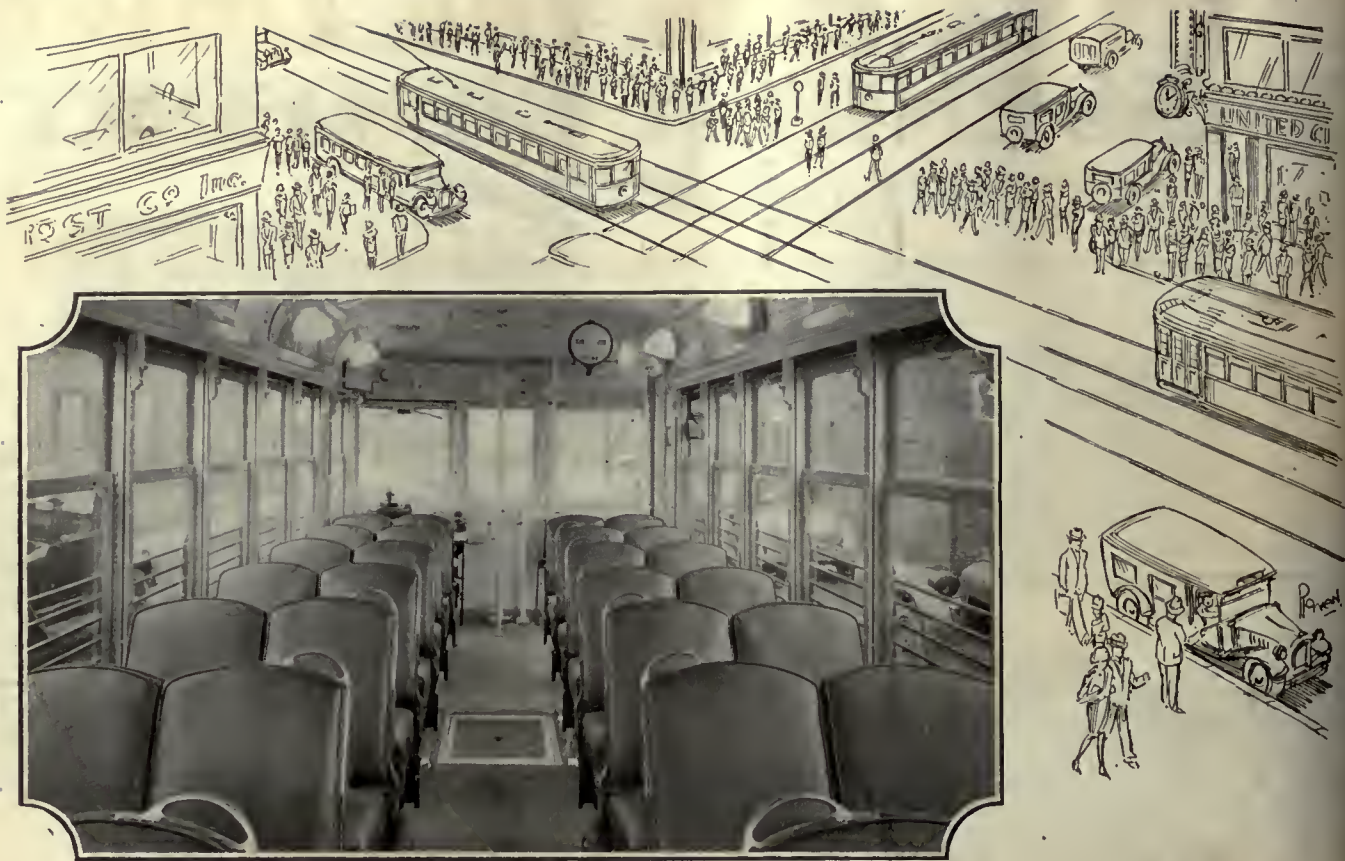
THE BENDER BODY COMPANY

W. 62nd and Denison



Cleveland, Ohio

BENDER BODIES



Easy chair luxury that invites new passengers to the E W & L line—old cars made new by H & K Seats!

“THE greatest innovations,” says an Elmira newspaper, speaking of the car remodelling of the Elmira Water, Light and Railroad Company line, “are the leather seats with spring cushions which eliminate much of the jar, and the battleship linoleum on the floor—”

The new seats are Hale & Kilburn Walkover design No. 392 with leather upholstery, divided concave spring edge backs and deep double deck spring edge cushion.

With seats such as these and a few inexpensive minor changes—linoleum perhaps and a little fresh paint here and there—you can create an entirely new up-to-date car out of an old one—new comfort, new luxury, new atmosphere, new passenger-creating attractiveness.

Do you require new cars? Why not make new cars out of your old ones—with H & K Seats? Worth your while to send for the latest H & K catalog describing every type of up-to-date seat best suited to meet your remodelling needs.

HALE & KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale & Kilburn Co., Grayber Bldg., New York
 Hale & Kilburn Co., McCormick Bldg., Chicago
 E. A. Thornwell, Candler Bldg., Atlanta
 Frank F. Bodler, 903 Monadnock Bldg., San Francisco
 C. S. Wright Co., 66 Temperance St., Toronto, Ont.

T. C. Coleman & Sons, Starks Bldg., Louisville
 W. L. Jefferies, Jr., Mutuel Bldg., Richmond
 W. D. Jenkins, Praetorian Bldg., Dallas, Texas
 H. M. Euler, 46 Front St., Portland, Oregon

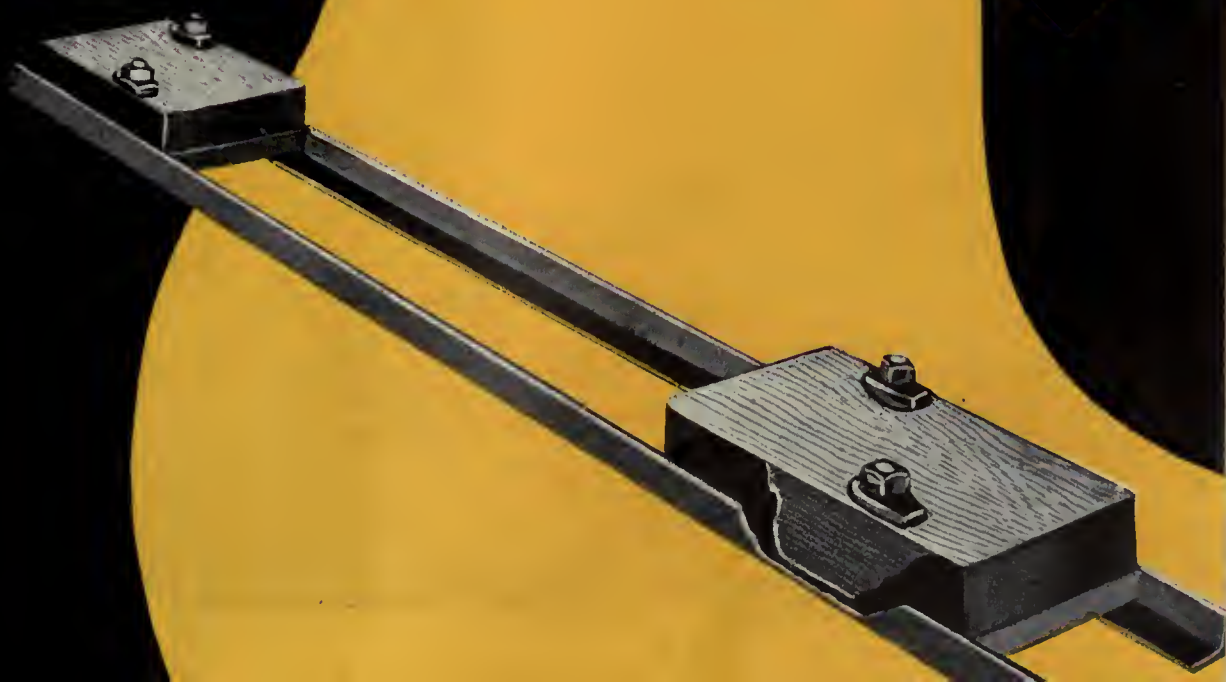


*In the Quest
for more
Permanent
Track*



*Engineers
Have Found*

DAYTON TIES



Dayton Tie Track Is More Nearly Permanent

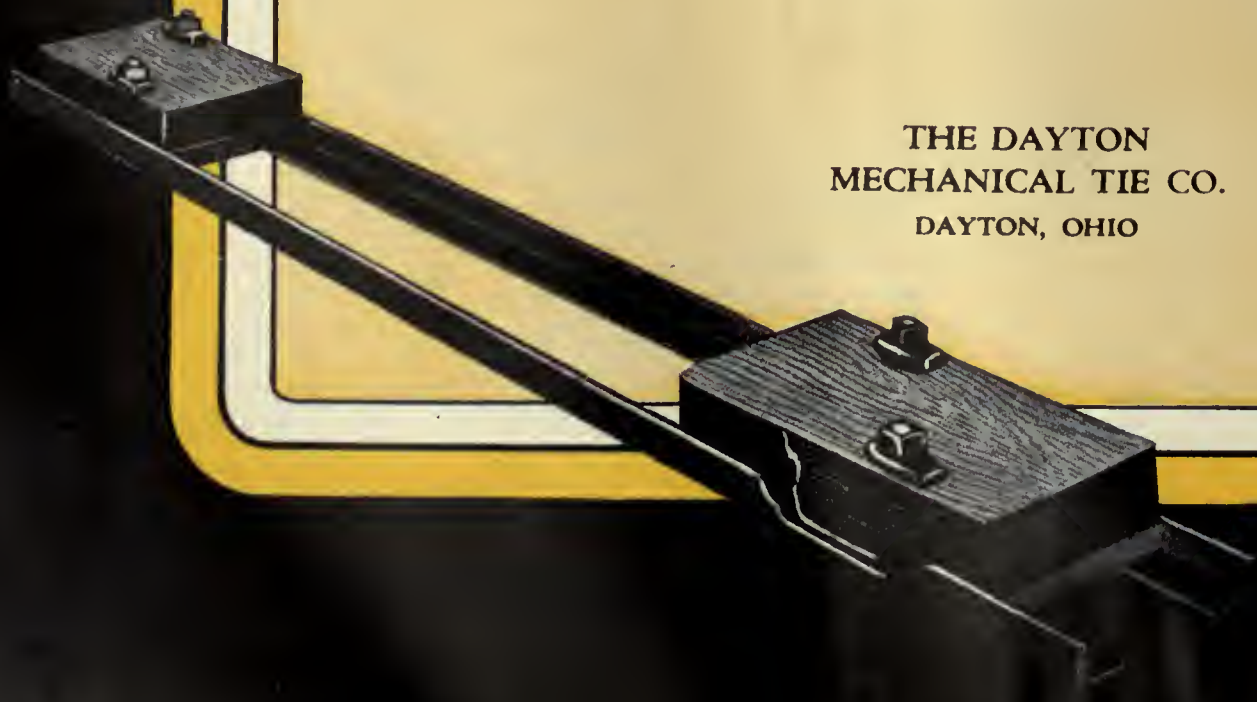
For years street railway engineers have sought for more permanent track.

Track that would, through lasting qualities, bring about real economy.

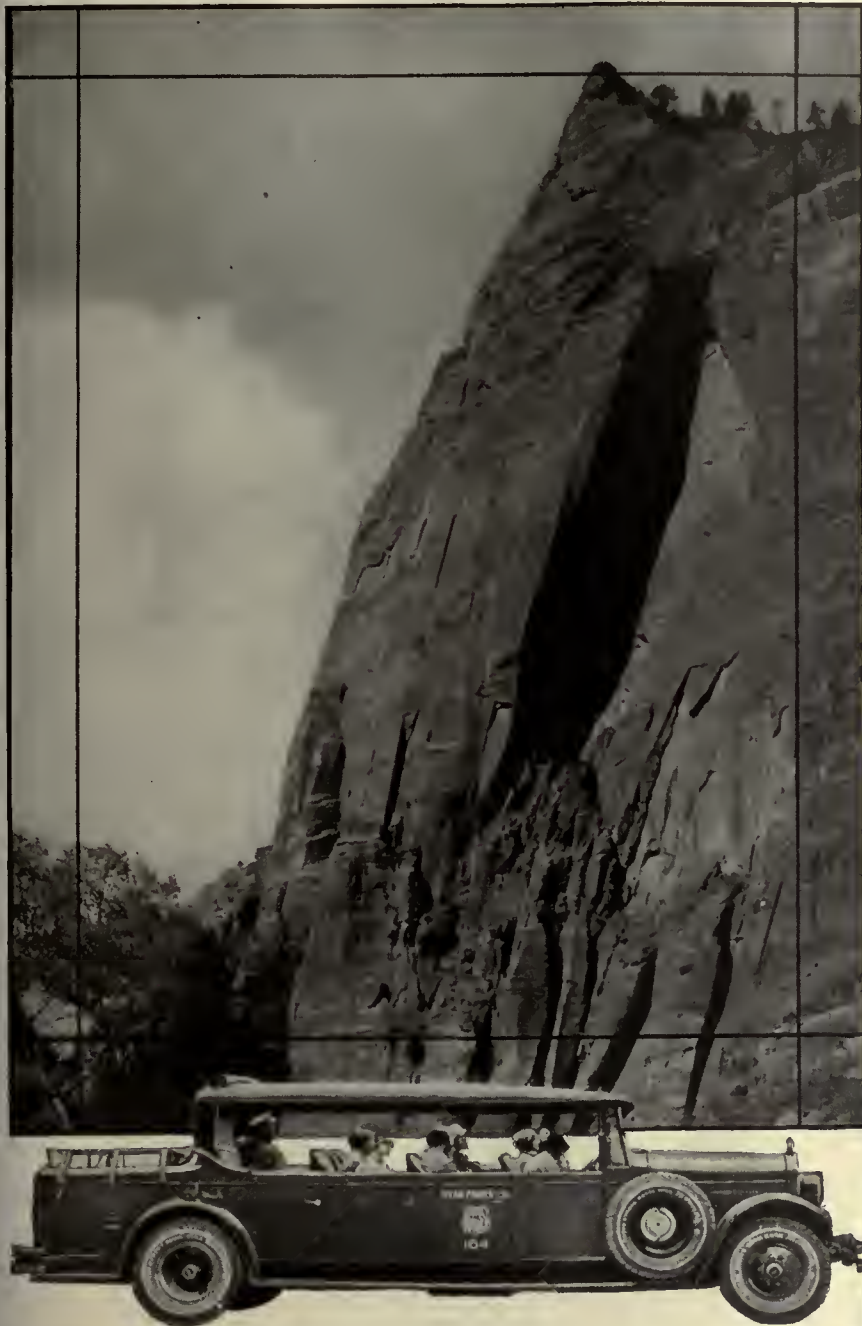
Engineers of over 150 properties have found Dayton Tie Track.

Dayton Ties protect the concrete in which they are embedded—the combination lasts four or five times as long as the usual track without maintenance

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO



UNITED STATES TIRES ARE GOOD TIRES



UNITED STATES RUBBER COMPANY



The motorcoaches of the Utah Parks Company carry thousands of tourists through the wonderland of Zion National Park. At the left is shown a view of Zion Canyon, one of the most striking beauty spots of America.



The Union Pacific System equips its Utah Parks motorcoach fleet with tires which have proved their ability to deliver low cost mileage and to assure safety, comfort and uninterrupted service to its patrons—U. S. Royal Cord Motorcoach Tires.

U.S. Motorcoach Tires
 ROYAL CORD
No Better Tires Made Today

F A R E T O K E N S



CONSIDER the high quality of die-work in Scovill tokens. Think of the experience accumulated in over 100 years of production of fine coins, medals and planchets. Bear in mind that Scovill's facilities for volume output of tokens are unequaled. No wonder Scovill is known throughout the electrical railway field as a dependable source of supply. The brass and nickel silver are fabricated in the Scovill plant. The tools, dies and special machinery are designed and built within the Scovill organization. And every manufacturing process is under strict laboratory control.

Scovill means SERVICE to all who require parts or finished products of metal. Great factories equipped with the last word in laboratories, and modern machinery manned by skilled workmen, are at your disposal. 'Phone the nearest Scovill office.

SCOVILL

MANUFACTURING COMPANY - - Waterbury, Connecticut

NEW YORK — CHICAGO — BOSTON — SAN FRANCISCO
 DETROIT — PHILADELPHIA — LOS ANGELES — ATLANTA
 PROVIDENCE — CLEVELAND — CINCINNATI
 IN EUROPE — THE HAGUE, HOLLAND



8 FITZJOHNS for Marinette & Menominee

Illustrated here is a fleet of eight FitzJohns recently sold to the Menominee and Marinette Light & Traction Co.

FitzJohn Pay Enter Grand Type Bodies—mounted on Reo GB chassis.

They will operate between Menominee, Mich., and Marinette, Wis. Winters are severe, weather is trying, roads become heavy. Body as well as chassis endurance is essential.

FitzJohn Bodies were selected after exhaustive investigation by the operator.

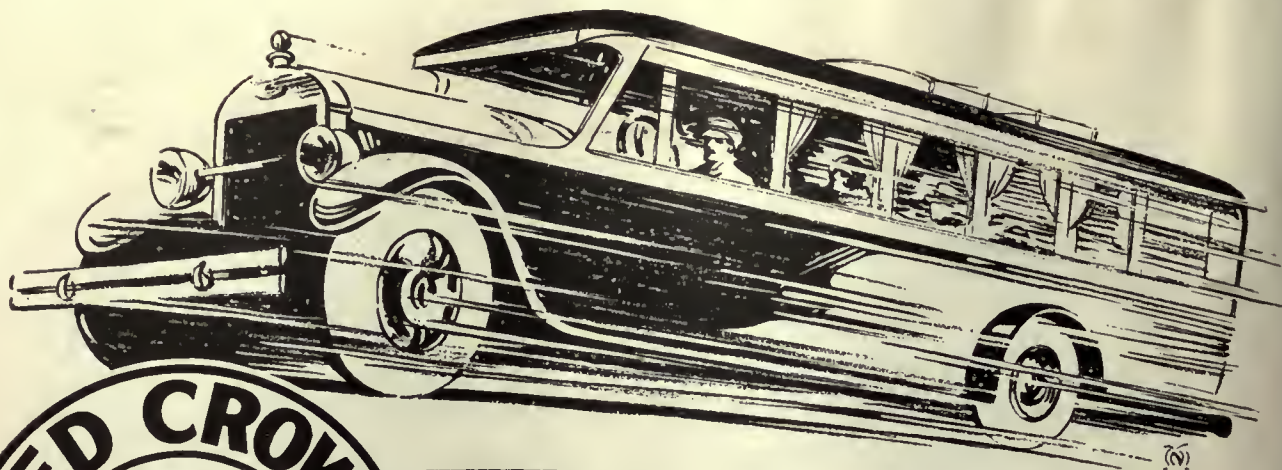
FitzJohn Bodies Are Quality Jobs.

*Luxury
Economy
Sturdiness*

FitzJohn

FITZJOHN Manufacturing Company

Exclusive Bus Body Builders
MUSKEGON, MICHIGAN



*All that
gasoline can
contribute*

Power of the kind that sends a loaded bus rushing up formidable hills . . . pep of the sort that makes possible the speed for maintaining schedules . . . acceleration that fairly leaps, yet gathers speed with the smoothness of a well oiled bearing—these are the things which Red Crown Gasoline helps your bus motor to achieve.

Red Crown Gasoline

is essentially a Power-Mileage gasoline—refined expressly for use in the modern internal combustion engine. The test of day-by-day operation proves it to be the most efficient and economical motor fuel for buses. And whether the tanks are filled in Indiana or Kansas, North Dakota or Illinois, the quality of Red Crown Gasoline is always uniform.

Let Red Crown prove these claims. Try it in one of your buses. Compare its performance and economy with the fuel you are now using.

STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Ave.

Chicago, Illinois

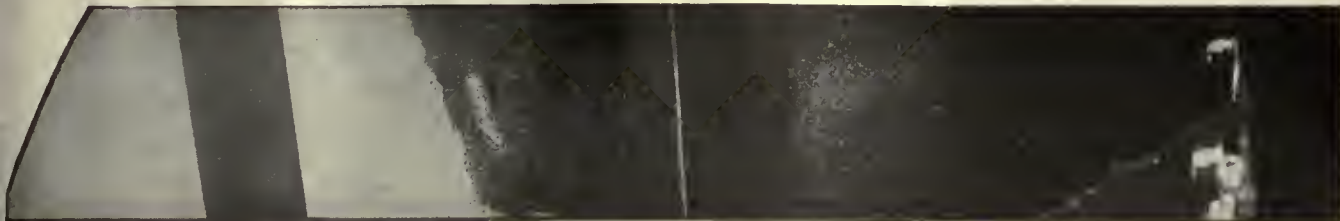
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EVERY operator is interested in solving his particular tire problem. No matter how tough the job is, General tackles it with the experience gained in supplying the big share of the truck and bus tire market. ~ ~ This factory experience is available through the General dealer who knows how to properly fit the tire to the job. The result is always the greatest uninterrupted mileage.

THE GENERAL TIRE AND RUBBER COMPANY, AKRON, OHIO



The
Heavy Express
Special

Specially built to stand up under the load at express speed, the Heavy Express Special carries through on any job. Operators everywhere are swinging to it.

The Mark
of Leading
Tire Stores
Everywhere

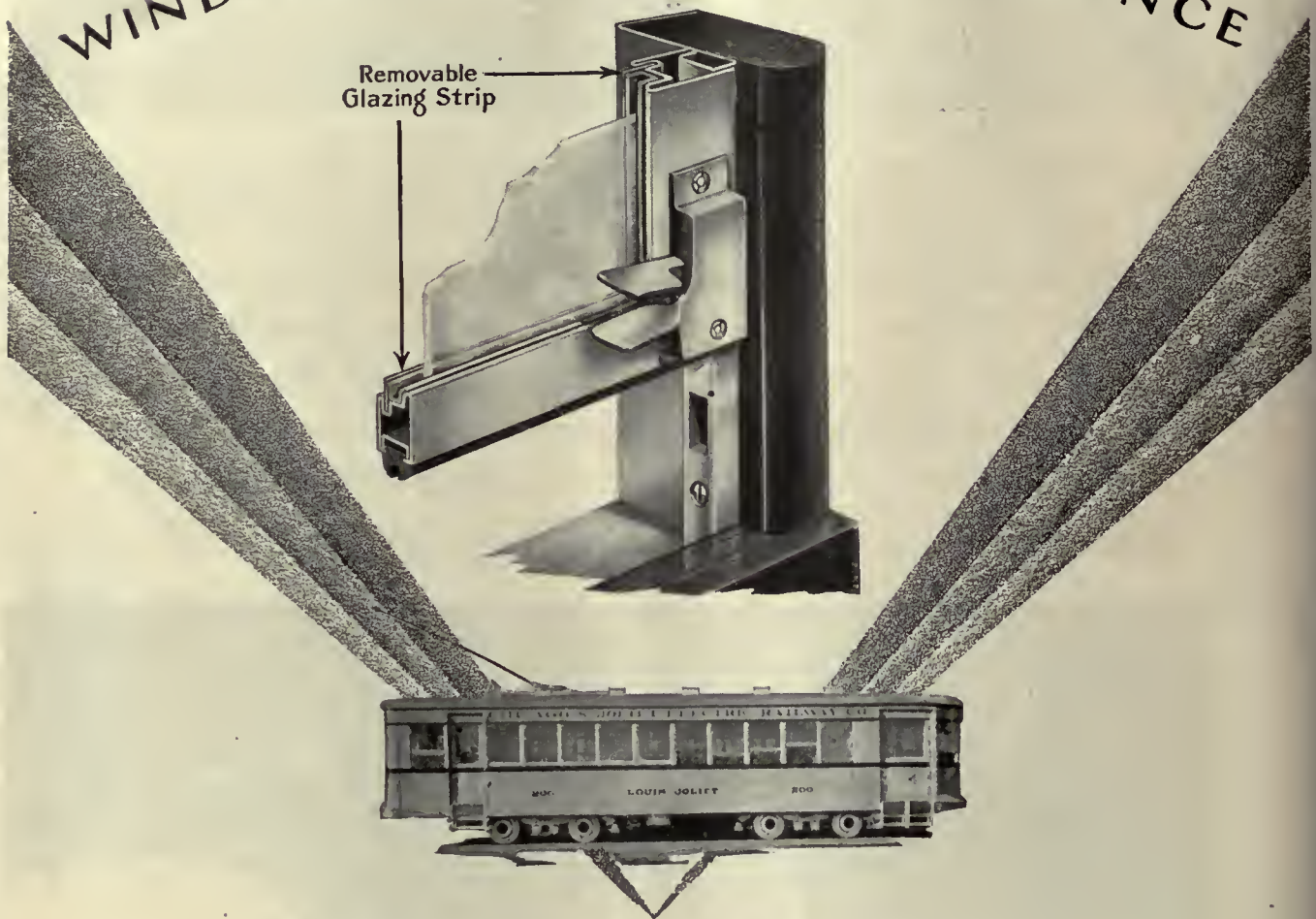


The

GENERAL
TIRE

—goes a long way to make friends

WINDOWS DO MAKE A DIFFERENCE



Every Edwards Feature— Plus this New Advantage

On thousands of electric railway cars and motor coaches, Edwards Metal Sash are proving that Edwards Quality pays. The same high quality is fully maintained in this new sash—Edwards Metal Sash with Removable Glazing Strips.

But this *new* advantage is added—with the Removable Glazing Strips reglazing can be done in as short a time as two and one-half minutes—*without removing sash from the opening.*

It takes only a few seconds to remove the glazing strips.

Replace the glass, slide the strips into place, and the window is ready for service.

No costly delays while the car or motor coach is pulled into the shop. Your glass cost sheets will tell an interesting story of lower replacement costs.

Detailed specifications and complete information sent on request.

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Illustrated is a new aluminum car of the Chicago and Joliet Electric Railway Company equipped with Edwards Metal Sash with Removable Glazing Strips. Cummings Car and Coach Co., builders.



Edwards Metal Sash

BUDA

ESTABLISHED
1881



THE BUDA COMPANY
HARVEY [Chicago Suburb] ILLINOIS

BEFORE THE SKIPPER HAD THOSE HYATT EASY ROLLING BEARINGS PUT ON THE CAR THE BLACKSMITH USED TO CARRY HIS TOOLS OVER TO THE TRACKS AND WORK ON THE CAR THERE.



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Smooth rolling Hyatts mean . . . riding comfort . . . quieter running . . . easier starts . . . less power . . . lubricant economy . . . freedom from journal box attention. These operating advantages . . . and contributing factors to public good will . . . are worth investigating.

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ROLLER BEARINGS
 PRODUCT OF GENERAL MOTORS

**Consider
these -**



no seizing

cuts like solid wire

no waste from unstranding

uniform lay—easier to splice

tighter construction, resists corrosion

equal distribution of load

Tru-loc fitting—gives 100% strength at joints

*money-saving
facts*

PAGE *preformed* **Strand**

it performs because it is preformed.

Now



a strand that cuts like bar

*Requires no seizing—resists unstranding—does not
“bird-cage” and kink*

Page Preformed Strand is made from preformed wires—the first basic improvement in 100 years of strand manufacture.

The wires of Page Preformed Strand are laid in place—not twisted. Because they are not twisted the wires are free from locked up stress. There is no tendency for the wires to fly apart. You can cut Page Preformed

Strand like bar. No seizing is required, there is no wastage from frayed ends.

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It will pay you to investigate. The coupon brings sample and bulletin. Mail it today.



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An Associate Company of the American Chain Company, Inc.
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Manufactured under license arrangements with the
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Gentlemen:

Better strand that
costs less interests me.
Send your bulletin and a
sample of PAGE PRE-
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PAGE *preformed* Strand

CANADA

UNITED STATES



**A DEPENDABLE SUPPLY
OF BRAKE SHOES**

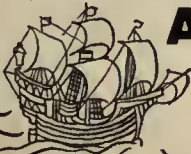
WITH twenty plants located at the large transportation centers in the United States and Canada, the American Brake Shoe and Foundry Company can deliver brake shoes economically and conveniently to all transportation properties. With this dependable supply and with fewer shoes needed over any given period of time, you can cut down inventory and reduce your brake shoe costs.

PACIFIC OCEAN

CARIBBEAN SEA

**THE AMERICAN BRAKE SHOE
AND FOUNDRY COMPANY**

30 CHURCH ST., NEW YORK
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First in America to make carbon brushes

SO FAR as we have been able to ascertain, the first carbon brushes made in America were manufactured in the original National Carbon Company plant in Cleveland, in 1887. For eleven years before that date the company had been making arc lamp carbons, battery carbons and similar products. This experience in the handling of carbon was turned to immediate advantage when the first experiment with carbon brushes proved a startling success. Brushes were made for the Thomson-Houston Co., the Edison Company, General Electric Company, Westinghouse Electric & Manufacturing Co., Western Electric Co., the American Engine Co., Eddy Electric Mfg. Co., and the Bullock Electric Co., now the Allis-Chalmers Mfg. Co. Many other companies that were active during the early days of the electrical industry were also supplied.

Proud as we are of this record, we are still prouder of our present clientele, including as it does the vast majority of manufacturers of electrical apparatus, and of producers and users of electrical current.



NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide  and Carbon Corporation
Carbon Sales Division

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**AMCRECO
~ POLES ~**

poles

are dependable

You can depend on an Amcreco creosoted yellow pine pole—

1. For strength.

Because of its full size; the natural strength of pine; the careful selection, handling, storing, and inspection for soundness which these poles receive; and the effective treatment which maintains their original strength indefinitely.

2. For long life.

Because of the careful selection, handling, storing and inspection which insure soundness and also because of the effective treatment which prevents deterioration.

3. For economy.

This is the natural result of the strength and long life of these poles. Their strength permits the minimum size for a given requirement, their long life distributes the first cost over the maximum period of service, and their maintained strength minimizes maintenance and repairs.

These statements are more than mere sales claims. They are backed by the largest organization in the wood preserving industry—one with a long record of achievement. When you specify Amcreco Poles you not only get a dependable product—you have the satisfaction of dealing with a dependable producer.

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He has a finger on the pulse of your trade's activities. He promulgates helpful information.

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He has pledged himself to determine the highest and largest function of the trade which he serves, and to strive in every legitimate way to promote that function.

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Your paper. A member of the Associated Business Papers, Inc.

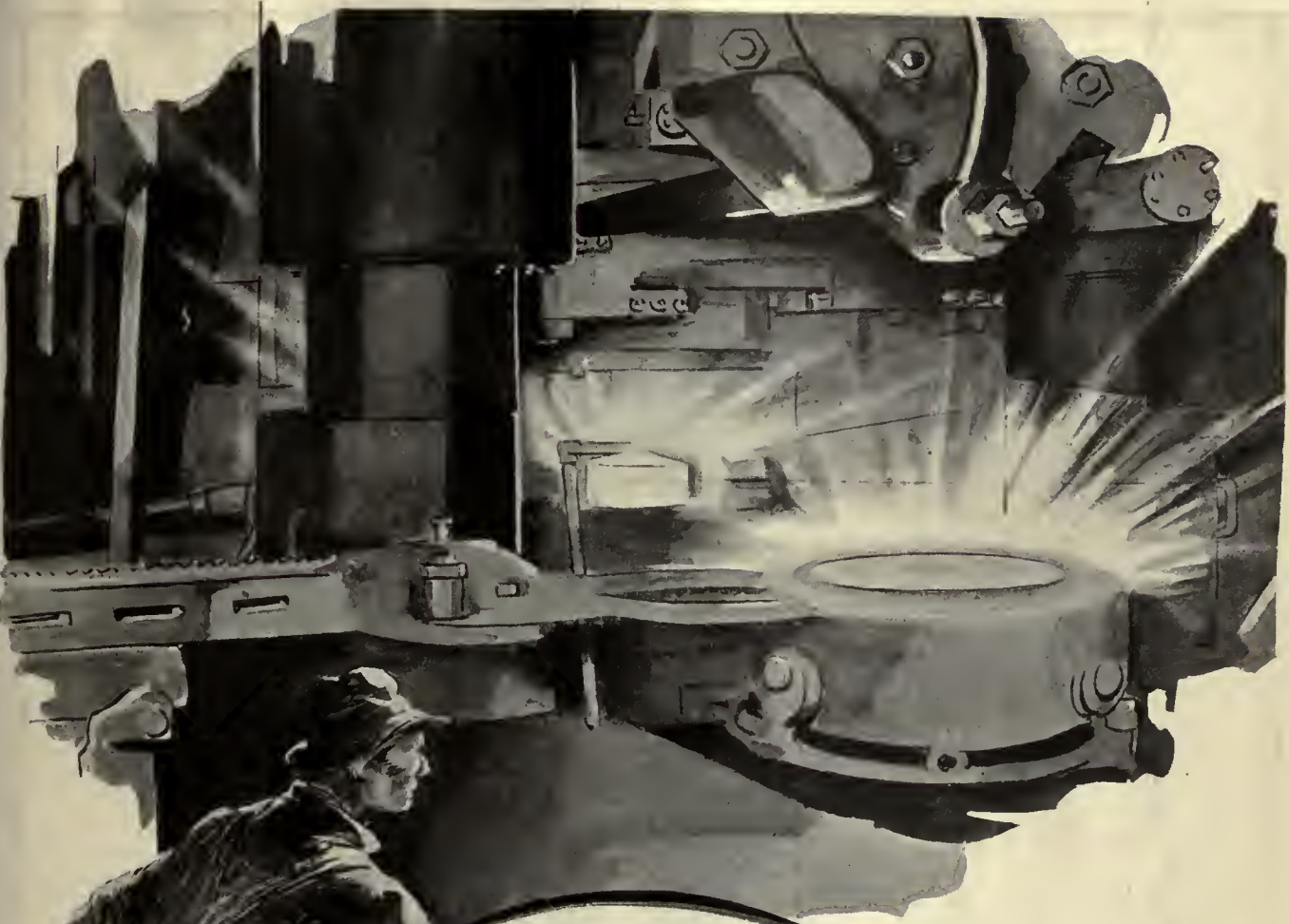
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Here a ten-thousand-ton hydraulic press is transforming GARY "wheel blocks" into GARY "wheel blanks."

Defects are forged out—and extra mileage forged in. The hub is formed, the flange and rim partially formed. The blank is being made ready for the rolling operation where further reduction and refinement is to take place.

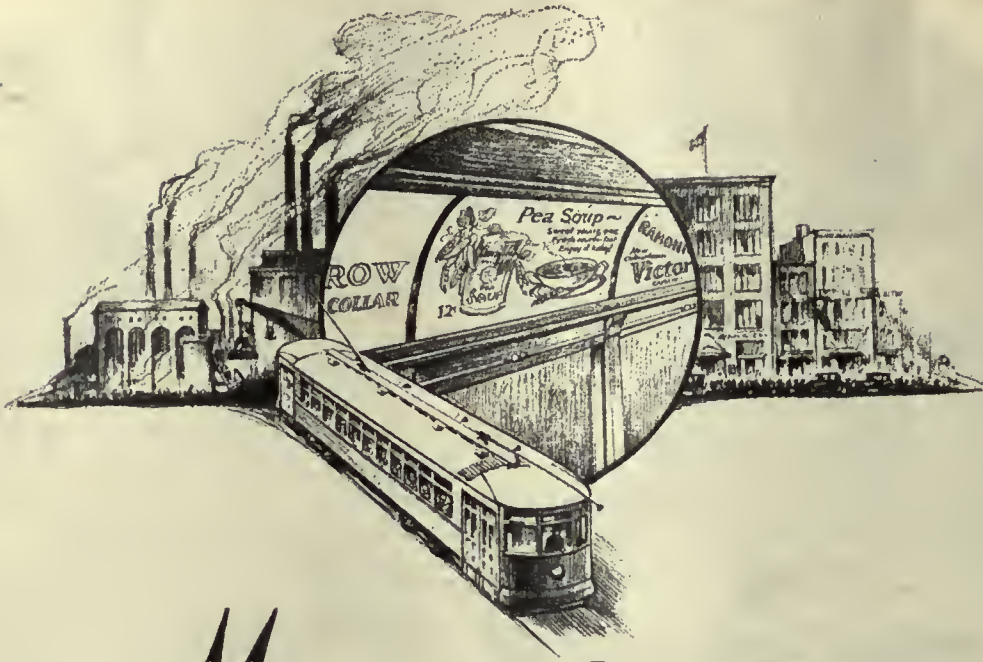
The course of GARY WROUGHT STEEL WHEELS from block to finished product is a steady one toward mileage. Our wheel engineers are at your service.

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This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



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Reduce Power Cost— Raise Voltages to Normal



Type
EAS

Type EAS

Types EAS rail bands are brazed to the rail using either the portable welding furnace or the bonding car. The loop of these bands may be offset at any angle, making the bond suitable for application to a wide variety of rail joints, including joints with heavily beaded splice bars. The Champion type is supplied with a heavy copper sheath that grips the strands beyond the zone of the weld. Either Champion or standard type are electrically efficient, "service-proven" bonds.

NEW impetus has been given the electric railway industry. New motors, new drives, new designs in types of cars and equipment!

The proper functioning of these new motors and drives depends to a large extent on proper rail bonding. Just any old bond won't do.

Regardless of the type of Erico bond, all are noted for their ease of application, their tenacious adherence to the rail, *their ability to reduce power cost and raise voltages to normal.*

Normal voltages secured through right rail bonding results in faster schedules, lower motor maintenance costs and increased revenues.

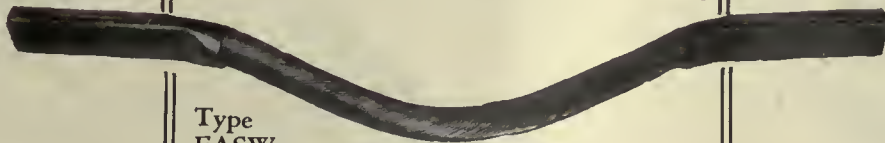
That is why it is well worth while for you to investigate Erico Rail Bonds. Write today for details.

**THE ELECTRIC RAILWAY
IMPROVEMENT CO.**

2070 E. 61st Place
CLEVELAND, OHIO

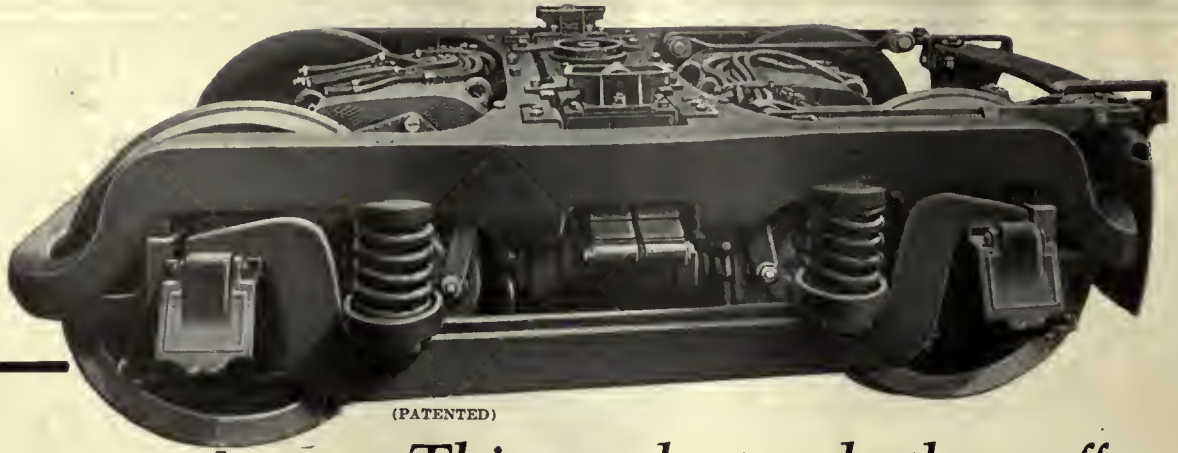
Type EASW

These bands are applied with the loop extending out perpendicular to the rail. The flexibility of this bond, together with the copper sheathed Champion terminal, contributes greatly to the trouble free service these bonds give. Like EAS type, EASW bonds are electrically efficient because when applied each has a contact area eight times the conductor area—the ratio of conductivity of copper to steel.



Type
EASW





(PATENTED)

Cast steel frame, including cross and end transoms, a single strong unit.

Pedestals cast integral with frame. Removable hardened spring steel liners protect them from wear.

This truck stands the gaff of high-speed interurban service!

It's a Commonwealth Motor Truck. And the long service it gives at remarkably low maintenance has made it standard with many of the most progressive railways.

COMMONWEALTH STEEL COMPANY
GRANITE CITY, ILL.

**More Mileage
per Motor
Bearing**

**-NORMA-
HOFFMANN
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Stamford - Connecticut

IS ON ALL ROLLER AND THRUST BEARIN





**You can't
go Wrong!**

Page doesn't stop at tagging gas welding wire and electrode bundles—in addition, every piece is plainly stamped. No matter how much lots may become mixed in your shop, the mark identifies every piece.

You can depend on the PAGE identification mark, too, for every piece is carefully processed. And it is shop tested to assure proper working qualities "on the job."

Prove for yourself PAGE has taken the guess out of gas welding wire and electrodes. Your name and address will bring a sample.



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**Welding Wire
and Electrodes**



Balsam-Wool
insulated cars provide comfort
and add to profits



IN addition to its insulating efficiency Balsam-Wool contributes to passenger cars an economy that should be especially attractive to railway officials.

A saving of several hundred pounds per car can mean but one thing—lower operating costs.

Balsam-Wool is light-weight—because it is composed of millions of dead air cells. Technically it is 95% "still" air. This is the feature which accounts for its higher insulating efficiency and its light-weight.

Operating economy is important, but comfort for passengers—both winter and summer—promotes greater patronage—larger dividends. The Balsam-Wool insulated car is quieter, easier to heat in winter and more comfortably cool in summer.

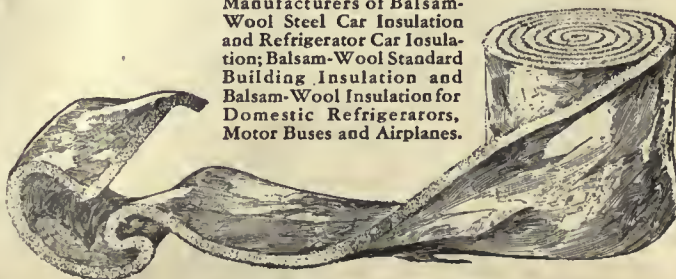
Interested railway executives will be sent samples and complete information on request.

WOOD CONVERSION COMPANY

*Insulation Division of Weyerhaeuser Forest Products
Mills at Cloquet, Minnesota*

Industrial Sales Office: 360 N. Michigan Ave., Chicago, Ill.

Manufacturers of Balsam-Wool Steel Car Insulation and Refrigerator Car Insulation; Balsam-Wool Standard Building Insulation and Balsam-Wool Insulation for Domestic Refrigerators, Motor Buses and Airplanes.

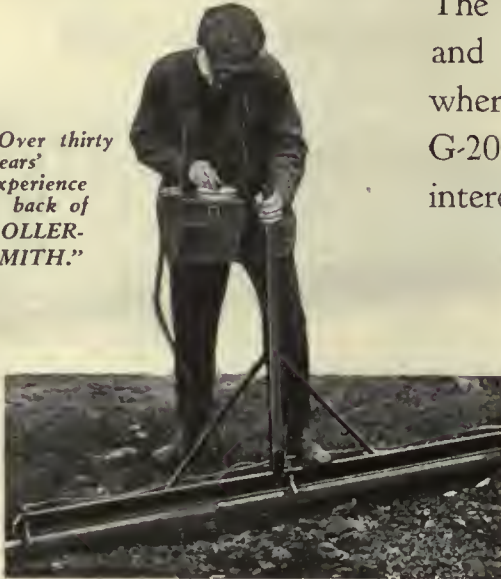


ROLLER-SMITH BOND TESTERS

are known and used all over the world

They are the Standard with which all others are compared

"Over thirty years' experience is back of ROLLER-SMITH."



The Type SBT is recommended for all ordinary work and the Super-Sensitive Type BBT for conditions where there is little or no current in the rail. Bulletin G-200 should be in the hands of every man who is interested in bond testing.

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Make Your Own Tests



How to Secure a Lustrous Gloss Finish!

For applying a thoroughly atomized wet coat of heavy bodied lacquer enamel in order to secure a finish of lustrous gloss, the "Binks No. 105, Type DD" Spray Gun is recommended. Write for detailed information.



In car shops, the value of essential advancements in finishing methods and equipment is recognized. Here Binks Spray Painting Equipment is rapidly standardizing itself.

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Strength Plus Economy

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Their capacity for withstanding tremendous shocks and of supporting excess wire loads, if necessary, makes the strong appeal.

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The enormous economies resulting from three or four companies dividing the cost of installation and maintenance is at once evident.

Let us tell you about the many advantages of Elreco Tubular Steel Poles. Write.

THE ELECTRIC RAILWAY EQUIPMENT CO.

2900 Cormany Ave.
Cincinnati, Ohio

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This Test Tells Your Compressor's Future

Dependable air supply has a lot to do with your profits—but you can't X-ray your portable compressor to find out how good it is.

That is why the water test was created. This test is easy to make, but it reveals clearly the amount of vibration in your portable—the biggest factor causing wear and trouble.

Just fill an ordinary glass to the brim with water, and place it on the compressor frame. Do not block the wheels or brace the machine in any way.

Then start up and run full speed; let the machine load and unload, and watch the glass. *Under this test the smooth running Sullivan Vibrationless Compressor causes scarcely a ripple on the surface of the water.*

Vibrationless operation with its many advantages, is something you are now entitled to in portables. Catalog 3283-F will tell you about "Vibrationless" Compressors.

Sullivan Machinery Company
150 S. Michigan Ave., Chicago

SULLIVAN

Send me Free Catalog 3283-F describing Vibrationless Compressors.

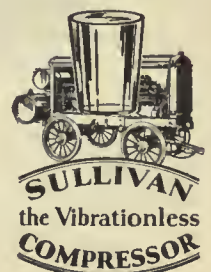
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MICANITE and **EMPIRE**
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M-J Armature Babbitt



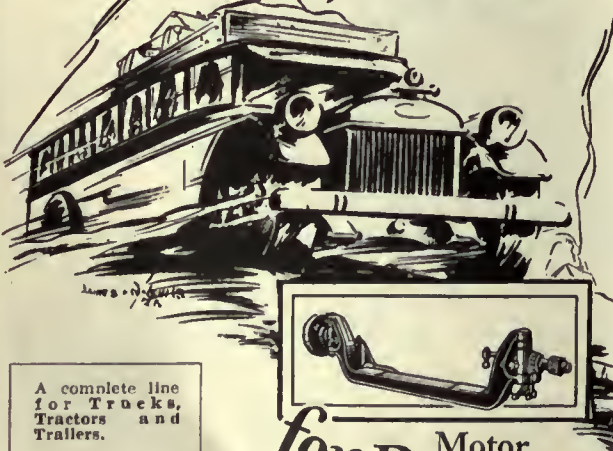
No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

National Bearing Metals Corporation

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Jersey City, N. J. Portsmouth, Va. Meadville, Pa.

"MORE-JONES QUALITY PRODUCTS"

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A complete line for Trucks, Tractors and Trailers.

for **BUSSES**

SHULER AXLE COMPANY

Louisville Incorporated Kentucky

Member of Motor Truck Industries Inc. of America



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Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

- No-wear Check Pawl
- Free-Winding Tension Spring
- Ratchet Wind
- Emergency Release
- Perfect Automatic Lubrication

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Canadian Agents:
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KHIYAR

The giant Kurd is the greatest of burden bearers.

Some carry loads as high as 700 lbs. The sightseer asking "Upon what food does he feed to get such strength?" expects the answer to be "Raw Meat."

But the real answer is *Khiyar*—meaning *raw cucumbers* . . . more than three pounds daily is his summer ration. Proving again that the big point in anything is not what you put into it—but what you get out of it.

That's why we don't talk about the ingredients of Morganite brushes.

What does it matter whether they be curd, or carbon, or cucumbers as long as they'll carry any loads and reduce your annual brush cost.



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They wanted good poles in a hurry!



"Please ship as soon as possible," read the order.

It was for five carloads of high-grade creosoted transmission poles of Southern Yellow Pine. The purchaser was a distant power company.

Less than 48 hours after the order reached us, our switch-engine was swinging the entire consignment on to one of three trunk line spurs that run into our plant—ready for speedy delivery.

Back of service like this are 60,000 acres of our own timber, the most modern and complete treating equipment in existence, and excellent rail and water shipping facilities.



CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J.F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.



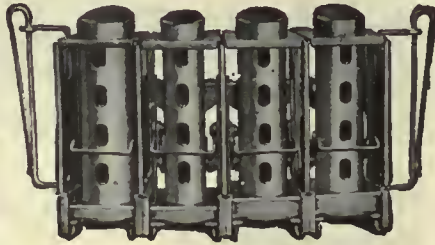
JOHNSON FARE COLLECTING SYSTEMS



Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1 1/4 to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates. It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.



Johnson Fare Box Co.

4619 Ravenswood Ave., Chicago, Ill.



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.

Trenton, New Jersey, U. S. A.



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company Muncie, Ind.

Est. 1848—Inc. 1870

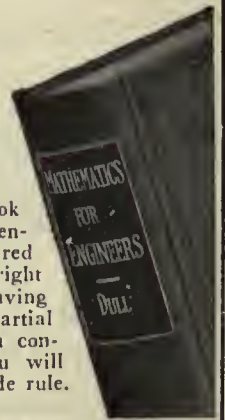
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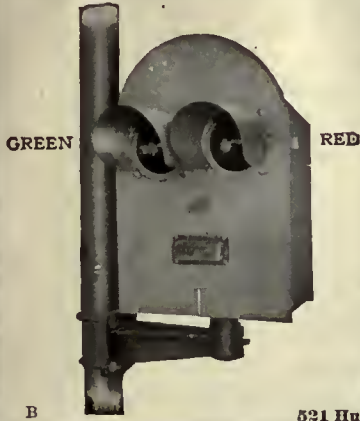
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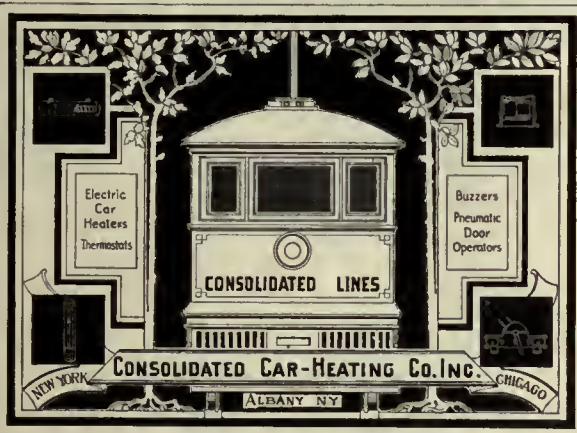
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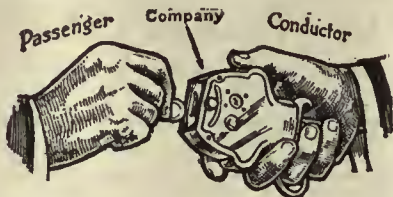
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Stop Signals Nichols-Lintern Co.	Ticket Choppers & Destroyers Electric Service Sup. Co.	Tees, Wire Okonite Co. Okonite-Callender Cable Co.	Ventilators, Car Brill Co., The J. G. Cincinnati Car Co. Consolidated Car Heating Co. Nichols-Lintern Co. Railway Utility Co.	Wheels, Trolley Columbia Machine Wks. Electric Railway Equipment Co. Electric Service Supplies Co. National Bearing Metals Corp. Ohio Brass Co. Star Brass Works
Storage Batteries (See Batteries, Storage)	Ties, Mechanical Tie Co. Dayton Mechanical Tie Co.	Trolley Bases National Bearing Metals Corp. Ohio Brass Co.	Voltmeters Roller-Smith Co.	Wheels, Wrought Steel Illinois Steel Co.
Strain, Insulators Electric Service Supplies Co. General Electric Co. Ohio Brass Co. Westinghouse E. & M. Co.	Tie Plates Illinois Steel Co.	Trolley Bases, Retrieving Ohio Brass Co.	Welded Rail Joints Electric Ry. Improvement Co. Lorain Steel Co., The Metal & Thermit Corp. Railway Trackwork Co. Una Welding & Bonding Co.	Whistles, Air Ohio Brass Co. Westinghouse E. & M. Co. Westinghouse Traction Braks Co.
Stand American Steel & Wire Co. Roebbling's Sons Co., J. A.	Ties, Wood Cross (See Poles Ties, Posts, etc.)	Trolley Buses Brill Co., The J. G. Westinghouse E. & M. Co.	Welders, Portable Electric Electric Ry. Improvement Co. General Electric Co. Ohio Brass Co. Railway Trackwork Co. Una Welding & Bonding Co. Westinghouse E. & M. Co.	Window Guards & Fittings Cincinnati Car Co.
Street Cars (See Cars, Passenger, Freight, Express, etc.)	Tires General Tire & Rubber Co. Goodyear Tire & Rubber Co., The United States Rubber Co.	Trolley Material (Overhead) Electric Service Sup. Co. General Electric Co. National Bearing Metals Corp. Ohio Brass Co. Westinghouse E. & M. Co.	Welding Processes and Apparatus Electric Ry. Improvement Co. Metal & Thermit Corp. Ohio Brass Co. Railway Trackwork Co. Una Welding & Bonding Co. Westinghouse E. & M. Co.	Wire Connectors (Soldierless & Tapeless) Ideal Commutator Dresser Co.
Superheaters Babcock & Wilcox Co.	Tokens Johnson Fare Box Co. Scovill Manufacturing Co.	Trolley Wheels (See Wheels, Trolley)	Welding Wire American Steel & Wire Co. Railway Trackwork Co. Roebbling's Sons Co., J. A.	Wire Splicing Plyers Ideal Commutator Dresser Co.
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)	Toogoe Switches Wm. Wharton, Jr. & Co., Inc.	Trolley Wire American Brass Co. American Steel Foundries Amer. Steel & Wire Co. Anaconda Copper Min. Co. Page Steel & Wire Co. Roebbling's Sons Co., J. A.	Wire Rope Amer. Steel & Wire Co. Roebbling's Sons Co., J. A.	Wire and Cables American Brass Co. Amer. Steel & Wire Co. Anaconda Copper Min. Co. General Electric Co. Okonite Co. Okonite-Callender Cable Co. Page Steel & Wire Co. Roebbling's Sons Co., J. A. Westinghouse E. & M. Co.
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Switches, Tee Rail Ramapo Ajax Corp.	Tower Wagons & Auto Trucks McCardell Co., J. R.	Turbine, Steam General Electric Co. Westinghouse E. & M. Co.		
Switches, Track (See Track Special Work)	Towers and Transmission Structures Bates Exp. Steel Corp. Westinghouse E. & M. Co.			
Synchroscopes Roller-Smith Co.	Track Expansion Joints Wm. Wharton, Jr. & Co., Inc.			
Tampers, Tie Railway Trackwork Co.	Track Grinders Metal & Thermit Corp. Railway Trackwork Co. Ramapo Ajax Corp. Una Welding & Bonding Co.			
Tapes and Cloths (See Insulating Cloth, Paper and Tape)				
Tee Rail Special Track Work Bethlehem Steel Co. Lorain Steel Co. Ramapo Ajax Corp. Wm. Wharton, Jr. & Co., Inc.				



A Big Success in Little Rock

1927 was the most successful year in the history of the Arkansas Power and Light Company, Little Rock, Arkansas. As reported in the *Electric Railway Journal*, May 5, the very favorable net profits which accrued were attributed to their modernization program, started with the purchase of eight double-truck cars built by the American Car Company and followed by thirty single-truck cars purchased from the same company in 1926.

Increased speed, lower maintenance and added comfort are factors in which these Brill Modern Cars are performing an important part.

The attractive earnings in Little Rock are typical of the profit producing possibilities of Brill Modern Cars as successful competitors of the family automobile.

Write for the Brill Car Catalog and learn the "what," "how" and "why" of modern cars.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WAGON MANFG CO.
ST. LOUIS, MO. — CLEVELAND, OHIO — SPRINGFIELD, MASS.





1925--G-E Gears Installed
1926--G-E Gears Standard
1927--G-E Gears Standard

The Chicago Surface Lines chose G-E improved Grade M gears and pinions for a large part of its 1925 requirements. As a result, G-E gearing was specified for all 1926 requirements, and now in 1928, General Electric gearing continues to be the standard.

Gears and pinions which thus meet the rigorous, rapid-acceleration demands of service in Chicago have proved their worth.

*Use your G-E Railway Supplies Catalog
to simplify your buying*

Make sure that your gearing bears this mark. The unsurpassed research facilities of General Electric, together with its manufacturing and testing resources, assure a product of lasting dependability.



GENERAL ELECTRIC

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ELECTRIC RAILWAY JOURNAL

Hill Publishing Company, Inc.

MAY 26, 1928

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Timken Thrust-Radial Capacity for Armatures

Reduced friction in armature bearings is *highly desirable*. But extreme endurance is *absolutely indispensable*. BOTH can be had in Timken-equipped railway motors, because Timkens are the anti-friction bearings which provide greater load carrying area, full thrust-radial capacity, highest shock resistance, and positive closure.

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TIMKEN Tapered Roller **BEARINGS**

Another big improvement in Electric Car Drive



The New W-N Drive

Back in the early days most operating men thought that the cast steel spur gear was the last word in car drives— until they tried the Nuttall Helicals.

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With the W-N Drive you can take full advantage of the efficiency of modern high speed motors, gearing them down without loss, to deliver an even flow of power, with smooth starting, quick acceleration and quiet operation.

The new W-N Drive is economical both in original cost and upkeep as well as in the space that it occupies on the truck. Let us tell you more about this latest development in electric car drive.

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PITTSBURGH  PENNSYLVANIA

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Vol. 71, No. 21

May 26, 1928

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Worcester Builds for Adequate Maintenance 848

Carrying through the rehabilitation program agreed to last year, the Worcester Consolidated Street Railway has just completed a new carhouse and garage on a single plot. Some 203 cars and 50 buses will be operated from this point, and there is room for expansion, both for cars and buses. This article covers all the facilities included in the group.

International Association Meets at Rome 857

Reports on many subjects were presented at the biennial convention of the Union Internationale de Tramways, de Chemins de fer d'interet local et de Transports Publics Automobiles. This association, which was organized in 1885, has just finished its 21st meeting at Rome. The papers published this week are: "Radial-Axle Cars," by Charles Harmel; "Electric Railway Construction on City Reservations," by J. Lenartowicz; "One-Man Car Operation in Holland," by P. Nieuwenhuis; "Parallel vs. Radial Axles for Cars," by Jean Castaing. Abstracts of other papers will appear in subsequent issues.

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Coming—An Article on Pittsburgh's New Experimental Cars

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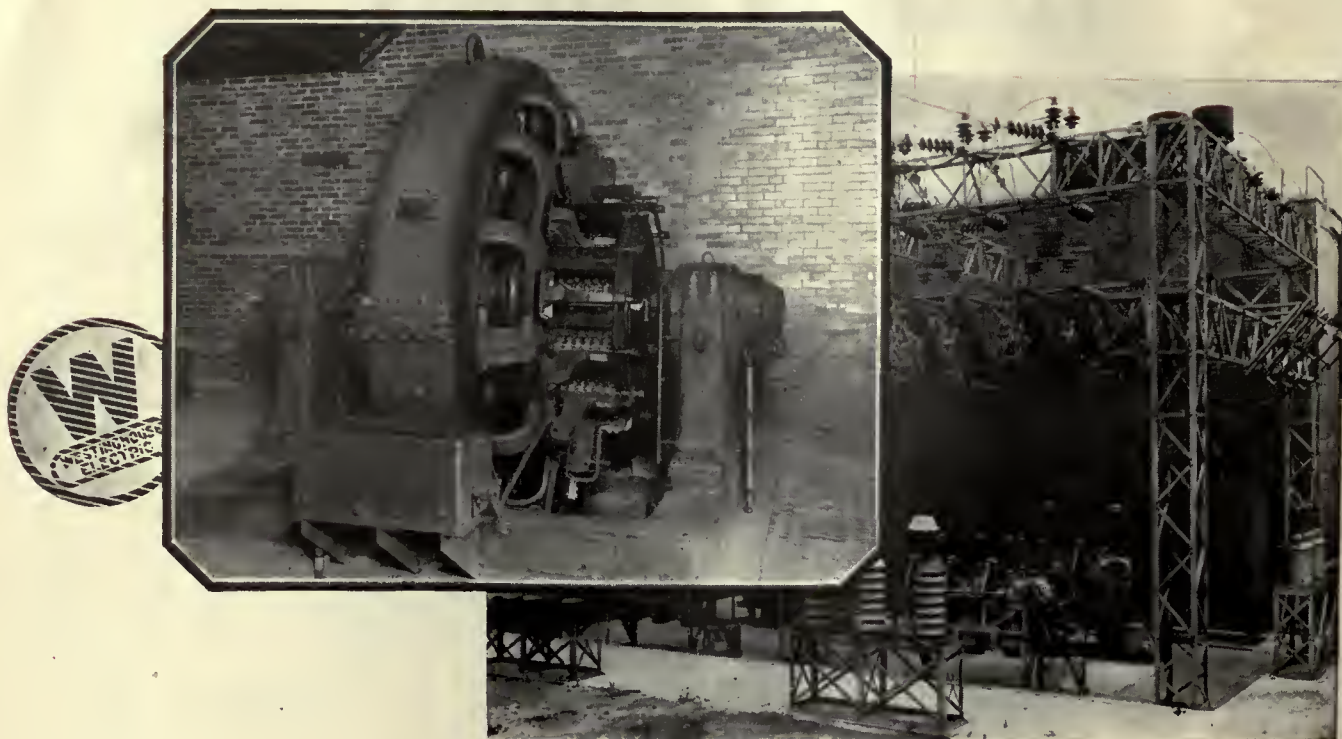
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ELECTRIC RAILWAY JOURNAL is official correspondent in the United States for Union Internationale de Tramways de Chemins de fer d'Interet local et de Transports Publics Automobiles.



Indianapolis Street Railway Now *buys* its power—

TO completely change over from 25-cycle generated power to 60-cycle purchased power is truly a major undertaking. That is exactly what the Indianapolis Street Railway Company did—and successfully, too—when it started upon an extensive program to increase the operating efficiency of its lines.

After making a complete survey of conditions, requirements and various types of apparatus, nine Westinghouse 1500 kw. shunt-wound synchronous converters, with transformers and automatic switching, were selected for this important

project—a noteworthy tribute to the performance records of Westinghouse equipment.

There are five automatic substations, comprising two single units, two double units and one three-unit station. Since the first station opened on May 15, 1927, unfaltering service has characterized every phase of operation. The entire installation is another exemplification of Westinghouse engineering service—engineering based on close association with the industry, on constant research, and on properly designed and applied equipment.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

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



Westinghouse

X98107



DOLLARS AND SENSE!

Suggests
Rehabilitation

Is the Overhead Built Years Ago Filling the Requirements of Today?

DIRECT suspension still has its proper place in city and low-speed service. Where increased speeds and heavier current collection are involved, engineers have always recognized the advantages of catenary construction. For this class of operation, slack wire is out of the question, and even the best maintained direct suspension is far from ideal.

Catenary construction assures perfect alignment. It does away with vibration, pounding and arcing. Dewirements are eliminated. And it is not too expensive! Savings in maintenance soon offset the increased first cost.

The Ohio Brass Company does not contemplate "selling" catenary construction to properties not yet ready for it. Our engineers are available to investigate your operations and to inspect existing overhead. They will give you the facts on catenary advantages. They will suggest proper design for your conditions. They will offer estimates of cost and probable savings. The decision will be yours.

"Is your overhead, built years ago, filling the requirements of today?" If this question is in your mind, ask for O-B recommendations.

Only a few typical examples of O-B Catenary Materials can be shown here. O-B fits the equipment to the requirements.

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co., Limited
Niagara Falls, Canada
823L



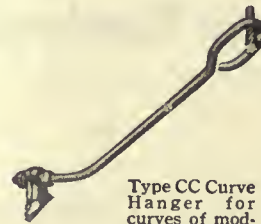
Type CT Catenary Hanger, for pantograph operation. Page 634, Cat. 20.



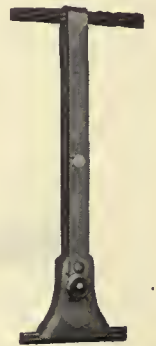
Catenary messenger insulator pin. Made in 2 sizes. Page 624, Cat. 20.



One piece duplex catenary clip for suspending contact wire from messenger cable. Slips over messenger and clamps on trolley. Page 642, Cat. 20.



Type CC Curve Hanger for curves of moderate degree. Page 636, Cat. 20.



Type CS Catenary Hanger, for wheel operation. Page 633, Cat. 20.

Ohio Brass Co.

NEW YORK CHICAGO PHILADELPHIA **B** PITTSBURGH ATLANTA CLEVELAND ST. LOUIS SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

BETTER RAIL, BETTER TRANSPORTATION

Lest we forget

“Many are prone to forget that the foundation of good service is good track.”

WILLIAM L. BUTLER

*Vice President—Cincinnati,
Hamilton & Dayton Rys.*

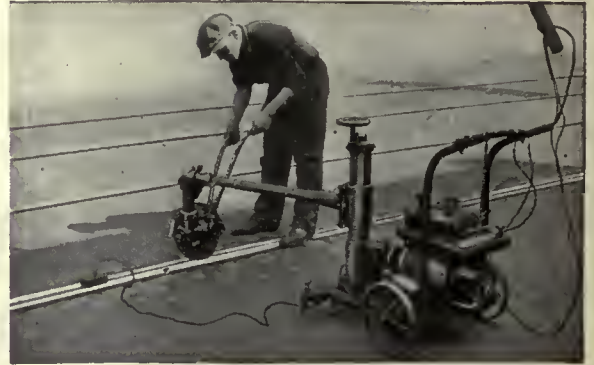
Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

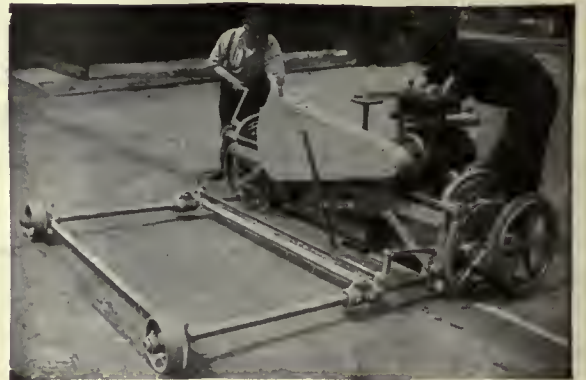
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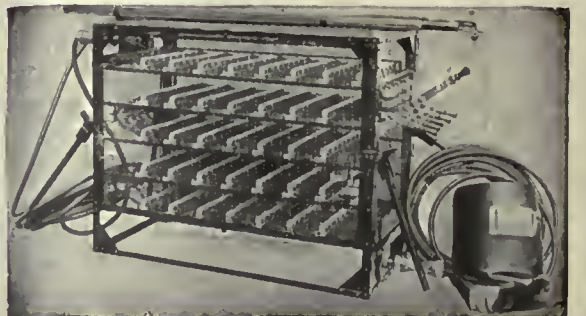
Eureka Radial Rail Grinder



Vulcan Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

BETTER RAIL, BETTER TRANSPORTATION

TO PUT YOUR 1928 TRACK PROGRAM ON A PRODUCTION BASIS—

—ask yourself these questions

1. *Construction operations:*

- (a) Are they all necessary?
- (b) If necessary, can they be improved?

2. *Parts and materials:*

Are any parts through lack of uniformity slowing up labor operations?

3. *Time:*

Can man-hour time per operation be reduced by using labor saving devices and machinery?

4. *Design of materials:*

- (a) Is the design wasteful of materials?
- (b) Can lower rails be used?
- (c) Are joints modern and long lasting?
- (d) Are ties a compromise with custom or are they a well thought out, uniform product—designed to save labor and materials, with no sacrifice of bearing under rail and on ballast and sub-grade?

5. *Design of Track:*

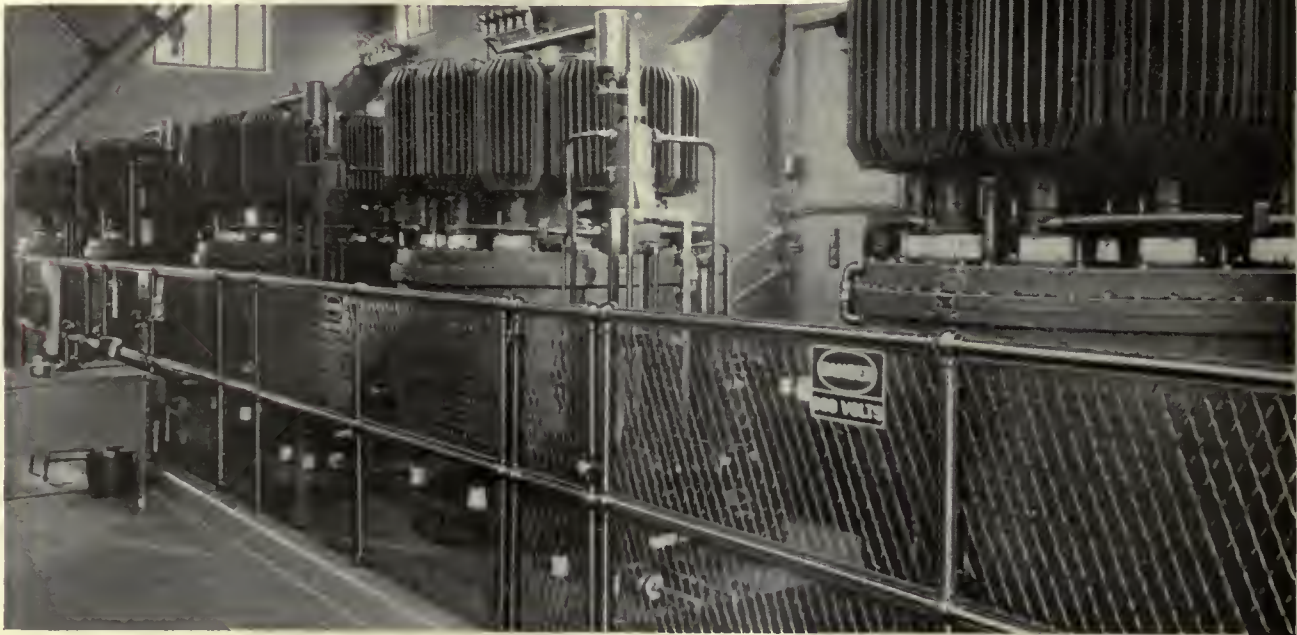
- (a) Does the track design meet the requirements of higher quality and lower costs by economizing material and labor?
- (b) Does the design adapt itself to the complete use of labor saving machines?
- (c) Has the design immediately available labor saving equipment for all operations?

On any program of a mile or more of track,
Twin Tie production methods can be applied.
A conference with our engineers will in no
way obligate you.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

STEEL TWIN TIE TRACK THE BASE OF MODERNIZATION

Bridgeport's New Substation is largest of its kind in the United States



A-B-B Rectifiers carry entire traction load of city of 165,000!

THE responsibility of providing uninterrupted current supply for the continuous operation of all Connecticut Company trolleys in Bridgeport is carried by A-B-B Mercury-Arc Power Rectifiers.

This substation comprises five units of 2,000 amps. each, delivering power at 600 Volts. To date, it is the largest rectifier installation in the United States.

In the realignment of the company's power system, an obsolete generating plant was eliminated and arrangements were made for purchasing 13,000 Volt, 3 Phase, 60 Cycle power from the Devon Plant of the Connecticut Light & Power Company.

An additional A-B-B Rectifier substation arranged for automatic operation and consisting of two units similar to the above in capacity was installed at Stratford, a nearby town.

The Bridgeport substation handles the highly variable load of a traction property,

the momentary overload capacity of the station being 15,000 amps. In addition to their ability to do this, Mercury-Arc Power Rectifiers of A-B-B design also possess high efficiency, low maintenance cost, and freedom from the necessity for heavy foundations. The rectifier equipment with its ability to operate on either 25 or 60 cycles a.c. offers an advantage over rotary converter equipment.

Thousands of kilowatts capacity of A-B-B Mercury-Arc Power Rectifiers are now giving this kind of service at many points in the United States and Canada. We will gladly provide literature or information on this type of conversion equipment or will arrange for inspection trips to the nearest A-B-B Rectifier installation.

American Brown Boveri Electric Corporation
Camden, New Jersey

AMERICAN BROWN BOVERI

Golden Glow



Prestige and Service!

These two factors go hand in hand. For better service will quickly build up prestige.

And good lighting plays an all-important part in providing better service and in making the modern car more attractive, more business-like, more profitable.

Send for our latest pamphlets to learn about the business-building possibilities of Golden Glow Headlights.

All types of Golden Glow Railway Headlights may be fitted with refracting lenses, as illustrated.



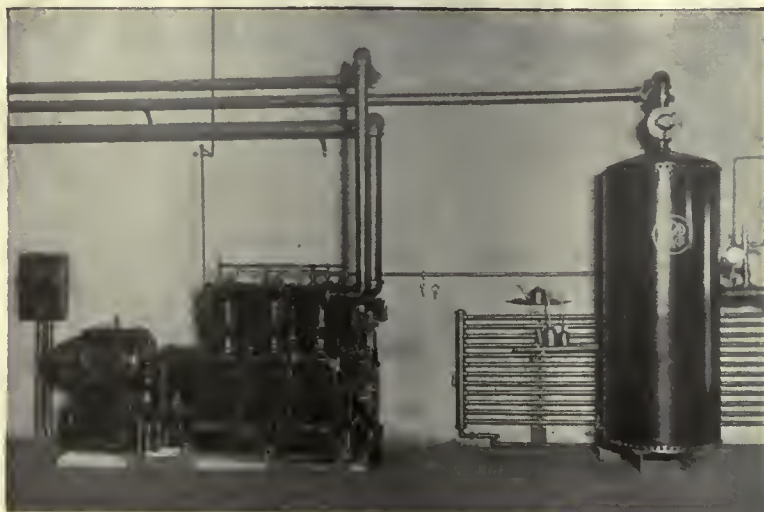
Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

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A type and size suitable for every purpose
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Their distinctive features are explained in
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 had for the asking. Write our nearest dis-
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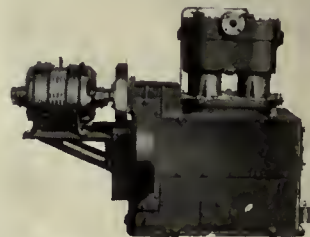
WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

WESTINGHOUSE-NATIONAL
Air Compressors
 "QUALITY MACHINES FOR QUALITY SERVICE"



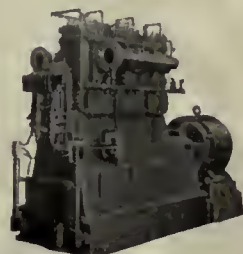
Type "N" compressor, 12 to 60
 cu.ft. displacement.



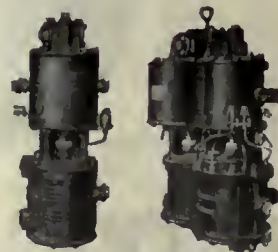
2V Type Compressor—75 to 150
 cu.ft. displacement.



3VS Type Compressor—208 to 468
 cu.ft. displacement.



3VD Type Compressor—550 to 700
 cu.ft. displacement.



Steam Driven Types—35 to 150
 cu.ft. displacement.

Challenge to the Rail Chiefs

AMERICA
is now a
two-car country

TODAY the American family is discovering that a second or third car is not only a convenience but an economy.



This costly broadside flashes across the expanse of America's newspaper pages. It may or *may not* be true—
What will be your answer?

ask STEWART

ask WOOD

ask PINKL

The ANS



ST. LOUIS PUBLIC SERVICE COMPANY

Twin Coach

bu

ask KUHRTS

ask BUFFEE

ask BLIN

ask ALEXANDER

ask GREENLAND

WER



Frank R. Fageol

ask RICHARDSON

ask FITZGERALD

Prepare Now!



One of 10 Twins in service of Virginia Electric and Power Co. at Norfolk, Va.

to meet the transportation
Tastes of the men and
women of *Tomorrow*

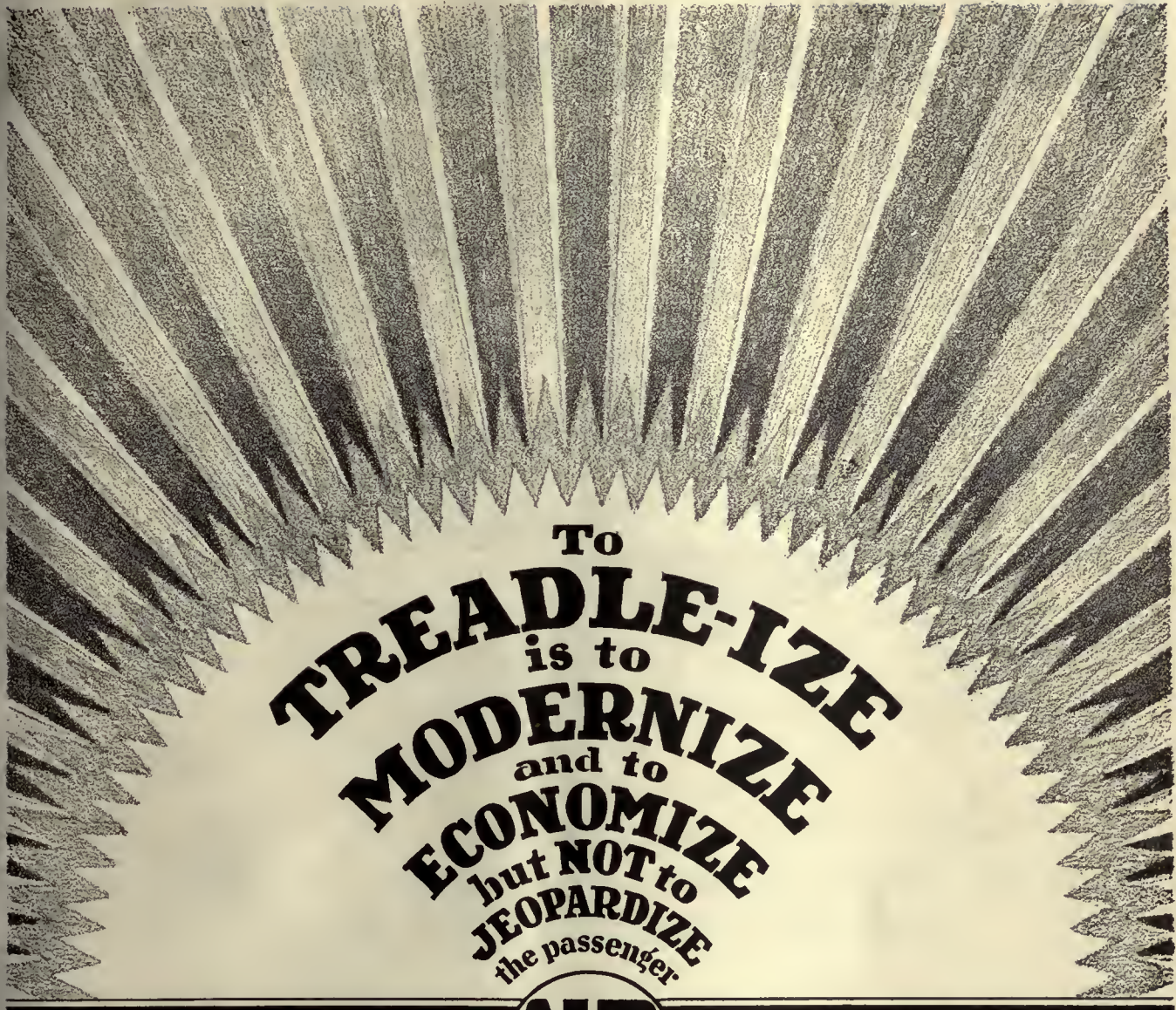


MONTHLY SALES BULLETIN

~~\$2,000,000~~ invested in Twin Coaches in 9 months

\$2,500,000 invested in Twin Coaches in 10 months





To
TREADLE-IZE
 is to
MODERNIZE
 and to
ECONOMIZE
 but **NOT** to
JEOPARDIZE
 the passenger

ECONOMY



WITH SAFETY

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

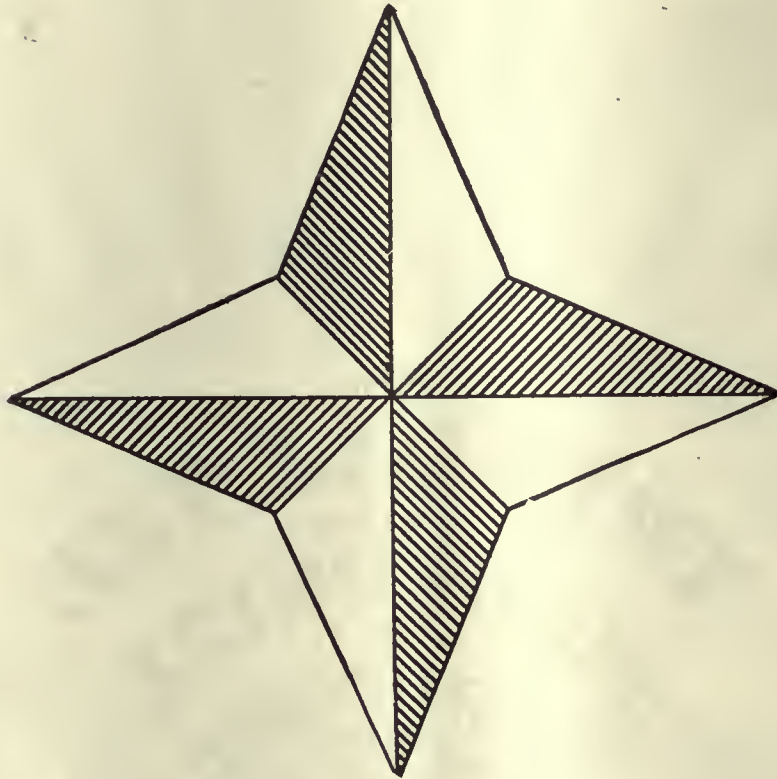
PHILADELPHIA
1010 Colonial Trust Building

CONSTANTLY



BETTER

You are willing, of course



It is a fact that increased revenue and reduced costs follow in the wake of:

“speed with safety”

“capacity with comfort”

“lightweight with strength”

“beauty with low cost”

The Four Cardinal Points in Cincinnati Construction

to deal frankly with fact?

A close scrutiny of the electric cars you send out to serve your fare payers—and to win and hold their good opinion—will reveal an array of facts that demand frank dealing.

To make your study of present equipment constructive we suggest a comparison with Cincinnati BALANCED LIGHTWEIGHT cars. Will a fresh coat of paint compete successfully with “Beauty at Low Cost?” Will towering accident reserve funds win over “Speed with Safety and Cincinnati Duplex Air-Magnetic Braking Equipment?”

Will the cost of operating heavy cars or maintaining excessively light ones prove less expensive than “Lightweight with Strength?”

Will the standards your present cars set compare favorably with “Capacity with Comfort?”

We suggest that you establish the facts and deal frankly with them. It pays to be frank.

CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI
BALANCED
LIGHTWEIGHT **CARS**

— still a step ahead of the modern trend!



**Why
Not
Invest**

**In A
Sure
Thing**

Dayton Tie Track

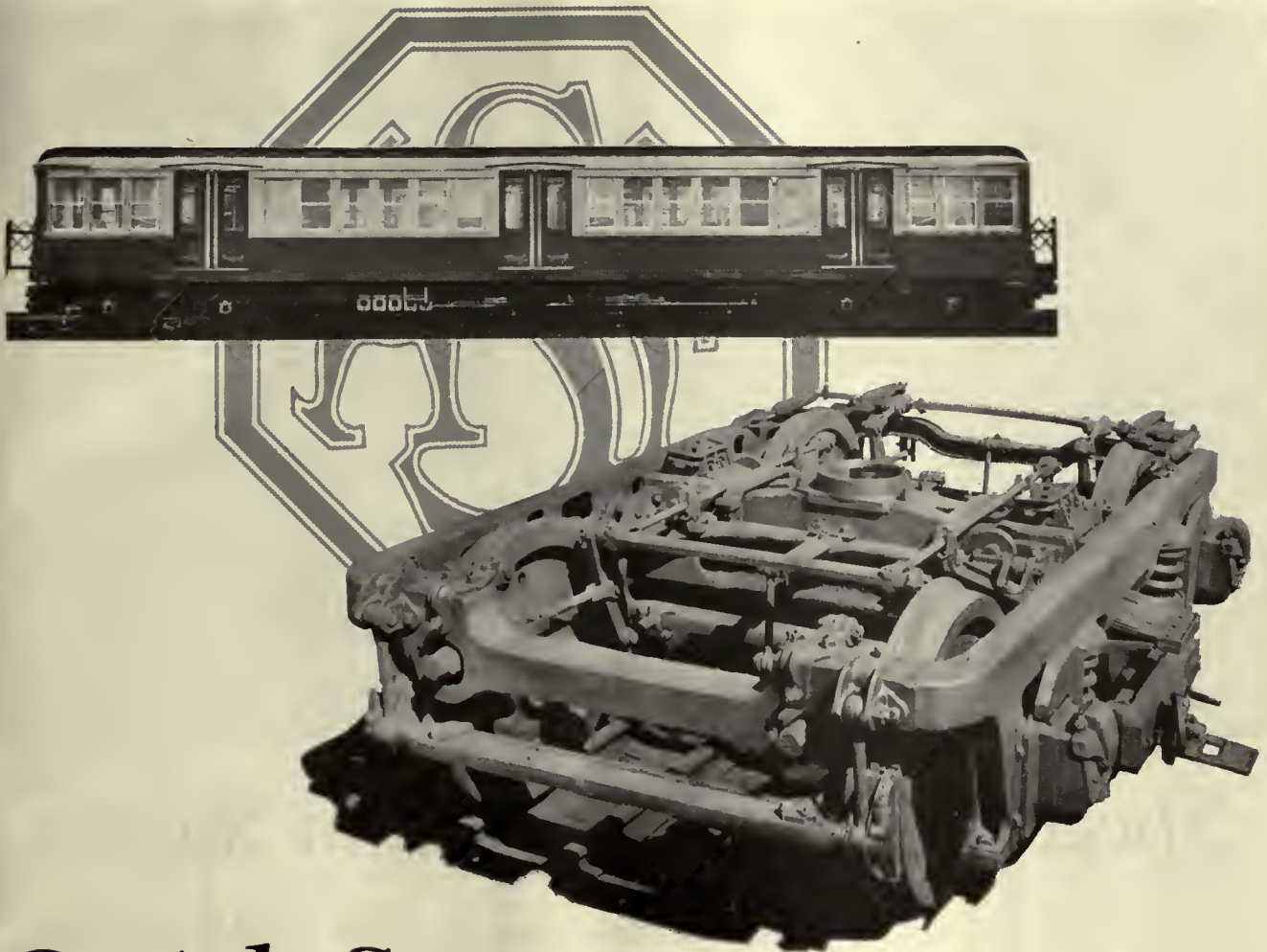
If Dayton Tie Track cost twice as much as ordinary track the investment might look too big, even considering its long life.

But, due to economies in concrete, etc., it actually costs less—it has been laid for \$8 per lineal foot—including tearing up of old pavement, rails, concrete, ties, and relaying new pavement.

The scientific construction of the Tie makes it immune to forces which ordinarily destroy track.

We can *show* you Dayton Tie Track is a sure thing.

The Dayton Mechanical Tie Co.
DAYTON, OHIO



Quick Stops

For High Speed Subway Service

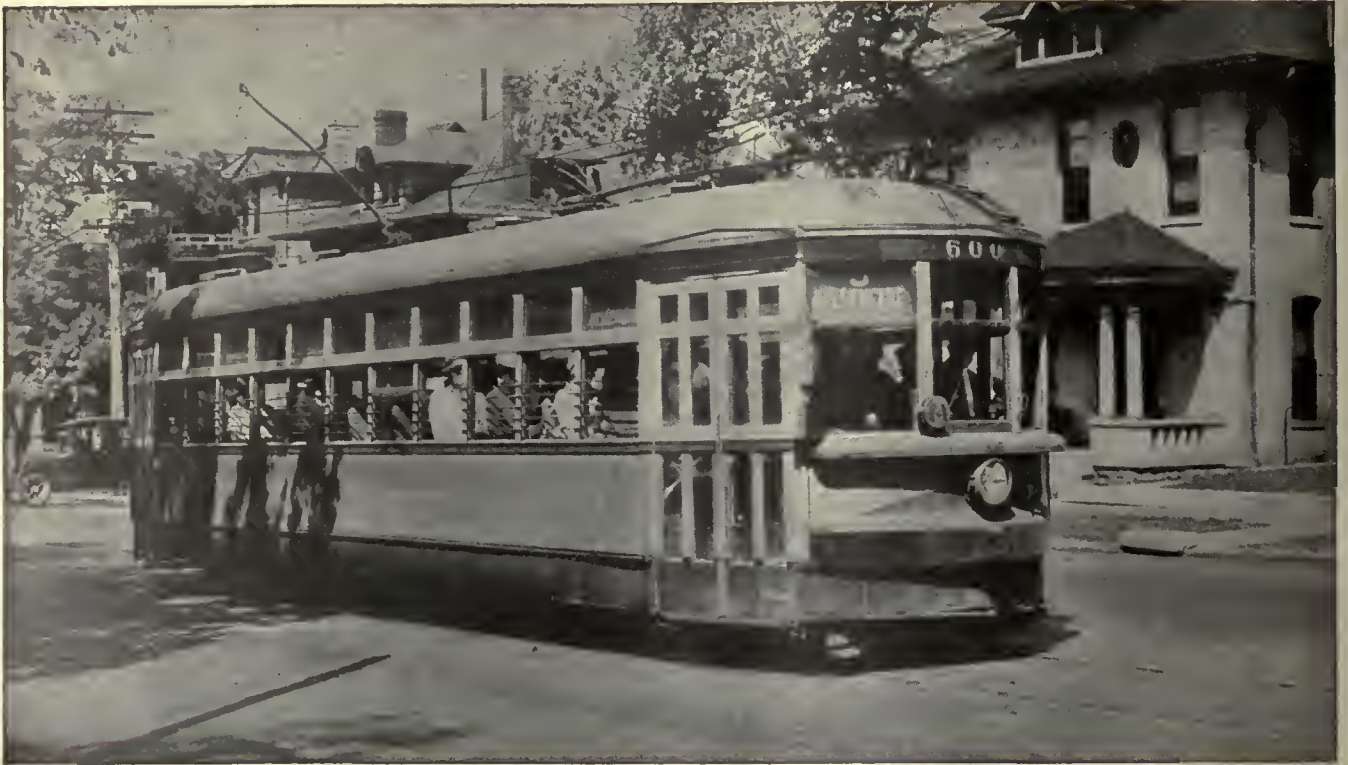
⌘ Fast subway service requires quick retardation as well as rapid acceleration. ⌘ Running time can be cut substantially by increasing the braking effect through the use of Clasp Brakes. ⌘ Simplex Trailer Truck Clasp Brakes use two brake shoes per wheel, thus doubling the braking area insuring short smooth stops. ⌘ Balancing the heavy braking forces on opposite sides of the wheel has many advantages.

1. Less journal, journal box and pedestal wear.
2. Permits wheels to follow freely track irregularities.
3. Divides energy absorption between two shoes; reducing heating effect
4. from brake application, resulting in higher coefficient of friction.
4. Reduced frequency of brake shoe replacement lessens maintenance costs.
5. A balanced, efficient brake.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Simplex Clasp Brake for Multiple Unit Trailer Trucks



Speeding Transportation Safely

When transportation conditions impel shorter headway between cars to reduce waiting time of patrons . . . quicker brake applications to reduce time consumed in making stops . . . rapid interchange of passengers to cut down standing time . . . prompt release of brakes to permit quick get-away . . . THEN the Safety Car Control Equipment will help speed up the service while maintaining the basic element of safety.

This is the modern equipment for modern cars.

The illustration shows one of the ten modern light weight cars now being used by the Nashville Railway and Light Company. Each car bears the name of a distinguished Tennessean. All of these cars are themselves rendering distinguished service because they by nature have the common name of SAFETY CAR.

SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:
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Nothing costs so much
as a rail joint
that costs a little less —

Price is a deception which often blinds intelligent men to real value.

Above is shown a rail joint,—low, cupped and battered. There are two alternatives before you—either to repair it by one of several more or less common expedients—or to eliminate that joint as a source of trouble for good and all.

It's a little cheaper (the first time) merely to patch it up. It costs a little less—to start with. But experience shows it usually has to be done again in a few months. And then again!

At the left you see the job which may perhaps cost a trifle more at the start. A job which never needs to be done again during the life-time of the rail. A 'Thermit job!

Ask yourself which policy is truly the "cheapest."



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

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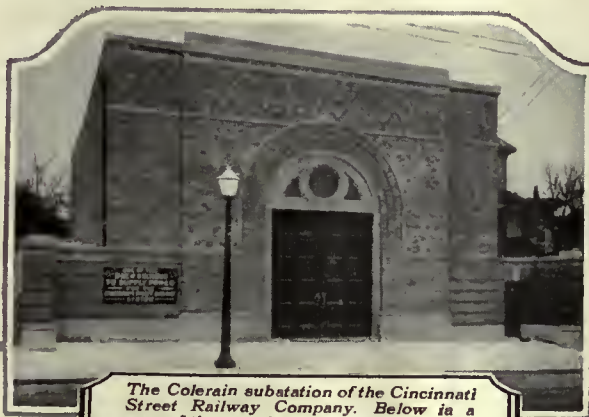
Completely Automatic— The Cincinnati Street Railway Power System

Nineteen automatic substations having a total capacity of 29,200 kilowatts and operated, without a single attendant, by the Cincinnati Street Railway Company, will form the largest completely automatic trolley-power system in the world.

The supervisor, in his office, can perform any important governing operation at

all of the substations. Operating conditions are indicated by colored lights and remote-metering instruments.

This system, designed by the Cincinnati Street Railway Company in conjunction with General Electric engineers, is an outstanding development in street-railway practice.



The Colerain substation of the Cincinnati Street Railway Company. Below is a map of the complete system.



GENERAL ELECTRIC

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

Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
Street Railway Journal and
Electric Railway Review

CHARLES GORDON
Editor

Volume 71

New York, Saturday, May 26, 1928

Number 21

Before and After the "Take-Off"

JUST a year ago a glorious flight aroused public consciousness to the possibilities of general travel via the air. Since then that young pioneer whose exploits have fired the imagination of the entire world has repeatedly risked life itself in an effort to make his dreams come true. Now comes the startling expression of faith in his vision contained in the announcement from the Pennsylvania Railroad of its plan for a train-airplane service between New York and Los Angeles.

However fantastic the idea of spending week-ends in Paris may be, passenger airplane service between the Atlantic and Pacific coasts appears a certainty, and with the execution of such comprehensive plans the inter-urban or bus will have a part to play. Testimony of this fact is seen in the necessity for the purchase by the Detroit Municipal Railway of another bus to maintain its hourly schedule for the accommodation of passengers traveling the route of the Stout Air Services, Inc., on the regularly routed planes between Detroit and Cleveland. For the past year the Department of Street Railways has been supplying a de luxe coach service between the hotel district and the Ford Airport, but the increased volume of traffic incident in part to the recent all-American Aircraft Show and the regular aerial routes over the city emphasize the need that will come for an alliance between local transportation and the flying industry. The developments now being recorded almost daily in aviation are merely harbingers of the much greater things likely to come out of "An Unforgettable Lesson from the Sky."

Space Demands Exceed All Expectations

WHEN the convention exhibit committee met on May 16, it faced the assignment of 102,170 sq. ft. of space for the Cleveland show, Sept. 22 to 28. This demand at so early a date, representing 176 exhibitors, exceeds all expectations, according to Fred C. J. Dell, director of exhibits. The figures are exclusive of track space for car exhibits for which the applications of two manufacturers, and two operating properties, respectively, have been received.

These data are especially encouraging as a reflection of the steady growth which has characterized this phase of the association's work, since conventions were the order of the day. For instance: in nine exhibit years, space requirements have grown from 57,329 sq. ft. in 1916 to 116,634 last year; the number of exhibitors from 125 to 293, respectively.

Co-operation between manufacturers and exhibit committees is, of course, responsible for this growth. This co-operation should be recognized to the fullest extent. Here arises an important phase of the whole situation.

The best way the industry can show its appreciation is to see that key men are present to study every exhibit. Last year there was a notable display by the manufacturers of shop tools. Unquestionably what they had to offer was of inestimable benefit to the men who actually use this equipment. The men who saw the exhibit went back to their properties with a new slant on things mechanical. It is hoped that this year their number will be doubled. These are the men who spend maintenance money wisely or unwisely, depending on how well they are informed regarding new devices for increasing efficiency. They should get their information first hand, and the exhibit is one of the best places to get it. What applies to them is equally applicable to men in other branches of the service and to other phases of the exhibit.

Action on Merger Proposal in Washington Postponed

CALMER councils were in evidence in Washington at the close of the public hearings on the plan for merging the local railway and bus companies. True, the Senate District of Columbia committee will appoint a sub-committee to go into the question during the summer, but the proposal now has back of it the prestige of the declaration of the House District of Columbia committee to the effect that "the best interests of the district would be served by the consolidation." Doubt among the legislators appears to center around the valuation proposal, but it would seem that the zealots have been pretty well put to rout who tend to look upon any business proposal of magnitude as a deep and dark conspiracy.

As the *Washington Post* pointed out, no uncontrolled monopoly can be acquired in the national capital. The development of regulatory machinery long ago dissipated that bogey of self-appointed public champions—not only in Washington but in the country generally. In Washington there is a double check. Congress has exclusive legislative jurisdiction over the district. Fares can be regulated by the Public Utilities Commission, subject always to the overruling jurisdiction of Congress and the courts. If the people of Washington should ever be subjected to attempted extortion by any public utility, they could quickly obtain protection. Excessive railway and bus fares would be especially easy to combat.

Some of the technical aspects of the merger have already been the subject of comment in this paper. In the matter of valuation alone, the public stands to gain greatly, since the figure of \$50,000,000, proposed as acceptable to the companies, is about \$12,000,000 less than might have been secured under "due process of law." There are many other concessions on the part of the companies that make the merger desirable in the

public interest. Certainly it will pave the way for efficient and reliable service at the lowest possible fare.

If what the public wants is not good service at reasonable cost, then it would be idle to attempt to define what it wants, for no sensible citizen asks or expects good service at a cost that would not yield the public servant reasonable compensation. It follows obviously that the consolidation of transportation agencies under a single management properly supervised by public agencies will produce better service, particularly where co-ordination of facilities is contemplated. Incidentally, it might be remarked that the contemplated change in name to the Capital Transit Company is in line with other recent changes of the kind intended to convey more clearly the disposition of the electric railways to engage in any and all forms of mass transportation and even in certain classes of individual service as well.

The merger is in line with public convenience and necessity. It is needed now more by the public than by the companies, even though they favor it. The companies concerned having reached an agreement after making generous concessions for the general good under which the public would have benefited materially, it is too bad that further delay is to be encountered by the decision to postpone final action on the matter.

Fancy Retreats Before Fact in Kansas City

OUT of the school of practical experience with buses dating back to the fall of 1925 the Kansas City Railways has evolved a set of maxims which are reflected in the terms of the new bus franchise just granted to the company. Its plea has been heeded that trunk line fares be made 15 cents, based upon the cost of the service rendered. How many other points have been allowed which were made by the company in its recent report to the Council is not plain at this writing, but the facts contained in that document and the principles advocated are of the greatest interest to the industry.

Based on its experience, the company maintained that the bus system as a whole should be self-supporting; that the trunk lines should be routed to give the most direct and the quickest service between the residential and business districts; that feeder service should provide crosstown connections and give transportation to sections remote from existing facilities where the population has grown sufficiently to justify it; that night service, and in some instances non-rush hour service, should not be required on feeder lines; that transportation should be supplied where there is a need for transportation and not for the interests of business centers or real estate developments; that wherever street car facilities exist they should be intensively developed and wasteful duplication not required and that the bus franchise or permit should be kept elastic to meet changing requirements as experience increases.

It was on the very score of the experimental nature of bus operation in Kansas City that the original franchise was limited to three years. Even now the company in its report sees the future in terms so uncertain that it suggested the new operating grant be made for a term not exceeding five years. Not that the company has any doubts about the bus. Far from it. But it does recognize from experience that trunk line service providing a seat for every passenger in buses equipped with pneumatic tires cannot be rendered for a 10-cent

fare except at an actual operating loss. It is conceded that operation over the hilly routes of Kansas City is necessarily more expensive than in flat, level cities. In Kansas City the longest trunk line is 6.6 miles. The longest feeder is 5.48 miles. Each of the other feeders is less than 3 miles, and the shortest only 1.23 miles. There is one express line charging a 25-cent fare, four trunk lines at 10 cents and six feeders at 10 cents. The trunk line service comes nearer to paying operating costs than do the feeder lines.

The Kansas City management has utilized its past experience with buses to determine policies for the future. It now holds most firmly to the idea that losses from bus feeder lines should be met, if possible, from such profits as the trunk lines can earn on a proper basis of fare. It rightly says there is no equity in accommodating the 3 per cent who use the bus service at the expense of the 97 per cent who use the street cars. It is anxious to do full justice by the bus. Were that not so, it would not have made the plea that it be not "strait jacketed" in its use of the bus. The principles which it advocated as the basis for the successful application of buses in city service constitute a bill of rights for that vehicle as it is now constituted. They could hardly have been put more succinctly. That Kansas City's findings support *ELECTRIC RAILWAY JOURNAL's* contentions regarding the bus is incidental. The truly significant thing is that they indicate that those bus enthusiasts who have been obsessed with the idea of making the automotive vehicle merely a street car on rubber tires and limiting it to street car rates have been standing in the way of really sound development and expansion. Fancy must retreat before fact.

Loose Talk About the New York 7-Cent Fare Case

DECISION of the United States Supreme Court to set a date early in its fall term to hear the New York 7-cent fare case shows the importance with which the court regards this case. The order staying the collection of the increased fare is logical in view of the early day set for trial and the plea of the city that it had no authority to provide a bond to indemnify the company if the increased fare should be held valid.

Politicians are making the most of this stay, which is no indication at all of the opinion of the court as to the merits of the higher fare. They have also made a great many foolish remarks during the past two weeks about the decision of the statutory court in favor of the 7-cent fare. Thus, a New York senator in Congress criticized the view taken by the court of the intent of contract No. 3, and is reported to have said, "It will be a serious thing when the 6,000,000 people of New York refuse to pay the 7-cent fare which the Interborough may attempt to collect as a result of this outrageous decision." In the meantime, many politicians at home have bewailed in public the hardship which 4 cents a day additional fare will cause to the average workingman who has to use the I.R.T. system. All this shows the hysteria produced by long intrusion of politics into transportation affairs in New York.

Those who fear the dire effect on the populace of an increase in fare should realize that there were no riots in Chicago or Philadelphia when the fare went up to 7 cents,

or in Boston when it was increased to 10, or because of increases in any of the many other American cities where fares have been raised. The public may not welcome increases in living cost, but the more thoughtful in New York will know that this increase is the only practicable way by which they will get more and better rapid transit service. As for the cry about the increase in fare being an undue burden on some deserving wage earners, it is pure political bunkum. Transportation cost is only a small item in the living costs of even the most humble worker, and transportation is the only item which is at pre-war levels in New York. One needs only to observe the number of automobiles that are jammed into every available parking niche around the average industrial plant to realize how freely the "free corn" class of politician has called upon his imagination in conjuring up a picture of social disorder resulting from a fare increase of 4 cents a day.

As to the question of the intent of contract No. 3, it is necessary only to recall the situation in March, 1913. The Interborough was then in a prosperous condition and certainly would not have jeopardized this position if it had thought the contract unremunerative. There is nothing to indicate the city representatives had any different view or knew that a World War was coming within a year or so which would double operating and construction costs. In other words the intent of the contract was very clearly expressed in the statement of the statutory court that "There is no evidence that the Legislature," in the rapid transit act of 1912 under which contract No. 3 was authorized, "intended to burden the city with an exorbitant fare or the company with a non-compensatory rate."

Final grant by the federal courts of a 7-cent fare should be of as much benefit to the city as to the company. It will make immediate service improvements possible and future extensions more probable. On its part, the company might well emphasize these gains which will come to the city from a reasonable fare.

Group Meetings a Constructive Force

WHEN 52 men attend a series of meetings such as that held by the way and structures division of the American Electric Railway Engineering Association in Atlanta recently, it approaches the status of a convention of track men. Instead of holding sessions of the special committees at various times, followed by a meeting of the standing committee of way and structures, as many as possible of these meetings were grouped together in one week.

Everybody who attended was enthusiastic about the plan. That much of interest was added by the entertainment features arranged by the Georgia Railway & Power Company was a matter of comment. These features, however, did not interfere with the attendance at and the interest in the meetings, as may be seen from the report published in this paper on May 19. Discussion of the various subjects was participated in by all of those present, the voting of course being confined to the committee members. It is certain that the concentration of effort not only saved time for the delegates, many of whom are on more than one committee, but resulted in a more logical treatment of the problems involved.

The success of this meeting indicates the possibility

of similar meetings of the other divisions of the Engineering Association. If the plan can be worked out to bring together such groups, it would seem that time should be available for discussion of current problems. A plan of this kind has been proposed to the officers of the Association and has been under consideration by the chairmen of the several divisions. An additional proposal is that the members of a division interchange operating cost data and make these records a subject of discussion at one of the divisional meetings.

In this latter respect the plan approaches that of the Association of Equipment Men, Southern Properties. It is significant that the success of this latter body and the unqualified endorsement given it by the officials of these properties, has stimulated the formation of a new group, the Association of Electric Railway Equipment men, Middle Atlantic States, within the past week. There is every reason to believe that such groups, preferably under the leadership of the Engineering Association, can be a great force in improving operating and maintenance practices of electric railways the country over.

Uniform Traffic Ordinance Desirable

VALUABLE suggestions for improvement of traffic regulation are contained in the proposed model municipal traffic ordinance recently prepared by a special committee of the National Conference on Street and Highway Safety. A summary of its provisions was given in an article published in this paper for May 12, page 771. A number of these, which directly affect the operation of street cars and buses, are of particular interest to electric railway men. Moreover, anything which tends to improve general conditions will result in substantial benefit to the transportation companies.

Two desirable advantages may be expected to follow the adoption of this model ordinance. In the first place, wider knowledge of traffic regulations received from greater uniformity will undoubtedly promote better observation of these regulations.

This is a matter of growing importance, because today, more and more people are traveling considerable distances by automobile and passing through towns where they are unfamiliar with traffic rules. If the rules are approximately the same as those to which they are accustomed at home, fewer violations will occur.

In the second place, this model ordinance endeavors to select and apply the best features of more than 100 traffic ordinances studied by the Committee. The recommendation concerning the establishment of safety zones at street car stops, forbidding other vehicles to drive through such zones and discouraging the use of the track area by vehicular traffic, certainly will meet with the approval of railway men. Experience where such regulations are enforced indicates that good results for all traffic will follow from their general adoption.

A draft of the proposed ordinance has been prepared in printed form and is now being distributed by the committee. At present this draft is merely tentative. Comments and suggestions are invited from everyone interested in this suggestion. All suggestions received before June 10 will receive the careful attention of the committee. Such modification as may seem desirable will then be incorporated and the ordinance formally submitted for approval to the National Conference on Street and Highway Safety.



The new Grove Street garage. Space is available to extend the present unit in two directions

Worcester Builds for Adequate Maintenance

COMPLETION of the Grove Street carhouse and garage in Worcester, Mass., marks another important step in a series of major physical improvements. These make up the rehabilitation program of the Worcester Consolidated Street Railway and the Springfield Street Railway, which have received attention from time to time in the pages of *ELECTRIC RAILWAY JOURNAL*.

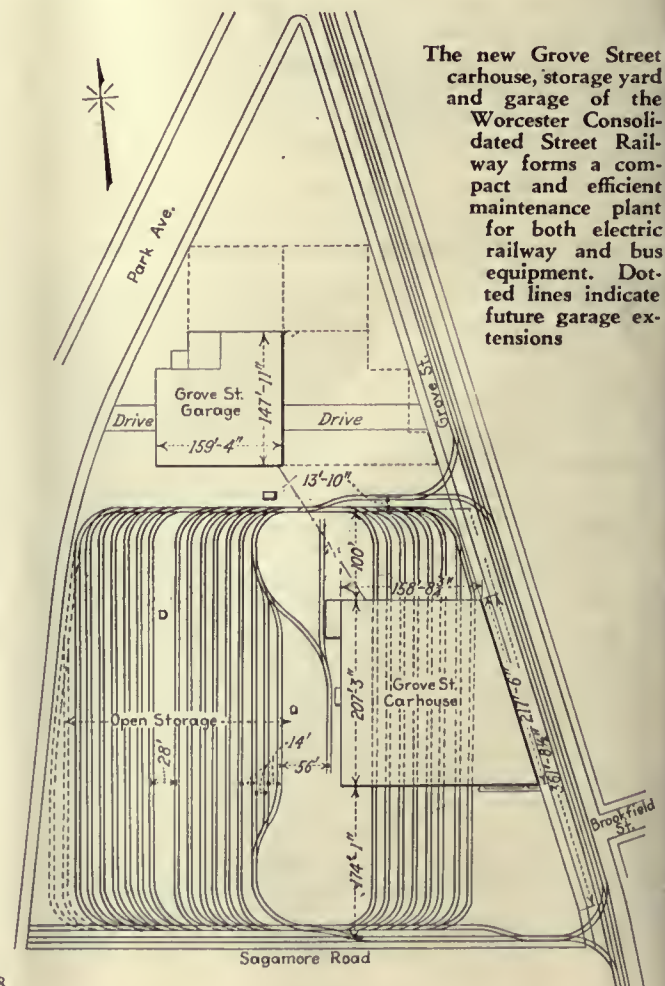
Development of the experimental worm drive car in Springfield, which was described in the March 26, 1927, issue, directed the attention of the entire industry to this pioneering work by a comparatively small property. Later, in the Oct. 1, 1927, issue there was an article on the 100 new cars which were subsequently purchased for Springfield and Worcester. More recently, in the April 14, 1928, issue, progress in the rehabilitation of track and other physical property in Springfield was reported. Concurrently with these major rehabilitation steps there were recorded a series of great bonfires to which were relegated the old equipment no longer suited to meet present-day transportation requirements.

NEW BUILDING HAS AMPLE CAPACITY

The Grove Street improvement now provides Worcester with a new carhouse and garage, with ample outdoor storage track and space for garage extensions. By grouping both the carhouse and garage on a single plot, it has been possible to utilize a common heating plant and to avoid duplication of compressed air and other service facilities. The carhouse has capacity for all the cars in the Worcester district and replaces old buildings at Market Street and Gates Lane. Some 203 passenger cars are to be operated from this point. The new garage, with capacity for 50 buses, represents only about one-fourth of the final possible development. Space for extension on the east will provide for 50 more buses, and permissible development on the north will house 75 to 100 additional. There is also room for future extension of

the carhouse to the south, which would accommodate sixteen additional cars.

An accompanying illustration shows the general arrangement of the Grove Street plant with carhouse,

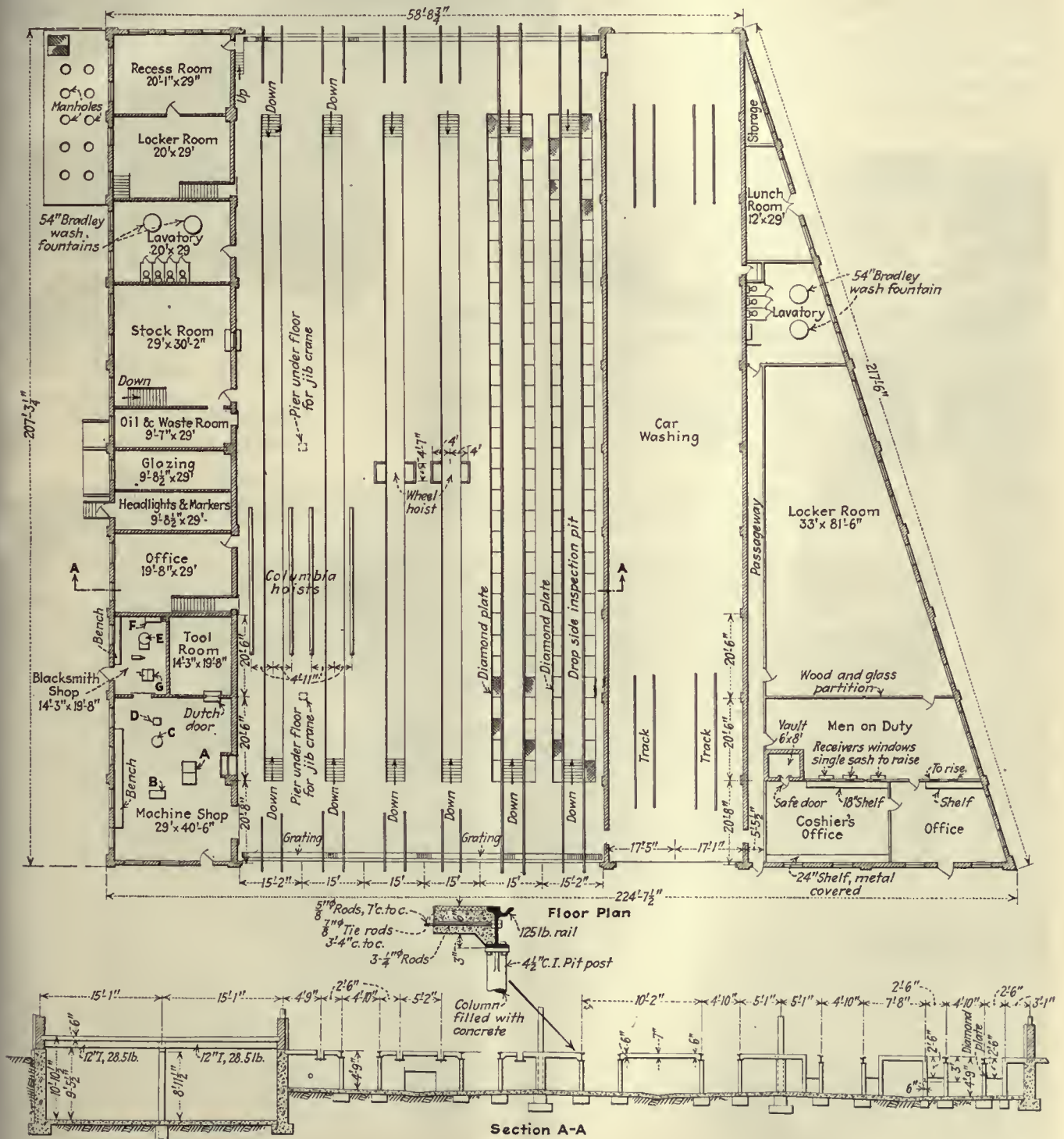


The new Grove Street carhouse, storage yard and garage of the Worcester Consolidated Street Railway forms a compact and efficient maintenance plant for both electric railway and bus equipment. Dotted lines indicate future garage extensions

storage yard and garage, and the contemplated extensions. Both buildings are of modern fireproof construction of red brick with artificial stone trim, steel sash, gypsum roof and with very large skylights giving almost ideal natural illumination. The floor area of the garage, 20,000 sq.ft., is the maximum which the state will allow in a class A garage. The trusses have a span of 105 ft., giving an unobstructed floor. Motor-operated, push-button-controlled Kinnear doors are installed in both buildings. Complete sprinkler systems of the "wet" type are provided. Pipes for air at 200 lb. pressure, gas, hot water, cold water and vacuum for cleaning purposes

are carried underground between the two buildings, thus concentrating service equipment for these several facilities at one place in the carhouse.

The general arrangement of the carhouse is similar to that of the Hooker Street carhouse in Springfield which was built a number of years ago. The size and shape of the lot permitted a track layout giving convenient storage facilities for a maximum number of cars. The building provides track, shops and pits for inspection and running repairs and a large wash bay. Cars entering on the north track are assigned to a position either in the storage yard at the west of the carhouse or



Car inspection, wheel changes and running repairs are made at this carhouse

All Worcester cars are now operated from this carhouse. Equipment indicated includes A, saw table; B, motor-driven hack saw; C, drill press; D, grinder; E, forge; F, fan; G, bending machine.

are run around and into the building from the south. Cars leave the building from the north end, establishing continuous movement between the yard and the several carhouse bays without switching or interference.

A total of 425,000 passenger car-miles per month are operated from this house. At present the base schedule from Grove Street calls for 76 cars with 94 scheduled extras, making a total of 170. The building will hold from 32 to 40 cars, depending on how closely they are spaced. The outdoor storage section west of the building will accommodate 144 cars, and the tracks at the north and south end will store 24 additional. This makes a total capacity of 200 cars, or 208 if the carhouse itself is closely filled. By placing cars on curves, north-and-south lead-in tracks, spur track to the coal bunker, etc., many additional cars can be stored.



**Convenient Facilities
Are Found
Throughout This
Modern Carhouse**



A—Well lighted and drained wash bay.

B—Oil pump room and waste treating equipment.

C—Wheel storage room in basement. Opening at right leads to wheel hoists in pits. Note monorail on ceiling for handling wheels.

D—View taken under carhouse floor showing open pit construction. Note ample drainage facilities, space heaters in background and near center of illustration.

E—Oil storage tanks and harrel hoist in basement under oil room.



Bracket hoist on carhouse west wall for handling oil and wheels from spur track to pits leading to storage rooms in basement

The carhouse building is divided into four principal bays. On the east side, in the triangular section adjacent to Grove Street, are the several rooms devoted to the activities of the transportation department. These include a cashier's office and offices for the receivers and the dispatcher. There is a large room for the men awaiting their runs, which is equipped with tables, schedule racks and chairs. A locker room and toilet, with

Bradley wash fountains and an electric hand drier, adjoins the men's room. There is also a lunch room and telephone booths.

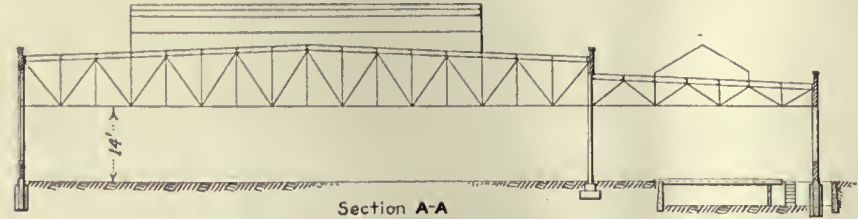
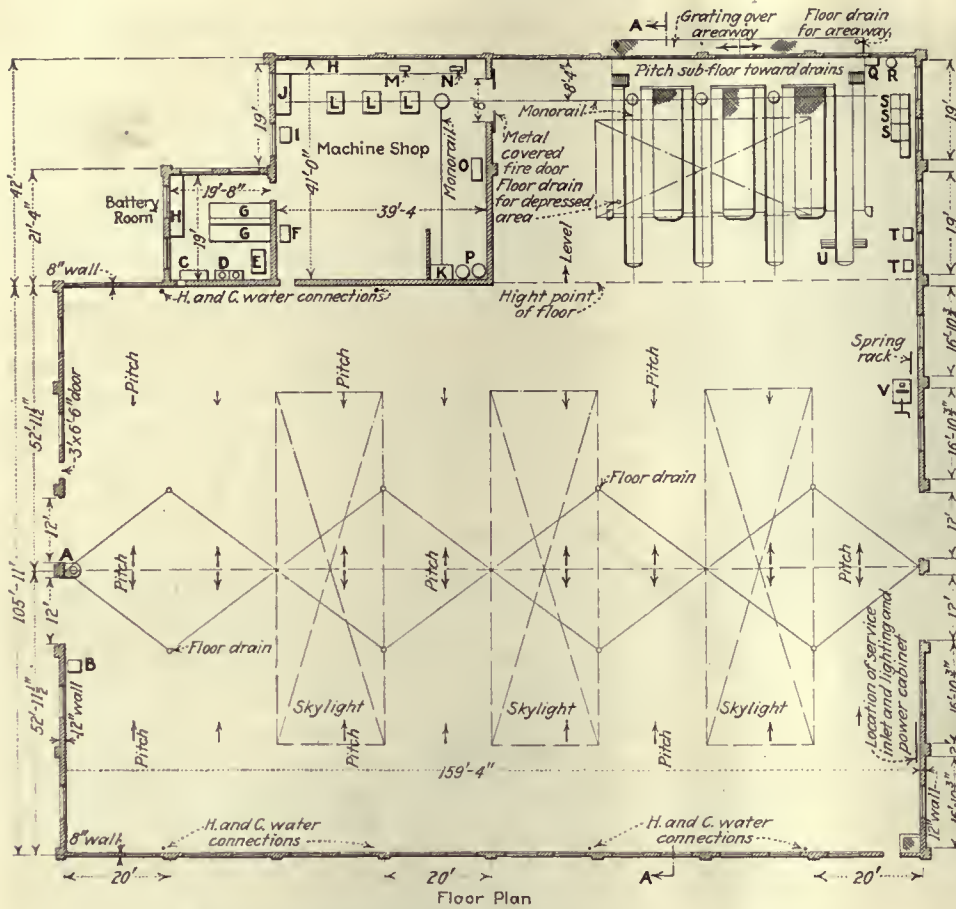
Adjoining the quarters for the transportation department is the car-washing bay which has two tracks with ample capacity for four cars each. In this bay there are numerous hot and cold water outlets and adequate drainage facilities. The hot water is supplied through a loop system of piping, and the concrete floor slopes sharply toward the several drains.

Next to the wash bay is the main section of the carhouse devoted to running repairs and inspection. Six tracks in this bay are supported on $4\frac{1}{2}$ -in. Lally columns to form an open pit below the entire carhouse floor. Two of the pits have side trenches to facilitate truck inspection, etc. These side pits are floored with diamond steel plates and the sides are open so that they drain readily and may be easily cleaned. The drainage of all pits was laid out so that they might be kept dry during wet weather. Between each pair of pits there is a wide drainage trench with ample sewer connections.

Facilities for hoisting and handling of heavy parts in this section of the building are indicated in an accompanying drawing. On the two west tracks adjoining the machine shop and store room there are two Columbia car hoists. Two jib cranes with 3-ton electric hoists and an overhead I-beam trolley are so located as to facilitate the handling of heavy parts or material between the repair track, the machine shop and store room. In line with the wheel storage room described later, and below the level of the carhouse floor, there are two pit wheel hoists arranged with removable rail sections in the carhouse track so that wheel changes may be made rapidly.



General interior view of Grove Street carhouse inspection bay. Note drop side inspection pit, Columbia car hoist and jib crane



Capacity for 50 buses is provided in the new garage

It has a floor area of 20,000 sq.ft. A well-equipped repair shop and a conveniently arranged depressed section for bus inspection and overhaul are special features of interest. Some of the equipment includes, A, Bowser nozzle controlled gas pump; B, gas meter in fill pipe; C, battery wash tank; D, acid crocks; E, constant potential battery charger; F, Elmco ignition test stand; G, battery charging

rack; H, work bench; I, Relio grinder; J, large Wadell bearing outfit; K, solution tank; L heavy-duty motor overhaul stands; M, Reamo bench reamer; N, bench grinder; O, 60-ton Manley press; P, McKee cleaning outfit; Q, Alemite grease compressor; R, transmission oil pressure tank; S, oil storage tanks; T, brakelining machine; U, Cowdrey brake tester; V, spring assembly vise.

Along the west side a section approximately 30 ft. wide and running the full length of the building, approximately 207 ft. long, has been divided for shop, office and store room facilities. Beginning at the south end, there is one 29x40-ft. 6-in. machine shop, then a blacksmith shop and tool room, an office for the master mechanic, store rooms for headlights and markers, glass, oil and waste; a 29x30-ft. stock room, lavatory and toilet for mechanical employees and large locker and

vacuum pump, separators for the vacuum cleaning system (one for ordinary service and the other for taking care of soot, etc., when cleaning the boiler tubes) and a hot water boiler for supplying the carhouse and garage. Returned steam from the heating system is used to supplement the main hot-water heater.

In addition to the heavy materials store room in the basement there are spaces for oil storage and wheel storage. An areaway extending out from the building within

recess rooms at the north end. For a distance of 144 ft. from the north end there is an excavated section which houses the boiler room, a basement store room for heavy or bulky parts, an oil storage room and space for wheel storage.

Between the boiler room and the basement store room are a heavy-duty, 65-cu.-ft.-capacity, 200-lb. National Brake & Electric Company air compressor and a Spencer vacuum cleaner pump. These serve both the carhouse and the garage. The switchboard here controls all 500-volt direct current; 500-volt three-phase, 60-cycle alternating current, and 110-220 volts, three-wire alternating current for light and power.

Two boilers furnish steam for heating the carhouse and garage. Standard radiators and steam coils are in most of the small rooms and offices. Throughout the carhouse and garage, unit-type base heaters with fans are located at points to give uniform heat distribution. The use of these unit-type heaters for keeping the carhouse pits at a comfortable temperature is particularly interesting and has worked very satisfactorily. There is a series of gratings in the carhouse floor just inside the Kinnear doors, and in the pit below these gratings are the unit heaters. The fans on the heaters draw cold air down from around the doors and force it through the unit-heater steam coils out into the pit. These heaters at either end of the pit are supplemented by additional heaters placed at intervals under the carhouse floor between pits. With this arrangement the pits are kept dry and warm even in cold weather.

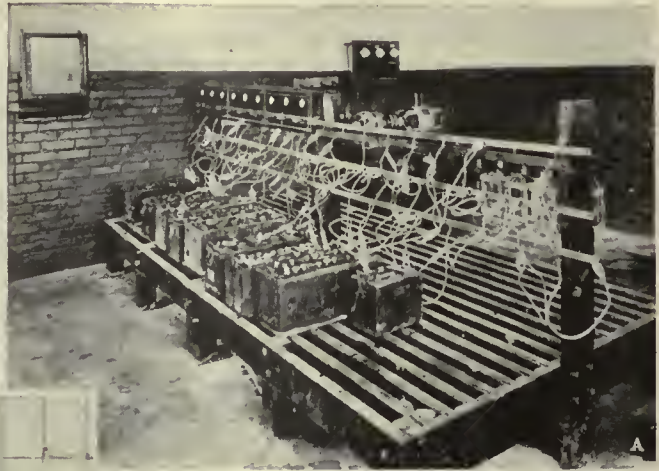
In the boiler room there are ample coal bins, ash-handling hoists, hot water circulating pumps, a sump pump, return

convenient reach of a spur track from the car storage yard, is served by a jib crane with electric hoists mounted on the building, as shown in the illustration. This gives a convenient means for handling oil barrels or car wheels from a supply car to the basement pit leading into either the oil storage room or the wheel room.

Bowser oil storage tanks in this basement room connect with pumps in the oil treating room immediately above. A barrel hoist permits oil to be conveniently poured into the storage tank. In the pump room above is an S. F. Bowser waste treating plant adjacent to the oil pumps.

The wheel storage room is served by an outside pit from the same jib crane and 1-ton Shepard electric hoist that serves the adjacent oil room pit. Within the wheel store room is an overhead monorail with a hoist. Wheels may be picked up from the floor of the store room and carried by the monorail through an opening in the foundation wall into the pit space under the main carhouse floor. At this point they are set on rails on the pit floor and can be rolled directly to the jacks where they are lifted into position in the truck on cars setting on the pit

In the northwest corner of the garage building are the repair shop, 39x41 ft., and the battery room, about 19 ft. square. An 8-ft. fire door from the repair shop into the garage leads directly to the depressed floor area in the northeast corner of the building where bus inspection and overhaul work are done. The depressed section is approximately 4 ft. 6 in. deep. Overhead runways



Modern bus maintenance facilities feature the new Worcester garage

A—Battery charging room with special rack for holding batteries. Against the wall behind is the constant potential motor-generator charging unit.

B—Oil storage tanks, Alemite grease pump, and transmission oil pressure tank in northeast corner of garage—adjacent to pit section. Note design of end stops on bus runways over pits in left foreground.

C—Elmco starter and ignition testing equipment in bus shop.

track above. The lift is accomplished by hydraulic pit hoists and removable sections of rail.

The Grove Street plant is primarily a carhouse and only necessary running repairs are made there. All major overhauling and any large machine jobs are done at the Market Street shops, where ample machine facilities are available. Only limited machine equipment, including a motor-driven grinder, small drill press, motor hack-saw and a saw table, together with a single forge, bending machine, benches and suitable hand tools are installed in the carhouse.

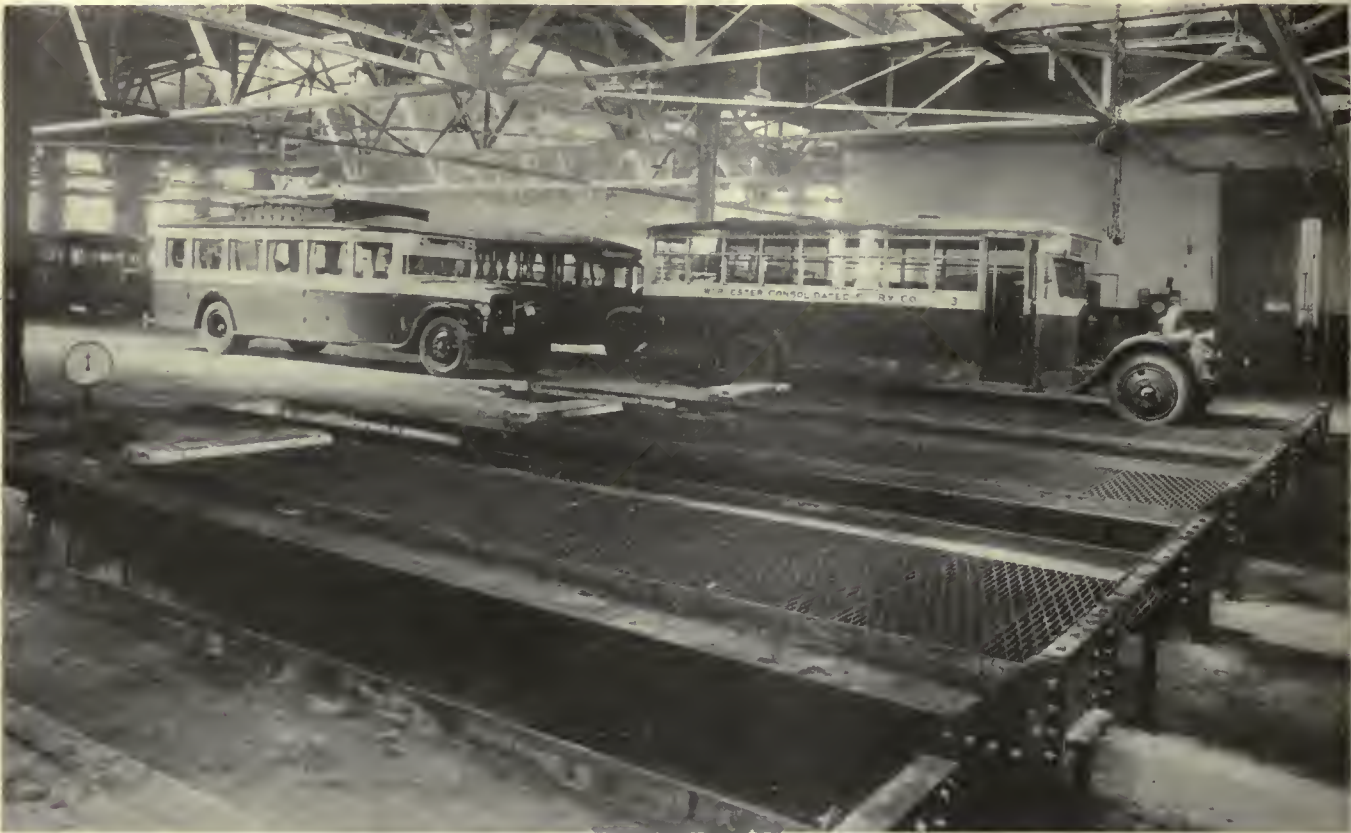
An illumination intensity of at least 9 foot-candles is obtained throughout the carhouse. This is intensified by the white color all walls and ceilings are painted. The carhouse is wired for the three-wire system at 110-220 volts, 60 cycles.

While the garage has a total capacity of only 50 buses, at present 23 vehicles are operated from it, and all the major overhauling and repairing on some 55 buses are taken care of. The total bus mileage operated is approximately 200,000 per month.

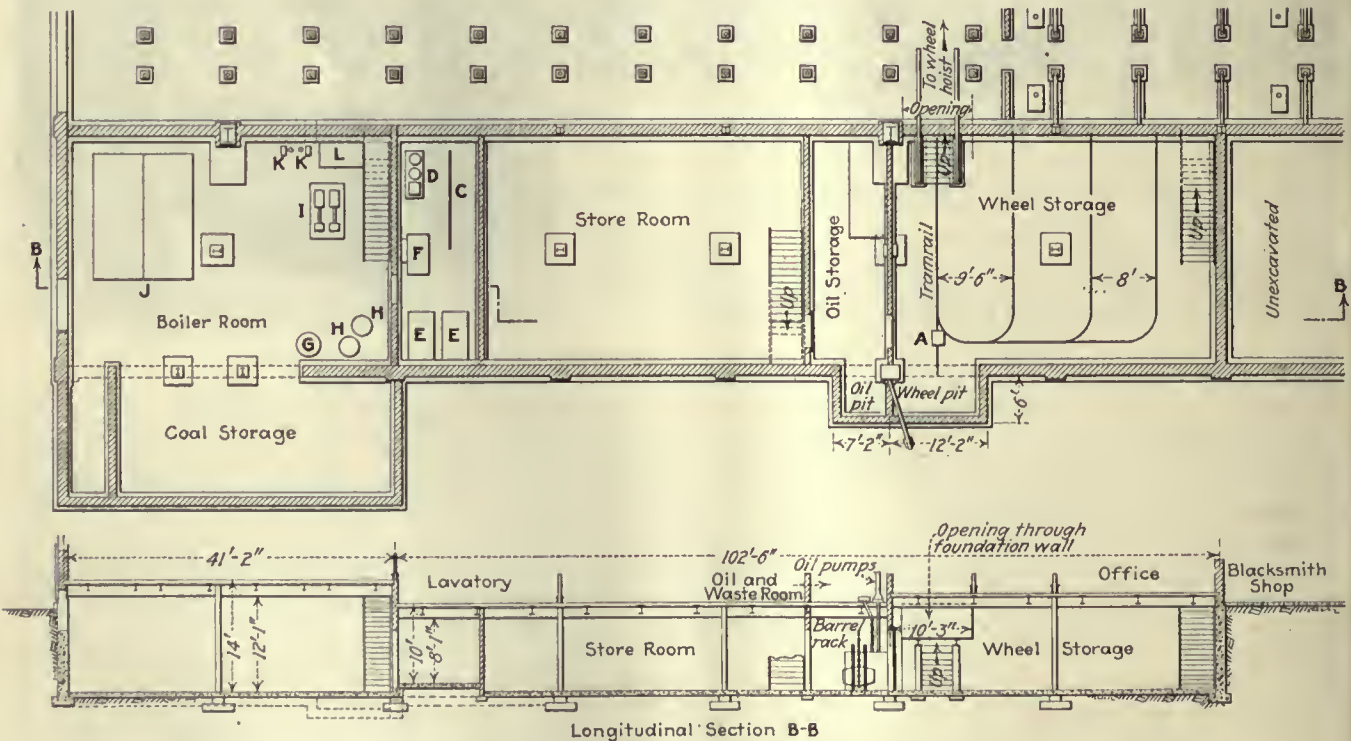
give space for four buses, and the remainder of the floor is covered with subway grating so as to give ample ventilation. Beyond the bus runway there is room for a long work bench on the depressed level to which stairs on either side give convenient access. Alemite grease and transmission oil are piped directly from a grease compressor and an oil pressure tank to outlets at several points in the open pit section from which buses may be lubricated conveniently.

The first runway on the east side of the pit section is used for mileage inspection. A Cowdrey brake tester is set flush with the garage floor so that bus brakes can be tested while other inspections are being made. The pits are served by a monorail running across the entire depressed section and communicating with the repair shop so that motors and other heavy parts may be moved directly between the pits and the shop.

Along the east wall on the garage floor level and adjacent to the inspection pits are the oil storage tanks and a brakelining machine. Here also there is a rack for springs and a spring assembly vise.



A depressed area in the garage, with subway grilles between bus runways forms a convenient open pit. At the extreme left is a Cowdrey brake tester set flush with the garage floor



A basement section along the west side of the carhouse provides space for boiler room, heavy stores, oil and wheel storage

The basement equipment includes A, electric wheel hoist; B, outdoor bracket cranes; C, switchboard; D, heavy-duty National air compressor; E, hot water tanks; F, vacuum cleaner; G, hot water heater; H, vacuum cleaner separators; I, return pumps; J, boilers; K, hot water pumps; L, sump and sump pump.

In the repair shop are a 60-ton Manley press, heavy-duty motor-overhaul stands, a Reamo bench reamer, a large Wadell bearing outfit, a Relio wet grinder and an Elmco test stand for starter, ignition and generator overhaul. There is also a McKee outfit for cleaning all parts that are taken off the buses. In the battery room there is a constant potential motor-generator charger set with battery racks having capacities for 36 batteries. In this room there are also work benches, battery wash tanks and acid crocks. Gasoline is stored in a 5,000-gal. underground tank with a Bowser nozzle-control, air-operated gas pump located inside the building between the two entrance doors. An Xacto flow meter on the filling pipe permits a check to be kept on the amount of gasoline received. No provision is made for body work or painting in the garage, as this work will all be done in the main shop at Market Street.

As indicated on an accompanying drawing, the garage floor is pitched to provide drainage to two lines of drains. Along the south wall of the building there are four hot and cold water outlets for washing. Numerous electric outlets along the other walls of the building and at the pits provide convenient connections for hand tools and portable lamps.

Chair Car is Popular in St. Louis

St. Louis Public Service Company is receiving much favorable comment on its trial car using individual bucket type seats

ON MARCH 28 the St. Louis Public Service Company, St. Louis, Mo., introduced to the patrons of the Grand Avenue line a new chair car furnished with 43 individual seats and having other interior improvements. The car ran on this line for four days and then was put in service in successive intervals of two or three days on six other lines. It was operated on a changing schedule so that a great number of people were able to ride in it. Post cards distributed by the conductor were used by many patrons to express their sentiments concerning the car.

The seats are of the individual bucket type and are covered with cane. The edges of the arms and back are bound all around with aluminum strips. The seats are supported by iron pedestals fastened firmly to the floor. They are placed at an angle of 45 deg. to the length and are tipped back slightly. Ample knee room and privacy are afforded by this arrangement. The deep-seat cushions are upholstered in genuine Spanish leather.

Instead of hand straps the car has white-enameled stanchions from floor to roof. The aisle is wider than in the standard type of car and accommodates a larger number of standees. Frosted lamps are used in the car



Privacy is afforded patrons of the St. Louis Public Service Company who use this car

and are so located that the passengers receive the light over their shoulders. A shelf behind the seats and next to the windows is provided for packages.

More than 97 per cent of those who wrote cards gave the new car their unqualified approval. Nearly every correspondent stressed the word "comfort," indicating that this is what patrons appreciate most as riders of the street cars. A great deal of comment was devoted to the soft light which came from the frosted bulbs, making reading a pleasure, while others mentioned a consciousness of respectability of all passengers being separated and riding as individuals. The general trend of sentiment on the many cards received is expressed in a few of the typical replies, appended here:

Very comfortable. Especially good for reading, as the light comes over the shoulder.

I think you should do away with all of your old equipment and place these cars on all your lines and charge a 10-cent fare.

The new car is delightful. Seats very comfortable. Better arrangement for standing space.

This car has all of the comforts of a bus, with better lighting and heating system, and no danger of skidding or turning over.

Better lighting arrangement. With more space in aisles, less chance for crowding and congestion on board. Even standing accommodations are better. Would like to see these cars on all lines in the city.

Very much impressed with this new car. It eliminates crowding in the aisles. Impossible to stumble over patrons' feet. Certainly seems to be another forward step in your rapidly improving service to the public.

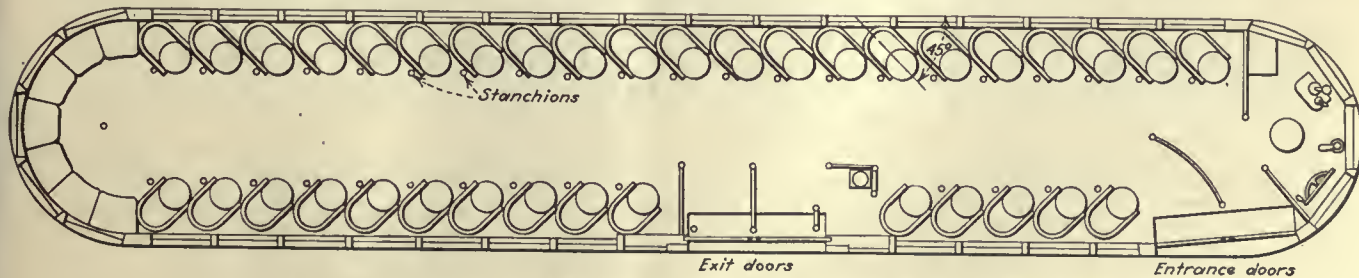
A daring and dangerous innovation in that no one who uses it will ever be content to ride in any other.

On boarding this car my first impression was that I was entering a well-lighted sitting room, full of comfort and good cheer.

Something St. Louis should be proud of. Something different. More sanitary. Not merely riding to get there, but taking a ride for pleasure. I think the individual chairs are great for comfort alone. I could stay in one and read all day with the utmost satisfaction.

I think the new seating arrangement very satisfactory. I was so comfortable that I was loath to leave the car.

Mighty fine. Privacy. Comfort and convenience. If you had cars like these on all your lines, we'd never ride the buses nor drive our own cars to work.



Forty-three individual bucket type seats are provided in the chair car as well as ample aisle room

Culvert Built Under Difficulties

By M. R. SUMNER

General Superintendent of Construction Pittsburgh Branch,
Byllesby Engineering & Management Corporation

MORE than usual difficulty was encountered in the replacement of the Girty's Run Culvert across the Millvale carhouse yard of the Pittsburgh Railways. An old rubble stone culvert of rectangular section, 10 ft. wide, 8 ft. high, and roofed with a stone arch, had been in use about 50 years and its weakened condition necessitated its replacement. The floor of the old culvert, originally of 10x16-in. white pine timbers was found to be worn to a 4-in. thickness in some places.

The new concrete culvert has a rectangular frame. While statically indeterminate and rather difficult to design, it permits simple construction, since it obviates the use of piling and permits a symmetrical arrangement

water. Both of these dams proved insufficient in times of high run-off or high river stages. The upper one could only divert normal flow, and in time of rain excess water delayed construction work. High water in the river washed out the lower dam a number of times where a No. 9 Pulsometer pump cared for normal leakage.

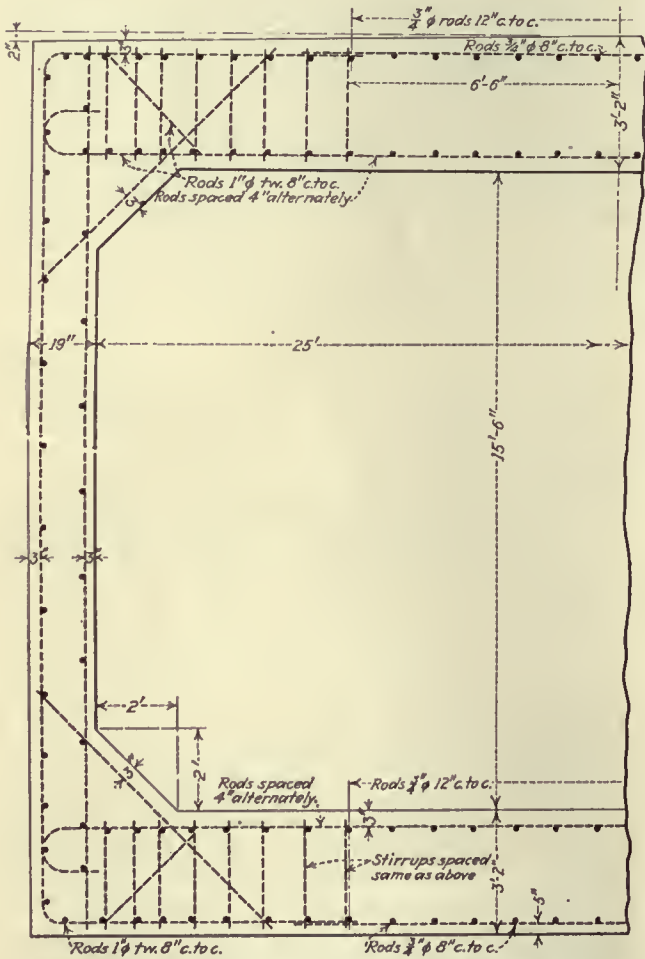
The work was started in July, 1927. High water halted the work from Nov. 25 to Dec. 6, and again from Dec. 12 to 20. The latter flood was the highest recorded in years. These floods necessitated excavation of one 28-ft. section three times, as each time the water filled in the trench.

Excavation was done by a stiff-leg derrick, aided at times by a steam shovel and a gasoline driven crane.



Building a culvert for Pittsburgh railways

In the center background is the old culvert channel, while the walls of the new are clearly shown. Some material remains to be removed before the new culvert is opened to its full width.



Cross-section of Girty's Run Culvert of Pittsburgh Railways

of the reinforcing steel. As completed, the new culvert is 201 ft. long, 25 ft. wide, and 15 ft. 6 in. high, and is roofed its entire length. The width was specified by an ordinance of Millvale Borough.

The normal flow of Girty's Run was diverted temporarily into a 36-in. sewer by a dam erected about one-quarter mile above the culvert, while water entering below the dam was run through a series of 4-in. pipes laid over the portion under construction. Another dam was built at the river end of the run to keep out back

The derrick services were limited at certain spots due to interference of the trolley wires in the carhouse yard. An engine foundation of masonry was uncovered that lay between 8 and 10 ft. below the surface and was 10x12 ft. in area, with a depth of 12 ft. This also had to be removed.

The concrete mixer was placed directly over each section as it was poured. The mixer was loaded by batch skips which were filled by hand. The skips were handled by the stiff-leg derrick. The job was handled under the supervision of W. J. Millington of the Pittsburgh branch of the Byllesby Engineering & Management Corporation and cost approximately \$100,000, being somewhat higher than originally anticipated, due to the presence of high water and other delays.

Taxes Doubled in Eight Years

THE single item of taxes and compensation paid the city by the Chicago Rapid Transit Company, operating the elevated lines in Chicago, gives an idea of the way in which operating expenses have increased. For the year 1919 the taxes paid by the company were \$908,057. For the year 1927 the amount was \$1,755,365 —almost doubled in eight years.

International Association Meets at Rome

Reports on one-man car operation, track design, radial trucks, fare collection and construction of reservations were presented and discussed. The association was organized in 1885, and the Rome meeting was the 21st in its history

REPORTS have been received of the opening sessions in Rome of the 1928 Convention of the Union Internationale de Tramways de Chemins de fer d'Intérêt local et de Transport Publics Automobiles. The last convention of this association was held in Barcelona in 1926.

The first meeting of the Rome Convention was held in the Senate Room at the National Capitol in Rome. As the Senate was not in session, this auditorium was placed at the disposal of the association by the Italian government. The convention continued from May 6 to 12. It was followed by a trip through northern Italy, during which the delegates had an opportunity to in-

spect the electric railway systems in Turin and Milan.

The association was organized in 1885, and the meeting this year was the 21st in its history. It was also the first meeting of the association to be held since the war at which delegates from Germany and Austria have been present. The reunion in one association of railway representatives from the former belligerent countries was brought about through the efforts of railway managers from certain of the countries which were neutral during the war, such as Holland and Switzerland.

Abstracts of some of the papers presented at the Rome Convention are published in this issue. Others, with a report of the meeting itself, will appear in later numbers.

Radial-Axle Cars

BY CHARLES HARMEL

General Manager, Liège Consolidated Street Railway Company, Liège, Belgium

RADIAL car axles always have had a number of advocates in Europe. The experience with them has been varied. The results of replies received from a questionnaire are given in the accompanying table. The Albrecht truck, at Ruhrort, is used in connection with Cardan drive motors.

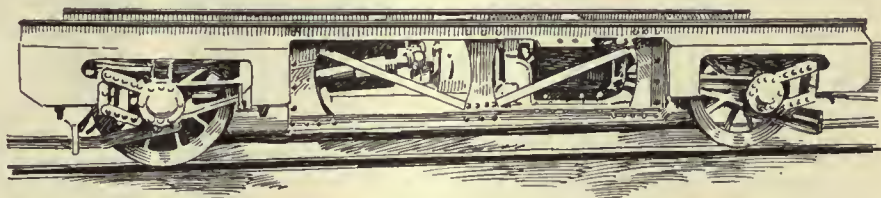
It must not be forgotten that the axles of a moving motor car are subject to the force of propulsion as well as the reaction caused by the contact of the wheel flange and the rail guard. The couple resulting from these forces tends to prevent the axles from taking a radial position on the curve. Even an absolutely free axle will not do so entirely, because as the wheel on the outside of the curve tends to take this position, the reaction from the wheel on the inside of the

curve tends to keep the axle at an angular position.

Efforts of truck designers to produce radial action of car axles on curves may be divided into three classes, depending on the location of the force needed for radiation, namely: (1) if at the center of the axle, (2) outside of the axle toward the ends of the car and (3) be-

tween the axles towards the center of the car. It is the opinion of the author that only those radial axles depending on the third principle will give satisfaction. This principle naturally calls for a three-axle truck. Several of these have been designed. One developed by P. Algrain of the Croyère Company, will be tried on the Brussels system.

Based on the same principle the Winterthur Locomotive Works has built an experimental car, equipped for Cardan drive, in which the motors are mounted on small four-wheel trucks between the two driving axles. This car has been



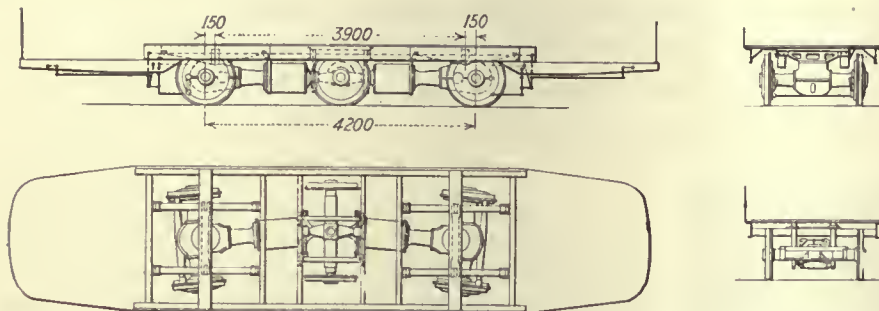
Albrecht-Krupp radial axle truck designed for Cardan drive

SUMMARY OF RADIAL AXLE SITUATION IN EUROPE, BASED ON QUESTIONNAIRE

Name of System	Number of Cars With Radial Axles	System of Radial Axles Used on Motor Cars	Results Obtained	Comments
Paris Surface Lines	8 m.c.	Exterior axle type with two diagonal connections.	Radiation defective, bad effect on track, maintenance costly.	Radial axles will be abandoned in favor of fixed axles.
Bordeaux	114 t.c. 9 cars	Delmez system without any connections.	Radiation good, economy of energy shown, less tire wear.	Will standardize on this type.
The Hauge	5 cars	Kamp system, one diagonal connection.	Test being conducted.	.....
Glasgow	2 cars	.....	Test being conducted.	.....
Leeds	200 cars	Central axle type with two connections.	Less wear on tires, better traction.	Will standardize on the radial system.
Baale	82 m.c. 68 t.c.	Link axle system with no connection.	Radiation defective but not much difference in tire wear than with fixed axles.	Expect to abandon.
Geneva	6 cars	.....	No radiation found.	Will abandon.
Liège	6 m.c. 12 t.c.	Kamp system.	Radiation favorable but not perfectly fulfilled.	Will continue trial.
Ruhrort	4 m.c.	Albrecht system with axle support on horizontal arms.	Radiation favorable, economy of energy, less wear.	Will standardize on this system



Early Zurich radial axle truck for Cardan drive



In the latest design for Zurich, a center axle takes the place of a guiding truck. This axle does not carry any weight of the car body. The car is shown on a curve of 17-meter radius

put in experimental service in Zurich (see *ELECTRIC RAILWAY JOURNAL* for Aug. 21, 1926, page 297), and another car is being built for Luxembourg. The Luxembourg car will have a wheelbase (distance between driving axles) of 5 meters (16 ft. 5 in.), while the small interior driving truck carrying two motors, will have a wheelbase of 2 meters (6 ft. 7 in.) This car rounds a curve with a radius of 15 meters (49 ft. 3 in.) The latest design in which the single

axle takes the place of the central truck is shown in the diagram above.

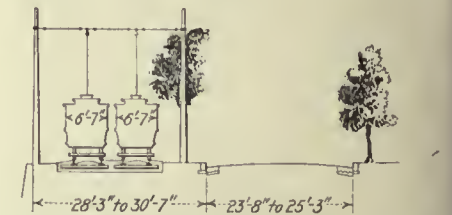
The trial in Zurich has been too short to give any definite results.

In conclusion, it might be said that parallel axles can properly be used on roads not having short radius curves and where the wheel base does not exceed from 10 to 11½ feet. Elsewhere axles which actually radiate are worth considering, providing their maintenance is not too high.

the portion of the street used for vehicular traffic by curbing or other means.

A number of different types of such reservations exist in European cities. Several are reproduced in section in the accompanying small sketches. The first section shows a construction suitable for locations such as along the sides of rivers, canals or steam railroad lines. It is used in Marseilles.

In the second, used on a highway between Paris and Meaux, the tracks are between the sidewalk and the street. This arrangement makes the cars very easy of access from the sidewalk. Some of its disadvantages are: There is greater danger of collisions at cross streets, street vehicles cannot easily reach the sidewalks for loading and unloading, and if track repairs have to be made it is complicated to shunt cars from one track to the other. On the whole, the plan does not help much in increasing the speed of the cars.



Construction used in Marseilles and suitable for routes adjoining a river, canal or steam railroad line

The third section, where the reservation is in the center of the street, shows a better arrangement. It is possible in streets 85 ft. 4 in. wide to leave a space 19 ft. 8 in. for the cars, 18 ft. on each side for vehicular traffic and 14 ft. 9 in. for the sidewalk, but it means that the span poles will have to be placed in the curbs. A better construction, where the width of the street permits, is that shown in the fourth section. It is the plan recommended by the Milan Highway Congress in 1926. With a width of 29 ft. 6 in. for the reservation, it is possible to use center poles and erect loading platforms for the cars on the reservation. A slightly greater width permits the construction used on the Corso Stupinigi in Turin, shown in a view on page 859. Here slow-moving vehicles use the outside highways, and a center highway is reserved for fast-moving vehicles.

From the standpoint of the railway, reservation construction has many advantages, including lower first cost and maintenance for track, lower energy

Electric Railway Construction on City Reservations*

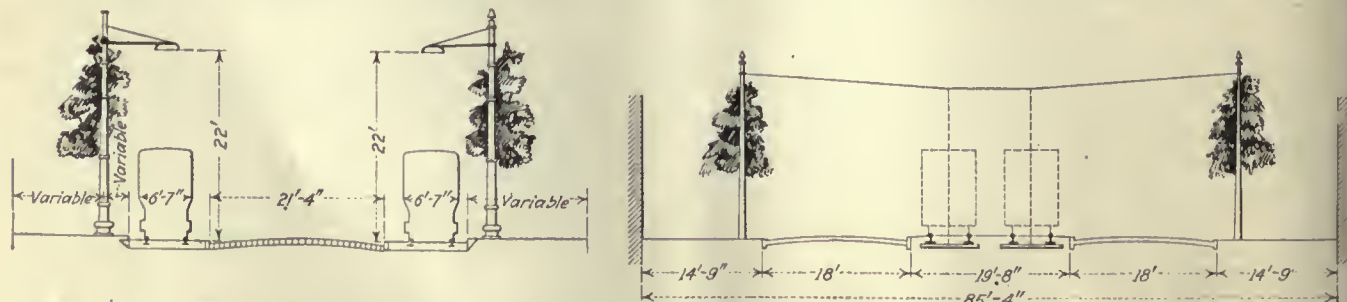
By J. LENARTOWICZ

Assistant Manager Warsaw Tramways, Warsaw, Poland

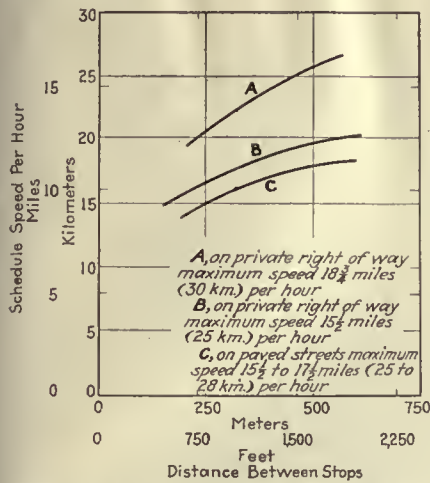
PROVISION for adequate passenger transportation is a necessity in proper city planning understood better now than formerly. In emphasizing this need, reports presented at previous meetings of this association have had an important part. Adequacy in this connection is understood to mean sufficiency both in capacity and in speed. The time which a passenger has to take for travel between his home and his business usually has an important influence on his choice of the locality which he will select for his residence. To care for this transportation, areas added to large cities should be provided

with broad radial avenues as well as belt or crosstown boulevards on which electric cars can operate.

Preferably the track should be laid in a reservation in these streets rather than in the portions of the highway devoted to other traffic. If the latter plan is followed, the car schedule speed can rarely be higher than from 7½ to 8 m.p.h., falling to 5½ m.p.h. in the narrow congested streets in the center of the city. On the other hand, on reservations, a speed of from 12½ to 15 m.p.h. can be obtained between stops. Except at street intersections, such reservations should be separated from



The section at the left shows construction between Paris and Meaux. While car loading is easy, this design has serious disadvantages. A better plan, where space permits, is shown at the right



Relation between maximum and schedule speeds and distances between stops

consumption, higher speed, fewer accidents and less noise. On such routes a schedule speed of 12 m.p.h. should be attained, based on a maximum speed of 15 1/2 m.p.h., stops 1,443 ft. apart and eight seconds in duration, an acceleration rate of 1.4 m.p.h.p.s. and a braking rate of 2.25 m.p.h.p.s. On the Corso Stupinigi in Turin, cars make a schedule speed of 12 1/2 m.p.h., with a maximum speed of 15 1/2 m.p.h. and distance between stops of from 2,300 to 2,600 ft. Other companies operating over reservations report maximum speeds of 18 3/4 m.p.h. The accompanying graph of possible schedule speeds has been compiled by Prof. E. Giese of Berlin, based on seven-second stops, an acceleration rate of 1.7 m.p.h.p.s. and a braking rate of 2.5 m.p.h.p.s.

The speeds obtained on street railway lines in reservations approximate those on rapid transit lines, and while these routes have the disadvantage that they have to conform to the grades of streets and are handicapped by frequent street intersections, they are far less expensive to construct than subways or even elevated railways. Moreover, the cars are much more accessible to passengers. Later, if future development in city growth seems to demand the construc-

tion of rapid transit lines, one can be built as an elevated or subway either above or below the reservation much more economically than if no reservation existed.

To permit the highest rate of speed on reservations, overhead or underground crossings for pedestrians and vehicles should be substituted for grade crossings where possible.

One-Man Car Operation in Holland

By P. M. NIEUWENHUIS
Manager of Municipal Tramways, Arnhem, Holland

IF THE results with one-man cars have been less satisfactory in Europe than in America the reason has been largely because a lack of capital to purchase new cars has induced many properties to try to use old and unsuitable cars for one-man service. American practice dictates in the one-man car the need for platform doors or gates which can be kept closed when the car is in motion. We have followed this practice in Arnhem, where since January, 1924, one-man cars have supplied all the service. Our first trial was with a car with a capacity for 18 seated and 14 standing passengers, with entrance on the front platform. For larger cars, or those holding 25 seated and 19 standing passengers, front entrance and rear exit are used, with manually operated doors or gates, interlocked with the controller. The arrangement on the rear platform is such that it is impossible for a person to enter from the rear, and we have suffered no trouble from this source. What in effect is a dead-man's handle has been added to the controller, but the spring on the controller handle is held down by a pedal, instead of by a button, as in the American design.

On our city lines we have a flat fare of 10 Holland cents (4 American cents), and the passenger is requested to have the exact amount ready. As fares are paid, the passengers receive receipts which entitle them to transfer to any other line, provided they keep traveling in the same direction. The time limit is indicated on these tickets by a pencil mark. The operator marks up a number of tickets in advance of each trip. On interurban lines zone-fare tickets are used, but as many pas-

sengers on these lines use commutation tickets which simply have to be shown to the operator, fare collections are not complicated. We estimate our savings at 6,000 florins per year per motor car.

Six other cities in Holland use one-man cars, namely Amsterdam with 700,000 inhabitants, Haarlem with 80,000 inhabitants, Groningen with 100,000 inhabitants, Leyden with 60,000 inhabitants, Utrecht with 150,000 inhabitants, and Enschede with 40,000 inhabitants. In most of these, entrance and exit are on the front platform, but only the cars in Amsterdam and Arnhem have separate passages for exit and entrance. Door and step mechanism usually is manual.

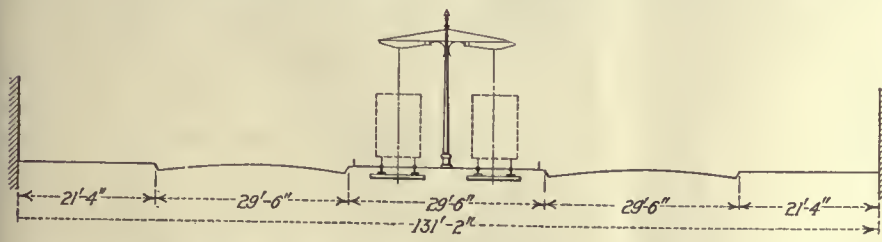
The Amsterdam service was begun in 1924, originally with five cars on a route with a fairly busy service (averaging 24 passengers per car-mile). Fare boxes are used and as in Arnhem the "dead-man's control" pedal is used. The doors and steps are actuated by a 1/2-hp. electric motor carried in the hood and interconnected with the controller. This mechanism operates about 200 times a day, but during four years has caused no trouble. When the brakes are set a red lamp lights in front of the operator and burns as long as the brake circuit is closed. Another red lamp on the platform lights when a passenger presses a push button and remains burning until the exit door is opened. Smoking is allowed on the rear platform. The front of the car carries a sign that the car is run by one man. Amsterdam has now about 100 one-man cars in service.

After some trial with entrance and exit in front, the exit in Amsterdam was changed to the rear, and the rear platforms were supplied with turnstiles to prevent unauthorized entrance. The city authorities took a hostile position to them, however, on the ground that they would impede rapid exit from a car in an accident, and the turnstiles were given up.

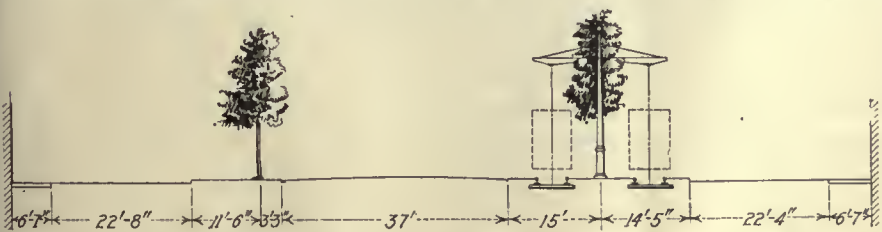
Tickets are issued by an automatic ticket-issuing machine.

There has been no reduction in schedule speed with one-man car operation. In fact, we found one-man cars have higher schedule speed than the former two-man cars.

Similar satisfactory results have followed one-man operation of motor buses in Holland. The principal points in the success of one-man car and bus operation is to adopt equipment which will enable the public to board and alight from cars quickly, to teach them to do so, and to secure the co-operation of the personnel.



This center arrangement of tracks was indorsed by the 1926 Milan Highway Congress



On the Corso Stupinigi, in Turin, the outside highways are for slow-moving vehicles and the center for fast-moving vehicles

Parallel Versus Radial Axles for Cars

BY JEAN CASTAING,
Chief Engineer of Rolling Stock, S. T. C. R. P.
(Paris Surface Railway and Bus Lines)

PROPER car body and truck design has been the subject of a number of reports presented to this Association. This year a questionnaire was sent out on the use of parallel and radial axles, and 26 companies replied. This report discusses the relative merits of parallel and radial axles. Another report gives data on recent designs of radial trucks.

The number of cars owned by the 26 companies which replied to the questionnaire is given in the accompanying table.

TABLE I—SHOWING CLASSIFICATION OF ALL CARS OF THE 26 COMPANIES REPLYING TO THE QUESTIONNAIRE

	Motor Cars	Trail Cars
Cars with four wheels and parallel axles	6,437	3,376
Cars with four wheels and radial axles	897	40
Cars with eight wheels and double trucks	1,056	727
Totals	8,390	4,510

As will be seen, the cars with radial axles make up only 10.7 per cent of the motor car group and 9 per cent of the trail car group.

Omitting consideration in this total of double-deck cars, whose use has been almost completely given up on the continent of Europe, the motor cars in this table range in capacity from 30 to 70 passengers and the trail cars from 30 to 80 passengers. The width of the cars varies from 6 ft. 4½ in. to 7 ft. 3 in. The over-all length of the motor cars varies from 25 ft. 3 in. to 45 ft. 10 in. and that of the trail cars from 20 ft. 4 in. to 41 ft. 4 in. With very few exceptions the minimum curve radius on the lines replying to the questionnaire is not less than 49 ft. 2 in. (15 meters). The problem presented then is how to get cars varying in length from 20 ft. to 45 ft. around curves with a 50-ft. radius, with a gage of from 4 ft. 8½ in. to 4 ft. 8¾ in.

The rule for a long time on this subject has been that single-truck cars, whose wheelbase does not exceed 10 ft., should operate easily around a curve whose radius is not less than 50 ft., and that cars whose wheelbase is not less than a third of their over-all length will run without nosing or teetering.

To avoid excessive wheel and rail wear as well as energy consumption on curves, efforts have been made to design radial axles which would be satisfactory, but though this effort has

been going on almost since the birth of electric traction, the table shows that of the companies replying to the questionnaire only about 10 per cent have their rolling stock so equipped. The writer hopes to show that for most conditions, on lines which have no curves with a shorter radius than 59 ft. (18 meters), single trucks with non-radiating axles are entirely practicable, notably on cars from 20 ft. to 30 ft. in length, and even up to 36 ft. in length.

The motor cars listed in the table can be divided into three groups as follows: (1) Cars without trucks but with motors connected to the axles by nose suspension; (2) cars on independent trucks and motors with nose suspension; (3) cars without trucks and with motors entirely spring supported. Each of these groups may further be divided into cars equipped with pendulum-action journal boxes (like the Peckham) which permit a slight lateral movement of the car body, and those cars which are not so equipped.

PARALLEL AXLES USED ON ROADS WITH A VARIETY OF CONDITIONS

From the replies submitted to the questionnaire, those from six representative properties operating four-wheel cars with parallel axles were selected. The wheelbases on these cars vary from 9 ft. 2 in. to 12 ft. 6 in., yet they operate without noticeable wear of the wheels and rails or consumption of energy about curves varying in radius from 50 to 66 ft. If this is possible on the properties mentioned, it would seem as if on the few properties out of the 26 reporting which feel they must have radial axles, the trouble must be due to improperly designed rail grooves or wheel flanges or both. The proper design can be determined. [The report then gives a geometrical treatment of the subject, recommends various wheel-flange sections for different rail sections and various lengths of wheelbase and wheel diameter, and presents an account of an experimental truck developed in Paris to confirm the conclusions reached theoretically as to the desirability of parallel axles. This part of the report is followed by a mathematical discussion of the action of various designs of radial-axle cars on curves, to show that the effect of the forces

to which these cars are subjected is to compel one or both of the axles to take a non-radial position.—Eds.]

Companies which have tried radial axles but have given them up include properties in Basle and Geneva, Switzerland, Nuremberg, Germany, and Paris, France. Only two of the companies replying, that at Leeds, England, and Bordeaux, France, definitely prefer cars with radial axles.

The principal charges against parallel axles are greater rail and wheel wear and greater energy consumption on curves. Unfortunately, there is no evidence on rail wear, and that on wheel wear in the replies to the questionnaire is very inconclusive. Nuremberg and Paris estimate wheel wear at 25 per cent less with parallel than with radial axles, Bordeaux puts the figure at 30 per cent, while Leeds, one of the advocates of radial axles, finds no material difference in this respect.

TESTS MADE IN PARIS

There is also some difference in evidence on energy consumption, but on this point figures are available on four different types of equipment on the same property, namely the Paris Surface Lines. Four types of cars were tested, namely: type L, with four wheels, Cardan drive and no truck; type G, with a single truck and nose suspended motors; type B, with two maximum traction trucks, and a car with two radial axles, known as type A.B.M. The three cars first mentioned had parallel axles. The accompanying table gives the energy consumption, etc., of these cars operated without trailers. From this table it will be seen that car L has the lowest energy consumption per tonne-kilometer and lowest average tractive effort per tonne, and that in kilowatt hours per tonne-kilometer the radial axle car showed the greatest energy consumption. Tests were also made with the same cars hauling trailers and they finished in the same order as before. Still another test was made with the type G car, equipped first with parallel and then with radial axles. The radial axles were connected by a lever and springs in various ways and also were operated without any such guides, but in no combination was the energy consumption so low as when the axles were kept permanently in a parallel position.

In conclusion, then, where the wheelbase does not exceed one-fifth of the minimum curve radius, parallel axles appear more desirable. With a minimum curve radius of from 59 to 66 ft. cars up to 33 ft. to 36 ft. in length are practicable. Where such cars do not weigh more than 44,000 lb. they can be carried on four wheels, yet not exceed the desirable limit of 11,000 lb. (5 metric tons) per wheel. For heavier cars, as well as for high-speed inter-urban service, double trucks are necessary. In either case, full spring-supported motors, with braking on the armature shafts, should be used, as on the type L car in Paris.

TABLE II—TESTS ON PARIS SURFACE LINES WITH DIFFERENT TYPES OF EQUIPMENT

	Type L, Parallel Axles without Truck	Type G, Parallel Axles with Truck	Type B, Two Max. traction Trucks	Type ABM, Radial Axles
Weight during test, kg	13,150	15,200	16,750	13,380
Wheelbase, meters	3.6	3.6	1.51	3.8
Kw.-hr. per car km.	0.361	0.433	0.521	0.459
Watt hours per tonne-km.	27.5	28.5	31.15	34.1
Tractive effort in kg.	132.6	159.2	191.7	169.1
Average tractive effort per tonne.	10.09	10.48	11.45	12.55

Railway Weather Bureau Aids Snow Fighting

Third Avenue Railway successfully operates a department to forecast storms. Finds it valuable in maintenance

DEMONSTRATION that a private weather bureau can be an invaluable aid to street railway operation, has been obtained during the past four years by officials of the Third Avenue Railway System, New York City. The bureau was started with a cheap aneroid barometer. A vane was rigged up on the top of the company's building. Next a box showing the main and intermediate points of the compass was located in the office of the transportation department. This was hooked with the weather vane by an eight-sector commutator, so that as the weather vane rotated it flashed lights designated as North, South, East, West, etc. From the bureau's inception, accurate observations have been kept every hour during every snow storm. They consisted of barometer and thermometer readings and data as to the direction of the wind.

According to Mr. Thompson, it took only two or three storms to demonstrate clearly that they usually travel in about the same direction, and that changes of wind bring about the same effect each time. There are exceptions, however, in the nature of freak disturbances to which the United States Weather Bureau has given the name of "dumb-bell storms."

In these incidents, two storms are traveling parallel so that the low pressure areas are overlapping from time to time. In such circumstances the observer is likely to be misled by the strange antics of the barometer. Among all the storms, which have been studied by the Third Avenue Railway's bureau, however, there have been only three that did not run true to form.

Observations made during four years show that whenever there is a snow storm, the barometer indicates when the center of it is approaching the locality where observations are being made. The bureau, by means of its weather vane and barometer, in connection with the daily maps issued by the United States Weather Bureau, which show low and high pressure areas in the country and their degree, is able to tell whether or not New York is in the path of the center of a storm. This is one of the outstanding advantages of the bureau and one that has saved the Third Avenue system not only a considerable monetary loss but nervous strain on the part of operating heads.

Experience of the Third Avenue shows that when the barometer begins to rise and the wind to shift from northeast toward the east and the southeast, it is invariably followed by a warm spell. If the barometer keeps on falling and the wind shifts from the northeast to the east, and on to the southeast, this is almost an infallible sign of rain. Under either of these conditions it is perfectly safe to leave a considerable fall of snow on the ground because rain or the warm spell will do the work of many men in removing snow.

On the other hand, if the wind is backing from the northeast to north and on to the northwest, if any snow is left on the ground it is certain to freeze. This means that the railway must clean up as quickly and thoroughly as possible after the storm because whatever is left on the ground will present a serious problem.

Probably the principal advantage of the company's bureau is that it enables transportation heads to predict the duration of a storm. When this is known, a comprehensive idea is gained in the matter of handling equipment. If the storm is to be short, and equipment has not suffered any severe strain, it appears safe to keep it on the road, so that a clean-up can be made as soon as it stops snowing. If, on the other hand, there are indications of a disturbance of considerable length, equipment is pulled in and measures taken to put it in shape for a long job.

THE BUREAU HAS PROVED ITS WORTH

When the bureau was first started it was accepted with a measure of skepticism, yet, according to officials, there has not been a storm in the last two or three years that has not resulted in many calls from other departments for information as to the state of the barometer.

The barometer, however, is not accepted as infallible; the experts have recourse to the U. S. Weather Bureau's predictions, which are furnished twice daily for publication in the press. This information is made up for the morning papers at 10 o'clock in the evening and at 10 a.m. the following day for the afternoon papers. When there is a change in the data, the government bureau in New York has always helped the Third Avenue weather department, by giving revised predictions.

As soon as means will permit it is proposed to add to the equipment an instrument to measure the velocity of the wind. This will be of great assistance in foretelling the probability of drifts.

Up to date the bureau equipment has cost less than \$300, and its installation has resulted in a great improvement in service during and after snow storms. There also has been an appreciable saving in maintenance costs.

A Popular Street Car!

CONSTRUCTION has just been completed of two experimental cars of similar types for the Pittsburgh Railways. These cars were designed with the object of improving service and providing greater attractiveness to the public. The company considers these cars an improvement of vital importance in meeting automobile competition. An article telling of the salient features and the innovations on these cars will appear in an early issue. Watch for it!

Advance Publicity Brings Large Vote

MUCH interest was shown in the recent balloting on a few lines of the St. Louis Public Service Company, St. Louis, Mo., to determine whether the rear entrance pay-as-you-enter system or the front entrance pay-as-you-leave system was preferred. The final results showed that on 949 cars a total of 303,000 votes were cast, a number representing a comparatively high proportion of the riders. The interest was not confined, however, to the day of the vote. Newspapers published advance stories and comments, and many discussions were engaged in by employees and customers.

Three days before the vote was taken, brightly colored

To Our Patrons

Which Do You Prefer?

**Front Entrance on this car
or
Rear Entrance, as we used to have.**

A vote will be taken February 27th.
Ballots and boxes will be in this car.

ST. LOUIS PUBLIC SERVICE COMPANY

This notice was placed in all the cars on the line where the entrance change was being considered, three days before the vote was taken

notices were posted in all the cars where the change was being considered. These notified the patrons when the vote was to be taken, and clearly stated the issue. On the day of the balloting, the notices were covered by new ones requesting that the riders vote on the question and giving instructions on how to secure the ballots and where to deposit them. The ballots, one of which is shown in an accompanying illustration, gave a full explanation of the two entrance systems and provided a convenient means to cast a vote.

When the patron boarded the car on the front end he was handed a ballot by the motorman and this was deposited in the ballot box at the rear door when he left

If

you prefer Rear Entrance, the *Just tear off this Corner*

old method of boarding this car

**Drop this Card In
box at Rear Door.**

If

you prefer Front Entrance, as *Just tear off this Corner*

now in effect on this car

(See other side for explanation)

The voter indicated the type of entrance he preferred by merely tearing off the proper corner of the ballot. Detailed information was given on the opposite side

the car. The final count showed 63 per cent in favor of the rear entrance, the system formerly used, and 37 per cent in favor of the front entrance. Plans were immediately made by the company to put the change into effect.

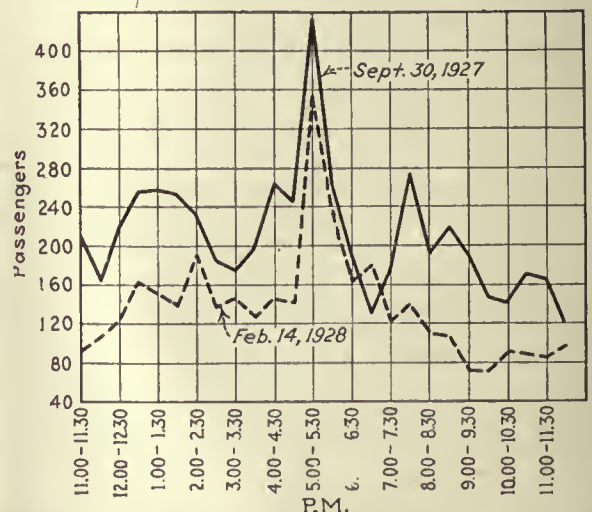
Surface Lines Shows Interesting Movie

"SAFE HIGHWAYS" is the subject of a new motion picture film produced by the Chicago Surface Lines for presentation in schools and before civic and community clubs and other non-theatrical audiences. This picture treats the entire traffic problem from the standpoint of safety. Since most traffic accidents result from the operation of automobiles, the picture undertakes to teach the automobile driver and the general public safe practices. The scenes in the picture illustrate the danger of pulling away from the parking space at the curb without looking to see what is coming, passing a street car on the wrong side, passing a loading street car where there is no loading zone, trying to beat the automatic signal by crossing the street on the yellow light and several other dangerous practices.

The pedestrian sees the danger of alighting from a street car without looking, in walking back of the car into the opposite lane of traffic and in crossing the street without due caution. For the children there are scenes cautioning them against stepping into the street while traffic is passing, playing in the street or stealing a ride by hooking on behind a wagon or truck.

This is the fourth picture produced by the Chicago Surface Lines in the past three years. The experience with earlier pictures convinced the management that there is no better way to drive home a lesson.

Checks Indicate Jitney Decrease



The two curves indicate a decided decrease in the number of passengers carried by jitneys on Jefferson Avenue, Detroit

CHECKS made on Sept. 30, 1927, and Feb. 14, 1928, with respect to jitneys in service on Jefferson Avenue, Detroit, indicate a decided decrease both in the number of passengers carried and the corresponding number of jitneys in service. The checks, made by the traffic division of the Department of Street Railways, covered a thirteen-hour period, from 11 a.m. to 12 o'clock midnight and show passengers by half hours. It is believed that the decrease has been caused by the express trolley and local bus service instituted on Jefferson Avenue.

Maintenance Methods *and* Devices

Keeping Motor Fields in Good Condition*

By R. T. CHILES

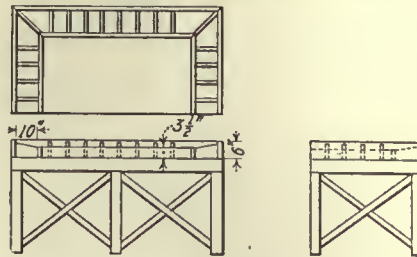
Master Mechanic Cumberland County Power & Light Company, Portland, Me.

CAREFUL attention to motor fields has been one of the most profitable maintenance practices of the Cumberland County Power & Light Company. During the year 1926 there was but one field failure for every 428,658 motor-miles operated. Of these failures 70 per cent occurred during February and March, when snow and rain increased the number of failures.

Cars are overhauled on an average of once in three years, or on a 125,000-car-mile basis. At this time motors are removed from the trucks and the fields are removed from the motor cases and sent to the field room, where they are tested, the insulation is examined and if found to be baked it is removed and new insulation is applied. The fields are then heated and submerged in a tank of air-drying P.&B. insulating paint, where they remain one hour and are then removed for drying. A second coat is applied with a brush, and this is allowed to dry, after which the terminals are cleaned carefully. After fields are put in the motor cases they are given another coat of paint. Lead wires are examined carefully to insure good connections and fields are tested for polarity and grounds before the armature is installed. The fields are also cleaned and painted every time it is necessary to remove an armature.

Work Bench With Material Racks

PRODUCTION has been increased and maintenance expense decreased by an improvement which has been added to the work benches in the shop of the New York & Harlem Railroad, New York City. This consists of a number of bins on top and around the sides of the bench. These bins are 6 in. high in back, 3½ in. high in front and 10 in. wide. They are



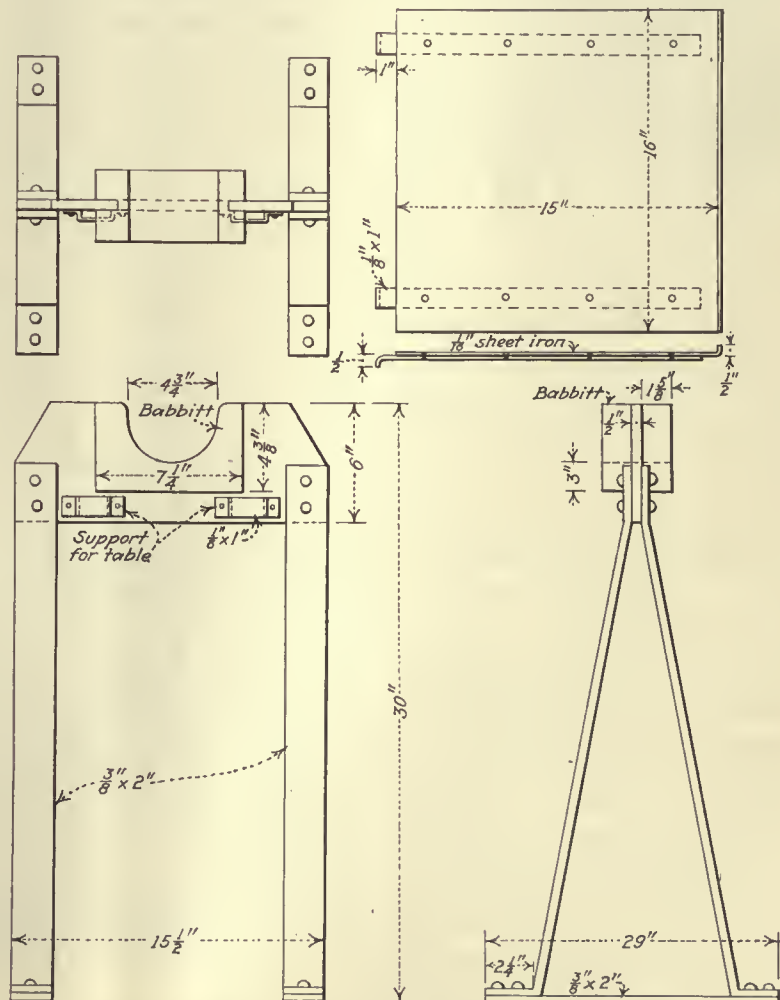
Material racks added to bench increase production

made of ¾-in. lumber. The inside dimensions are of various sizes in order to accommodate the different sizes and shapes of material necessary for the repair work. These benches were flat previously and the material was scattered around on top, which resulted in some being lost. With the new arrangement the assorted material is stored in these bins and it is within easy reach of the

mechanic. These bins have eliminated the loss of material and the workman's time in going for it.

Babbitted Bearing Armature Stands

BABBITTED bearings instead of rollers are used in the winding stands in the armature room of the New York, Westchester & Boston Railroad, Westchester, N. Y. These stands are of novel design. The uprights and bottom plates are made of ¾x2-in. bar, riveted to a ½x6-in. plate at the top. The bearings are made of solid babbitt molded on the top plate. The shaft-bearing surface is 4¼x3¼ in. All parts are riveted with ½-in. rivets. Slight lubrication of the surface of the babbitt makes rotation of the armature easy. The top cross-



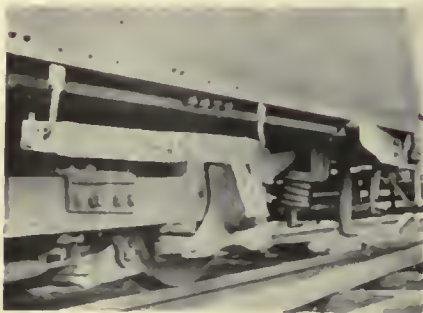
At left, armature stand with babbitted bearings. Above, at right, table for attaching to stand

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

members have clips for the support of a small table made of No. 16 sheet steel. The table is supported by $\frac{1}{2}$ x1-in. brackets.

Numbering Drawbars by Welding

POSSIBILITY of serious service interruption always is present unless the proper coupling facilities are available. The Jamaica Central Railways, Jamaica, N. Y., operates several types of cars, on all of which drawbars are carried on hooks fastened to the side sill. The coupling link centers are all alike

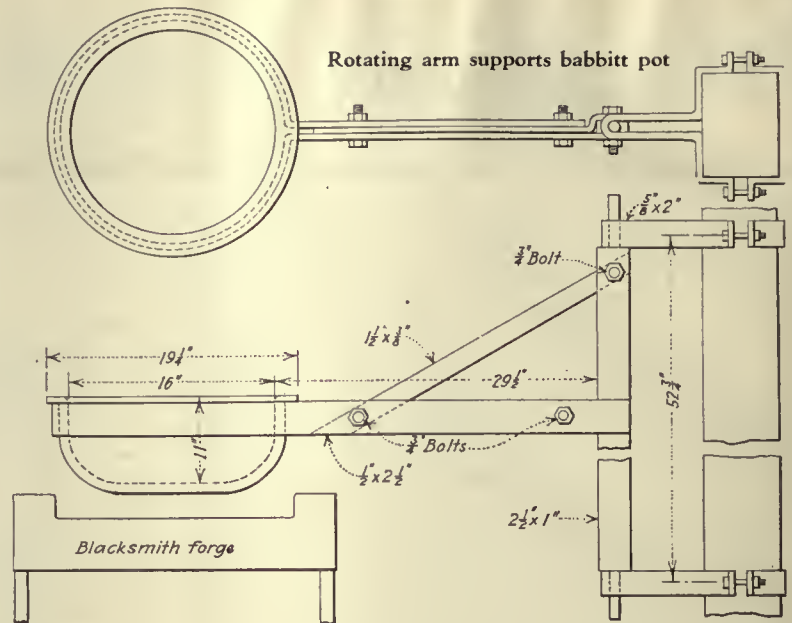


Car numbers are welded on the drawbars

but the shape is slightly different for each type of car. Trouble has been experienced in the past with drawbars being interchanged on the various types of cars. To eliminate this trouble the number of the car to which it belongs is welded on the flat surface of the drawbar. The cars are checked daily and if any drawbars have been interchanged it is evident. Some of these cars operate over tracks belonging to other companies, and when drawbars have gone astray it has been difficult to distinguish them. With the new idea it is very easy to identify them.

Blacksmith Forge Heats Babbitt

WHERE the shop floor space is limited the forging and babbitting work can be performed in the same section. The Manhattan & Queens Traction Corporation, Long Island City, N. Y., has found this arrangement economical. Here the babbitt is heated over the blacksmith fire. To accomplish this result and eliminate the handling of the babbitt heating pot it was necessary to design and build a special structure. This consists of a gaff 58 $\frac{3}{4}$ in. long and a boom 48 $\frac{3}{4}$ in. long, both being made of 1x2 $\frac{1}{2}$ -in. material. Each end of the gaff, for a length of 4 in., is



rounded and fits into two $\frac{5}{8}$ x2-in. brackets clamped to a column of the building. This arrangement provides for a 180-deg. circular movement of the boom. The end of the boom is clamped around the babbitt pot under the flange. A 1 $\frac{1}{2}$ x $\frac{3}{8}$ -in. diagonal brace fastened to the boom and gaff provides additional strength and prevents flexure of the parts. All parts are bolted together with $\frac{3}{4}$ -in. bolts. With this arrangement the babbitt pot can be swung over the fire or rotated out of the way when not required.

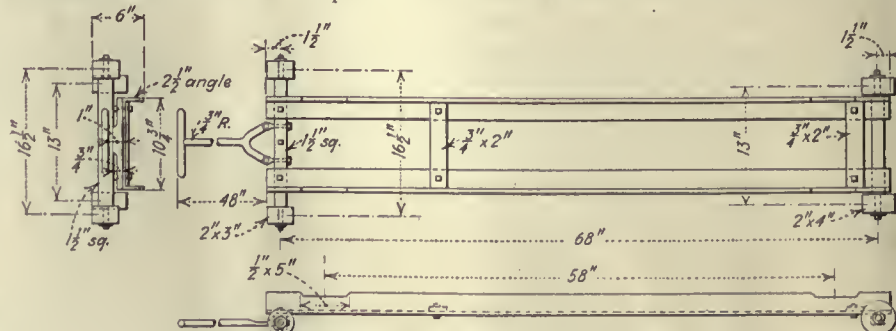
Hand Truck to Transport Wheels

SOME railway systems have one or more inspection houses at some distance from the shop and it is found advantageous to change wheels during the inspection period. Very often the carhouses are not equipped with a traveling crane or telfer for handling the wheels from their place of storage to the point of installation. Some means must be provided for transporting the wheels. A short I-beam equipped with a chain hoist is installed over the wheel pit in the

inspection shop of the New York & Harlem Railroad, New York City. Due to the layout of the building the wheels are stored at some distance from the hoist. When the carhouse is filled with cars some means must be provided for transporting the wheels along the floor to the wheel pit. This is done by a hand truck designed and constructed in the shop for this purpose. It consists of two 2 $\frac{1}{2}$ -in. angles, 71 in. long, spaced 10 $\frac{3}{4}$ in. apart and tied together with $\frac{3}{4}$ x2-in. straps. Each angle is provided with two $\frac{1}{2}$ x5-in. notches spaced 58 in. centers for the support of the wheels during transportation.

A 1 $\frac{1}{2}$ -in. square axle in the rear end of these angles carries two 4x2-in. steel wheels spaced on 13-in. centers. The front end has a 1x2-in. bolster to which is fastened a 1 $\frac{1}{2}$ -in. square axle. They are held together with a $\frac{3}{4}$ -in. king pin. This axle is equipped with two 3x2-in. steel wheels spaced 16 $\frac{1}{2}$ in. centers. The height of the truck above the floor is 6 in. A 4-ft. handle made from $\frac{3}{4}$ -in. round iron provides for easy movement.

This truck has been found very serviceable and provides a means for handling both the old and new wheels under all conditions.



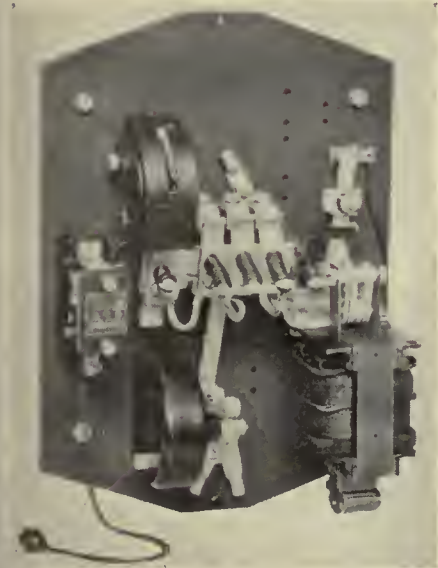
Convenient truck for handling wheels

New Equipment Available

Starters for D.-C. Motors

DIRECT - CURRENT motor starters for general purposes, forming a complete new line, have been introduced by the General Electric Company, Schenectady, N. Y. These starters are designed to provide definite-time acceleration for constant and adjustable-speed motors, and are divided into five types bearing the designations CR-4065, CR-4066, CR-4166, CR-4068 and CR-4168. A principal advantage is that, despite a reduction in size, the number of accelerating points has been increased. An improved appearance is secured by the use of drawn-shell inclosing cases.

The CR-4065 starter is a constant-speed type for general purpose appli-



Typical starter with cover removed

cations, and the CR-4066 is similar with the addition of dynamic braking. The CR-4166 is an adjustable-speed type with dynamic braking and full-field features. The CR-4068 is a constant-speed type, reversing, with dynamic braking. The CR-4168 is an adjustable-speed type, reversing, with dynamic braking and full-field features.

The cover of the inclosing case hooks over two pins at the top of the box, the bottom being held by a screw. This is in accordance with the Underwriters' requirements.

On those starters with dynamic braking a small relay with its contacts connected in the pick-up circuit prevents the solenoid from being re-energized until the motor has come

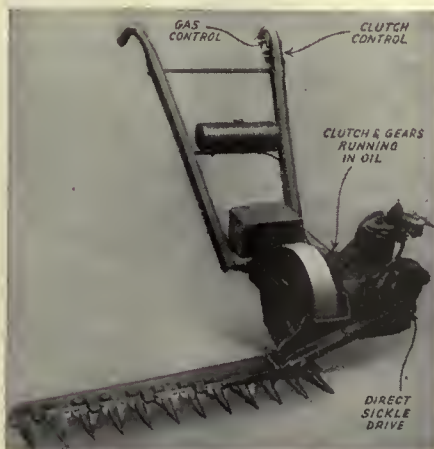


Mechanism of starter removed from case

to rest. Thermal overload protection is obtained by means of single-coil relays able to stand high in-rush currents. These relays operate only in extreme conditions and serve as a warning to the operator that the motor or wiring requires attention.

Gasoline Engine-Driven Mower

FOR CUTTING high grass and weeds along the right-of-way of electric railways a gasoline engine-driven mowing machine has been placed on the market by the Rawls Manufacturing Company, Streator, Ill. A four-cycle engine furnishes power for propelling and operating



New type engine-driven mowing machine

the cutter bar of the machine. Particular attention has been given to balancing so that the mower can be guided easily around any obstruction. It can be tilted for cutting up or down slopes and as it pivots on one wheel sharp corners can be turned easily.

The mower is propelled by a direct-gear traction-drive to the wheel with the cutter bar connected directly to a power take-off by means of pitman rod and balanced crank pin.

Automatic Tire Inflator

PREDETERMINED tire pressure may be maintained by an automatic tire-pressure inflator announced by the Yellow Jack-It Manufacturing Company, Chicago, Ill. The de-



New device for automatically maintaining tire pressure

vice is built on the air-compressor principle and requires no adjustments or oiling.

The construction includes a hardened cam mounted on the wheel spindle underneath the hub plate; a roller mounted on the end of a piston which follows the cam, and suitable connection to the tire valve. When the roller reaches the cam peak the air compression stroke is completed. At each revolution of the wheel air is forced past the intake valve into the inner tube. A check valve is provided which is set for the air pressure specified for the tire. When the pressure is up to the required amount the check valve functions and carries off the surplus air through the exhaust.

Proper tire pressure is maintained while the vehicle is in motion, and when the vehicle stops if there is a loss of air due to a slow leak or puncture which is insufficient to cause a flat tire the automatic inflator begins to function as soon as the car starts.

Association Activities

Midwest Association Announces Program

PRACTICALLY all phases of electric railway operation will be discussed at the annual meeting of the Midwest Electric Railway Association, June 4-6, in the Baltimore Hotel, Kansas City, Mo. According to the program, registration will begin at 9 o'clock Monday morning and the regular sessions at 10 a.m. Following is the three-day program of the association, as announced:

MONDAY, JUNE 4, 1928

BEGINNING 10 A.M.

"Welcome to Kansas City," by Hon. Albert I. Beach, mayor of Kansas City, Mo.

Response, by Powell C. Groner, president Kansas City Public Service Company.

"The City Manager Plan," by Hon. H. F. McElroy, city manager Kansas City, Mo.

"Present-Day Conditions and Tendencies of the Electric Railways," by R. P. Woods, president Kansas City, Clay County & St. Joseph Railroad.

Round-table Luncheons: Transportation Section. Mechanical Section.

AFTERNOON SESSION

BEGINNING 2:15 P.M.

"Modern Track Construction," by A. E. Harvey, superintendent of construction Kansas City Public Service Company.

"Power Conservation," by L. E. Gould, president Economy Electric Devices Company, Chicago, Ill.

"Co-ordinated Car and Bus Operation," by D. A. Scanlon, general superintendent Northern Ohio Traction Company, Akron, Ohio.

"Treadle Operation and Its Effect on One-Man Service," by R. L. Frehse, sales engineer National Pneumatic Company, Chicago, Ill.

Annual Banquet—Baltimore Hotel, beginning 7 p.m.

TUESDAY, JUNE 5, 1928

BEGINNING 10 A.M.

"Relation of Equipment to Car Speeds," by R. L. Hermann, transportation division manager Westinghouse Electric & Manufacturing Company, St. Louis, Mo.

"Electric Railway Advertising," by E. E. Soules, manager publicity department Illinois Traction System, Peoria, Ill.

"Organized Safety and the Electric Railways," by F. C. Lynch, director Kansas City Safety Council.

Luncheon and inspection trip to shops of Kansas City Public Service Company.

AFTERNOON SESSION

BEGINNING 2:15 P.M.

"Are You Abreast of the Times?" by J. C. Thirlwall, transportation engineer General Electric Company, Schenectady, N. Y.

"Modern Car Construction," by J. M. Bosenbury, equipment engineer Illinois Power & Light Company, Chicago, Ill.

"Worm-Drive Truck Development," by William Bonn, sales representative Timken-Detroit Axle Company, Chicago, Ill.

WEDNESDAY, JUNE 6, 1928

BEGINNING 9:30 A.M.

Reports of committees.

Unfinished business.

New Business.

Election and installation of officers.

Bus trip inspection of rehabilitation work in progress in Kansas City Public Service Company property.

The service betterment committee of the American Electric Railway Transportation and Traffic Association will hold a meeting in conjunction with the Midwest Association at 10 a.m. on Monday, June 4.

Ladies are specially invited to attend the meeting. Ample provision has been made for their entertainment. Representatives of supply companies and local

electric railways will provide the convention entertainment, as follows:

MONDAY, JUNE 4

Bridge luncheon for ladies, Blue Hills Country Club.

Banquet. Entertainment and dancing.

TUESDAY, JUNE 5

Luncheon for ladies, Kansas City Athletic Club, followed by Gray Line sight-seeing tour of Kansas City.

Reception for visiting delegates, Baltimore Hotel.

Carnival Dance, roof garden, Kansas City Athletic Club.

WEDNESDAY, JUNE 6

Al Fresco Picnic, Motor Country Club. Buses leave Baltimore Hotel for 11-mile trip to club where there will be a steak picnic, golf, bridge and dancing.

Selfishness and Misunderstanding Are Hindering Safety Work*

BY E. K. EASTHAM

Safety Director St. Louis Public Service Company

PREVENTION of traffic accidents is difficult because it is inter-related with so many diverse and otherwise unrelated interests and factors, some important and others not, yet all considered vitally important. This diversity is the essential difference between the prevention of traffic accidents and the prevention of industrial accidents. Within factories the management has a large measure of control and influence. It is a comparatively simple matter to get their own employees together in groups and sell them on accident prevention. Accidents in their own plants have a personal application, and for this reason the employees are willing to listen and discuss plans to remove dangers.

It is about equally simple for the management of a transportation system to secure a large measure of care on the part of its employees in handling street cars or driving buses. The requirements to produce those results are: first, complete honesty on the part of the management—that is, conducting a safety campaign without ulterior design and with a complete willingness to do its part; second, to have a well-organized plant and one under capable leadership, and third, to give the safety leader the position in the organization he deserves.

The safety department should be independent and in a position to make its recommendations and argue them through to a final conclusion before the impartial tribunal of the general man-

ager, for the reason that accident prevention is a plain duty owed by every public or quasi-public utility to its employees and to the public at large.

PUBLIC UTILITY MEN SHOULD BE SPOKESMEN OF THEIR PATRONS

The best means of reaching the general public in matters of accident prevention is a local safety council, where such is available, because it is a disinterested organization in which the public has confidence. Next comes my conviction that greater educational results can be achieved with the children than with any other group. Then I would urge that public utility men become more and more the spokesmen of their patrons, the great mass which seldom has an opportunity to make known its wishes. Be their spokesman, put your influence behind measures designed to give the pedestrians an even break with the drivers of automobiles. Help the street car passenger to get on and off safely by insisting that other vehicles be required to stop back of the street car when it is receiving or discharging passengers. By all means, be represented at every gathering where matters of public or traffic safety are to be discussed or decided, and don't be afraid to stand up and be counted. Automobile associations are always there in force. Shall we be too busy in our offices or too penny wise to make our own force felt, to make the rights and safety of our patrons respected?

In the complexity of the problem lies the difficulty. We are met first by the fact that inextricably interwoven with the accident problem is the whole ques-

*Abstract of a paper presented before the Electric Railway and Public Utilities session of the Central States Safety Congress, held at Kansas City, Mo., April 23-26, 1923.

tion of traffic in general; that the flow of all kinds of traffic—pedestrian, motor vehicle, freight, street car, bus, delivery, mail—is the life of any community. In seeking a broad plan we encounter the perplexing details of parking, of one-way streets, of police control, of automatic signals, of safety zones, of street-widening projects, of staggered loads for peak periods, of the routing of through traffic, of boulevard stops, of rapid transit and all the rest of the "57" multiplied varieties of suggested remedies, panaceas and cure-alls.

SELFISHNESS IS CRUX OF PROBLEM

The main trouble encountered when a real traffic expert starts out to bring order out of chaos, to prepare a comprehensive plan for the solution of traffic problems, is that he at once runs up against a more or less impregnable wall of opposition based 90 per cent on selfishness and 10 per cent on misunderstanding. The 10 per cent of misunderstanding can be corrected by a campaign of education, but the 90 per cent of selfishness is the crux and core of the whole problem. We have the very common spectacle of merchants objecting to no-parking ordinances because they fear it will drive some trade away. They fail to realize that in urging the use of the already overcrowded streets for the storage of dead vehicles they are helping to strangle the free movement of traffic which is the blood of the community business life. They further fail to realize that in catering to the automobile trade exclusively, they are placing serious obstacles before the vast bulk of their trade which uses street cars, buses and other vehicles of public conveyance.

Besides the selfish merchant we have the politician, whose main thought concerns itself with votes and who is swayed much more by any local interest he believes controls votes than by any consideration for the community good and safety as a whole. We have the individual in countless forms and manifestations who brays at every regulation which he believes encroaches on his free-born American right to do as he pleases without reference to the rights of the other fellow. We have those real estate men, those property owners who object to well-thought-out zoning projects. We have local and territorial improvement and business associations who object to any comprehensive plan of betterment which they think will bring more advantage to other sections than to theirs. We have the automobile associations which from time to time oppose safety measures and regulations because some liability, some duty, some regulation, is sought to be imposed on the drivers of motor vehicles commensurate with the hazards brought into being solely by the motor vehicle.

ACCIDENTS ARE RARELY BROUGHT HOME TO US

Offhand, one would think that the instinct of self-preservation would operate as a powerful check to these other forms of selfishness where any matter directly affecting safety of life and limb was in-

olved. It does not act as a check because of the widely diffused character of traffic accidents. The total of deaths, injuries and property damage is staggering, yet in the immensity and complexity of city life it is seldom that any of these deaths or serious injuries are brought home to us.

Inter-related as it is, the boundaries of accident prevention become co-extensive with man's every effort to substitute some measure of humanitarianism and of altruism for an undisputed reign of selfishness. Every effort made in any right cause will indirectly bring closer

to fruition the cause of accident prevention. Every friend cheered, every injustice righted, every vote against governmental corruption, every effort against business trickery, every helping hand extended to those less fortunate, brings nearer the day when the causes of accidents will cease.

Middle Atlantic Equipment Men Organize

ELECTRIC railway equipment men anxious to further improve their methods and practices, believing that intercourse between several properties in the same general locality is one of the best methods to accomplish this, met in Baltimore, Md., on May 16, 1928, and formed the Association of Electric Railway Equipment Men of the Middle Atlantic States.

Those present were C. O. Brooks, master mechanic Scranton Railway, Scranton, Pa.; D. E. Frame, master mechanic Delaware Electric Power Company, Wilmington, Del.; R. H. Dagleish, chief engineer Capital Traction Company, Washington, D. C.; E. L. Green, master mechanic York Railways, York, Pa.; C. E. Keefer, master mechanic Altoona & Logan Valley Electric Company, Altoona, Pa.; E. L. Kelly, chief engineer Newport News & Hampton Railway, Hampton, Va.; W. H. McCarty, master mechanic Capital Traction Company, Washington, D. C.; J. A. Mellor, master mechanic Washington, Baltimore & Annapolis Railroad, Odenton, Md.; A. F. Rexroth, master mechanic Harrisburg Railways, Harrisburg, Pa.; R. D. Voshall, superintendent of equipment Washington Railway & Electric Company, Washington, D. C.; A. T. Clark, superintendent rolling stock and shops United Railways & Electric Company of Baltimore, Md., and H. A. Leonhauser, assistant superintendent rolling stock and shops United Railways & Electric Company of Baltimore, Md.

After discussion of the need and desire for forming an association of this character a constitution and by-laws were presented and adopted. A paper was read by Mr. Voshall on maintenance of street railway motors. After the paper was read, a lively discussion of many of its interesting features was engaged in.

After luncheon an inspection of the shops of the United Railways & Electric Company was made. The subject of comparison of performance of each company by "pull-ins" or "failures" was gone into very thoroughly and finally it was decided to use the basis of "pull-ins" for comparison.

It was decided to have the next meeting in November at Hampton, Va., the Newport News & Hampton Railway to be the host.

The following officers were elected: President, A. T. Clark; vice-president, E. L. Green; secretary-treasurer, W. H. McCarty; directors—for one year, A. F. Rexroth; for two years, E. L. Kelly; for three years, D. E. Frame.

COMING MEETINGS OF

Electric Railway and Allied Associations

May 28-31—National Association Purchasing Agents, annual convention and exhibit, American Royal Building, Kansas City, Mo.

June 4-6—Midwest Electric Railway Association, Hotel Baltimore, Kansas City, Mo.

June 4-8—National Electric Light Association, Atlantic City, N. J.

June 6-8—Canadian Electric Railway Association, annual convention and exhibit, Toronto, Canada.

June 12-13—American Wood Preservers' Association, Chattanooga, Tenn.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 13—A.E.R.A. Executive Committee on Yacht "Florida," New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

New Englanders Banquet at Boston

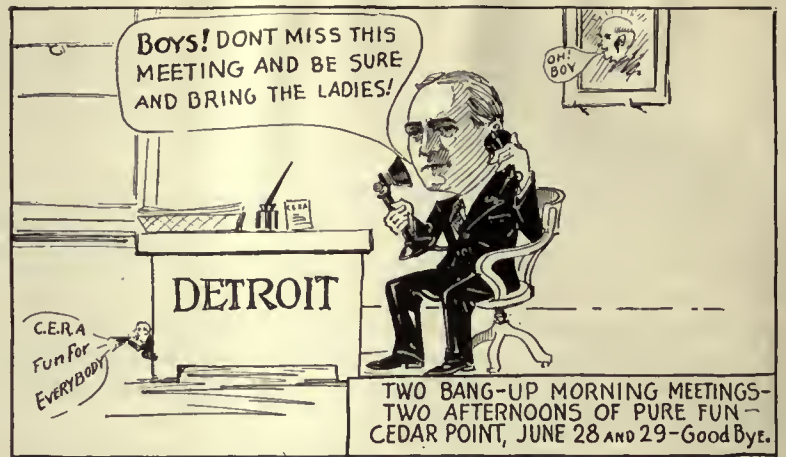
FOUR HUNDRED members and guests of the New England Street Railway Club celebrated the 28th annual banquet of the organization on Thursday of this week at the Copley-Plaza Hotel, Boston, the speakers being Lieutenant-Governor Frank G. Allen of Massachusetts; Robert B. Stearns, retiring president; Walter C. Slade, vice-president United Electric Railways, Providence, R. I.; president-elect Honorable Ralph S. Bauer, Mayor of Lynn, Mass., and T. A. Kenney, vice-president Hodenpyl, Hardy & Company, New York. Alonzo R. Williams, general manager United Electric Railways, Providence, was toastmaster.

Lieutenant-Governor Allen spoke optimistically regarding the future of New England industry, pointing out that whereas heavy losses have been encountered in certain fields within the last few years, the industries of the Northeast are gaining in diversity and magnitude. Mayor Bauer urged transportation men to get rid of the inferiority complex in their business and to emphasize the extent to which the prosperity of the modern city depends on railroad and railway lines as the only practicable means of handling mass transportation.

Mr. Kenney commended the work of the public utilities information bureaus of the country in striving to acquaint the public with the facts about the utility industry and paid a warm tribute to the New England Bureau in particular for its well-directed activities under S. T. MacQuarrie. He sounded a warning note against the tendency of the government to encroach further and further upon business. He briefly called attention to the increased economic inconveniences and risks which the electric railway industry faces as a result of the Interstate Commerce Commission's attitude upon depreciation accounting and certain provisions of the Transportation Act hearing upon taxation. Ordinary electric railways should be distinguished from common carriers doing a considerable interstate freight business, the speaker said, and provision should be made under which the railways can be taxed in some proportion to their net earnings, thus enabling poor years to be offset by good ones.

The following additional officers were elected: Vice-Presidents, H. M. Steward, Boston, Mass.; J. K. Pufferford, New Haven, Conn.; J. B. Crawford, Concord, N. H.; D. G. Clark, Burlington, Vt.; Edward M. Graham, Bangor, Me.; Alonzo R. Williams, Providence, R. I.; Secretary, John W. Belling, Boston; Treasurer, Fred F. Stockwell, Cambridge, Mass., and Executive Committee, George E. Haggas, Portland, Me.; Howard F. Whitney, Worcester, Mass.; C. B. Pierce, New Bedford, Mass.; H. S. Day, Providence, R. I.; George Acker, Boston, Mass.; A. J. Boardman and J. P. Alexander, Boston. Frank B. Walker was chairman of the banquet committee.

C.E.R.A. Promises Rousing Summer Meeting



"Fun for everybody," says C.E.R.A. program committee

EXTREME efforts are being made by the program and hotel and arrangements committees to make the summer meeting of the Central Electric Railway Association at Cedar Point, Iowa, Thursday and Friday, June 28 and 29, an outstanding event, according to W. S. Rodgers, president. There will be two morning business sessions filled with discussions of inter-

esting topics pertaining to the industry.

The entertainment features will be ample for the entire family. In addition a wide variety of sports is available at Cedar Point.

The accompanying cartoon is a sample of those being sent out to members, stressing "Fun for Everybody" and calling attention to various features of the program.

American Association News

Purchases and Stores and Stores Accounting

JOINT meetings of the committee on purchases and stores of the Engineering Association and the committee on stores accounting of the Accountants' Association were held at Association headquarters, New York, on May 18 and 19. Aside from the regular work of the committees, considerable time was given to the discussion and planning of an elaborate convention program and the following tentative program was adopted:

MONDAY, SEPT. 24—2:30 P.M. TO 5 P.M.

Address of welcome by R. H. Dalgleish, president A.E.R.E.A.

"Standard Packages," by W. E. Scott.

"Purchasing from the Manufacturers' Standpoint," by B. W. Forkner.

"Inactive Stock," by A. S. Duncan.

"Relation of Purchasing to the Stores Department," by A. L. Fischer.

"Handling Supplies for Buses," by W. S. Stackpole.

TUESDAY, SEPT. 25—LUNCHEON
CONFERENCE

"What Would Be a Fair Measure of the Cost of Handling Materials and Supplies," by C. A. Harris.

WEDNESDAY, SEPT. 26

Joint annual report by the chairman.

"The Cost of Controlling the Investment in Material and Supplies and the Distribution of That Cost," by W. P. McArdle.

"Pricing Problems," by R. A. Weston.

It is planned to include in the com-

mittee's exhibit a delinescope picturization of storekeeping practices and exhibits bearing on the question of unit piling, standard packages and other storeroom methods.

Members of the committees attending the meetings were J. Y. Bayliss, R. A. Weston, W. J. Walker, W. S. Stackpole, A. L. Fischer, A. S. Duncan, E. A. Murphy, J. Fleming, W. E. Scott, B. W. Forkner, A. A. Ordway, W. P. McArdle and C. A. Harris.

Preliminary Announcement on Brady Medals

AUTHORIZATION by Nicholas F. Brady to award the Anthony N. Brady Memorial Medals for the year ended Dec. 31, 1927, "for achievement in safety and sanitation by electric railway organizations of the United States" is announced by the American Museum of Safety. As in the past, the award will be made jointly under the auspices of the American Electric Railway Association and the American Museum of Safety.

The committee on conditions, composed of men from within the industry, has been giving all factors entering into this competition additional careful study in the light of the results of last year. Definite decision on the conditions covering the contest for the year 1927 will be reached at an early date. It is hoped to have the printed conditions forwarded to all contestants early in June.

News of the Industry

Fare Stay in New York

Interborough case to be heard by Supreme Court on Oct. 2. City not required to post bond

The Supreme Court of the United States on May 21 granted the stay sought by the city of New York and the Transit Commission and prevented the 7-cent fare from going into effect on the Interborough lines in New York City at least until the case is reviewed in the high court next fall. Under the ruling of the Supreme Court the injunction granted by the lower court, which would prevent any interference with the collection of a 7-cent fare, cannot become operative until after the case is retried on appeal.

CHIEF JUSTICE TAFT READ THE ORDER

Chief Justice Taft announced the decision of the court briefly, saying that after considering the application for the stay of the injunction pending an appeal to the Supreme Court it was ordered that the stay be granted and that the injunction not become operative until after that appeal had been heard. The court also announced that it would hear the appeal of the city on Tuesday, Oct. 2.

The order of the court in the case was as follows:

Upon consideration of the motion of the appellants for a stay of the order granting an interlocutory injunction, from which this appeal is taken, and for the advancement of this cause for an early hearing, it is ordered that the operating of the order of the District Court, May 10, 1928, granting an interlocutory injunction in this cause be stayed and remain inoperative pending the hearing and determination by this court of the present appeal, and that this cause be advanced and set down for hearing in this court on Oct. 2, 1928.

The supreme bench heard the arguments on the city's petition for a stay of the injunction granted by the statutory court on May 14, when Charles L. Craig and Samuel Untermyer laid their case before the court and William L. Ransom argued against the petition.

CONTENTION OF CITY COUNSEL

Nothing in the decision indicated whether the counter proposal of the counsel for the city and commission to file a stipulation in the lower courts should be carried out. Counsel had offered to file a stipulation which would permit the \$5,700,000 in preferentials which it is estimated will be due and payable to the city this year, to be set aside in a special account so that, if the courts in the final decision should grant the 7-cent fare, the company might be reimbursed for any losses it might have suffered by the maintenance of the 5-cent fare while the case is being tried. Counsel contended that the city has

no power to post the bond required and that there was no way under the law by which the city's money could be offered as security to indemnify the company for its losses.

In their arguments, Mr. Untermyer and Mr. Craig stressed the injustice of the terms imposed by the statutory court and the impossibility of meeting them. Mr. Ransom, in his reply, characterized the decision rendered by the statutory court as "the most clarifying document on the transit situation that had ever been written."

\$15,000 and No More Responsibility in Paris

The Council of Paris, Ill., has relieved the Central Illinois Traction Company, subsidiary of the Central Illinois Public Service Company, of further responsibility and obligation under its 50-year franchise, dated Aug. 1, 1910. A payment of \$15,000 cash for the release was made by the company, which agreed to remove all poles, wires, tracks and ties, except those on Main Street.

30,000,000 Miles Without an Accident

5,441 men in employ of Chicago Surface Lines had spotless records for year recently ended. Beautiful trophy awarded by Mr. Richardson to Lincoln division men at banquet

MOTORMEN and conductors of the Chicago Surface Lines were the guests of honor of officials of the company at a banquet held in the Stevens Hotel, Chicago, May 4, in celebration of the fact that 5,441 employees did not have a single accident in service during the fiscal year ending Jan. 31, and that the total number of accidents was 12½ per cent less than the total in 1926. Guy A. Richardson, vice-president and general manager, pointed out that the motormen among the no-accident group had operated their cars for a total of 30,000,000 car-miles without an accident of any kind.

Approximately 70 per cent of the motormen and 54 per cent of the conductors who had no accidents, he declared, had been in the company's service for more than ten years. In extolling the records made by the men, Mr. Richardson urged the same strict requirements of mental and physical ca-

capacity for automobile drivers as must be met by Surface Lines employees.

Each man was presented with a bronze insignia to be worn on the lapel of his uniform during the year. One of the features of the celebration was the awarding of a handsome trophy in the form of a sterling silver model ¼ of the actual size of the latest type Surface Lines car to the Lincoln Avenue car depot, which made the best accident prevention record on the system last year.

Mr. Richardson characterized the meeting as unusual in the annals of the Surface Lines. Indeed, it was. In the past the system of the company used in keeping accident records tended toward focusing attention on the few men who were in trouble rather than on the many who were satisfactorily performing their daily duties and formed the backbone of efficient and safe service. Beginning with 1927, this plan was changed with the avowed intention of being able properly to give credit where credit is due. Since a banquet hall large enough to serve the entire group was not obtainable, it became necessary to devise a plan for selection of as many as could be accommodated, so the group on the evening of May 3 was invited on the basis of seniority.

Mr. Richardson said the fact that approximately 60 per cent of the 5,441 clear accident record men have a service record in excess of ten years demonstrated conclusively that judgment and ability to operate cars successfully under the trying street conditions faced each day, came from years of experience in the school of hard knocks and that it could not be acquired overnight. In other words, successful operation in service such as that supplied by the Chicago Surface Lines depended on those who are devoting their lives to it rather

Farewell to the Wooden Car in Boston

THE last wooden car on the rapid transit lines of the Boston Elevated Railway, Boston, Mass., was retired from service on March 27, 1928. The wooden cars which have been retired have now been all replaced by steel cars, the last cars on the order for 100 having been received recently. The rapid transit lines have also placed in service the entire lot of 60 new steel cars ordered for the Dorchester rapid transit extension. Thus there are now in operation a total of 160 new steel rapid transit cars involving an investment of \$3,700,000.

than to the type that is here today and gone tomorrow.

An analysis of seniority of trainmen who have not had a chargeable accident during the year ending Jan. 31, 1928, showed:

	Total Number	More Than 25 Years	More Than 20 Years	More Than 15 Years	More Than 10 Years	Less Than 10 Years
Motormen.....	1,747	307	638	988	1,221	526
Per cent.....	100	17.57	36.52	56.55	69.89	30.11
Conductors.....	3,694	430	850	1,361	2,005	1,689
Per cent.....	100	11.64	23.01	36.84	54.28	45.72
Totals.....	5,441	737	1,488	2,249	3,126	2,215
Per cent.....	100	13.55	27.35	43.17	59.29	40.71

Last year cars of the company operated more than 136,000,000 car-miles. The number of 100 per cent motormen was 1,747, or approximately one-fourth of the total motormen. It can readily be computed then that this group of motormen operated on the streets of Chicago more than 30,000,000 car-miles in 1927 without accident—a performance, in Mr. Richardson's judgment, never equaled.

As indicated previously each no-accident trainman has been presented with a one-year safety button in bronze as a small token of the management's appreciation of his efforts in accident prevention. The Accident Prevention Advisory Council which, with Mr. Pasche, has charge of the plans and policies in this regard, advise that it is planning a different button for each additional year of freedom from accident, as follows:

- One year..... Bronze
- Two years..... Silver car on bronze
- Three years..... Solid silver
- Four years..... Gold car on silver
- Fifth year..... Solid gold button

The whole organization has been bending its energies to the reduction of accidents and for the last three or four years the need of accident prevention has been stressed more than ever before. As a result the accidents on the system last year were reduced 6,500 in number, or 12½ per cent, over the previous year. The total number of car-miles per accident last year was better than any year since 1923, and during that time there has been a 50 per cent increase in regis-

tered automobiles in Chicago. Incidentally there was an increase of 17 per cent in car-miles run per accident, comparing 1927 with 1926. Last year there were 5,700 fewer collisions with vehicles than during the previous year, in spite

of an increase of 19,200 vehicles registered in Chicago than in 1926. The recession of that amount represented more than 18 per cent in that one class of accident, and was a further testimonial to the outstanding merit of the motormen. There was a reduction of 14 per cent in fatalities, of 27 per cent in collisions of cars and 65 per cent in those brushed from steps.

Lighting and boarding accidents dropped off 5½ per cent, a credit to the men on both ends of the car, but there was an increase of 36 per cent in persons thrown by quick starting and stopping—something the motormen were reminded by Mr. Richardson they should bear closely in mind as a type of accident that is running in the wrong direction. Mr. Richardson said:

The whole trend of train service operation last year was in the right direction in accident prevention, in courtesy and all those other attributes that spell service in the broad way that we mean it.

I am rather inclined to believe that a great many people outside of our industry are beginning to think in the terms of accident prevention, undoubtedly brought about by the systematic work that is being done in the schools, shops and businesses all over the nation. This is borne out by the reports of many electric railways for the past year showing a marked reduction in accidents over the previous year. Our aviator friends say the public are becoming air-minded. I think we might well say that they are becoming accident-minded. This added to concerted attention to the causes of accidents in our business and the

effective work that you and the others in our organization have been doing has produced the excellent record of last year.

When we see the astounding figures compiled at the end of each year as to the fatalities and injuries caused by automobiles it makes us wonder whether the tide will ever turn and what, if anything, could cause it to do so. Until laws are passed in this state, as they have been in many states, making it necessary for all drivers of automobiles to pass a reasonable physical and metal test as to their ability to operate these high-speed, high-powered vehicles, it would seem that we may expect little along that line. You all know the strict requirements necessary to qualify you to perform the work of running cars on this system and I know you would think the management derelict in its duty if it permitted any man with a major physical or mental defect to operate its equipment over the busy streets of our city, yet men of this type are driving automobiles.

At the outset in our work of accident prevention we felt that if we could save a single life or major injury our efforts would be worth while. To have our own people killed and injured by being crushed between cars seemed an outstanding carelessness that should be completely eliminated. It may interest you to know that in 1927 none of our employees was killed by this form of accident while in 1923, when we started this campaign, four trainmen had been killed; one in 1924; three in 1925 and one in 1926. This would indicate that our endeavors along this line have not been in vain.

It is surprising how far-reaching accident prevention work is. At practically every meeting of our operating heads or of the staff many of the subjects relating to accident prevention are discussed. All of these discussions and conferences bring a better understanding of the problem we are facing and with the meetings of the safety committees and co-operation between all groups on the system we are beginning to show real results in this direction.

Many departments besides transportation are making enviable records. Their activities do not usually involve the public directly to the same extent as the train services do, but they prevent injury to themselves and to their fellow employees.

Only by good team work throughout the organization can we satisfactorily make progress in accident prevention or in any other constructive effort to improve the



5,441 trainmen of the Chicago Surface Lines were eligible for the accident prevention banquet at the Hotel Stevens on May 3, but it was possible to accommodate only a quarter of this number in the mammoth grand ball room

operation and service, and I want you men gathered here tonight to know how much the management appreciates the whole-hearted support and co-operation it has had from the entire force. Your 100 per cent record in accident prevention work last year makes you the outstanding examples of efficient electric railway operators.

As a climax to his address Mr. Richardson gave the signal to unveil the silver speed trophy represented by a miniature modern Chicago Surface Lines car, awarding it to the Lincoln Avenue carhouse as the winner. Superintendent Hays of Lincoln, in receiving the award, expressed his gratitude and the gratitude of the men serving under him. In presenting the trophy to Mr. Hays, Mr. Richardson said:

For the past two years all depots have been engaged in friendly rivalry in the matter of accident prevention on a system of credit and debits worked out by the Advisory Council. The first year's award went to North Avenue, but little did they realize when they accepted their 1926 trophy that over to the east of them the members of another group of determined men had been grooming themselves for 1927 to the extent that they stepped into first place in the first month and while sorely pressed once or twice were never forced from that position throughout the year. Individual effort is essential as the base of any endeavor. This has been repeatedly brought out before this evening, but team work of the whole group making this effort is vital to any organization such as ours in producing a finished result. The best team work in 1927 in accident prevention was under Mr. Hays' and Mr. Zage's leadership at Lincoln. They finished first, while Lawndale and Blue Island under Mr. Maguire and Mr. Eigelsbach finished scarcely two points behind Lincoln.

The Advisory Council this year prepared a surprise for all of us in the trophy that is to be awarded for last year's accomplishment. They advise that this trophy is to be held by the depot winning it for the year following, and that when any depot has won it three times it will then remain at that depot permanently. I had heard vague rumors of what the trophy was to be but had no conception that the master silversmiths at Marshall Field's could produce anything so beautiful as this silver replica of our most modern type of street car.

Mr. Hays, I am proud to have the honor of awarding the accident prevention trophy for 1927 to you as the representative of your efficient team mates of the Lincoln carhouse.

Would Prevent Interference With Piedmont Extension

Counsel for the Piedmont & Northern Railway, Charlotte, N. C., has filed in the United States District Court at Greenville, a petition for an injunction against the Interstate Commerce Commission to prevent its interference with the company in extending its line from Spartanburg to Gastonia and from Charlotte to Winston-Salem. The petition asked that the court set aside and declare null and void the recent decision of the commission that the road cannot extend its line in the directions desired. In its decision the commission held that the proposed line was not a public necessity.

Columbus Legislation Under Fire

A request to veto legislation passed by the City Council of Columbus, Ohio, on May 14, making all streets with car tracks main thoroughfares, has been made of Mayor Thomas by the Columbus Automobile Club. The ordinance also raises the speed limit of street cars from 20 m.p.h., to 25 m.p.h. Mayor Thomas declared that he had not signed the legislation, but gave it his verbal approval.

These ordinances supplemented a previous ordinance passed on April 16, authorizing the Columbus Railway, Power & Light Company to adopt the skip-stop system. That ordinance, which became effective on May 16, has been accepted by C. C. Slater, general manager of the Columbus Railway, Power & Light Company, but will not be put into effect until the other two ordinances become effective. Mr. Slater said that it would be necessary to change car schedules, rearrange car stop signs and work out other plans before the company could comply with the ordinance. All the present car stop signs will be taken down repainted and then relocated nearer the center of the street where they will be more visible.

Passage of the stop-street ordinance was opposed by Councilman Worley.

Lower Fares on Pacific Electric Lines

Fare reductions on Los Angeles lines of the Pacific Electric Railway affecting regular riders between zones one and two, one and four, and also a reduction in local fares in the Hollywood territory, were authorized May 15 by the California Railroad Commission effective upon one day's notice by the company. The new fares are the result of an agreement between representatives of the city of Los Angeles and the Pacific Electric Railway reached in an informal conference with the Railroad Commission at San Francisco.

The order provides for the sale of tickets to regular riders at a 5-cent fare between zones one and two, in the form of a twenty-ride book, good for 60 days, and carrying full transfer privileges within those two zones. A new cash fare of 5 cents is made effective on the Hollywood Boulevard and Santa Monica Boulevard lines between Crescent Junction and Vermont Avenue. This fare carries full transfer privileges to intersecting lines and will provide a 5-cent local fare between the business and residential districts of the Hollywood territory. Regular riders in the West Hollywood and South Pasadena districts are given the benefit of a 10-cent fare to and from Los Angeles by purchase of a twenty-ride book, good for 60 days with full transfer privileges.

In announcing the new fares the commission stated that since April 7, 1928, when an order establishing a series of experimental fares for the Pacific Electric Railway System was handed down, a careful check has been made day by

day. It has been represented to the commission that the fares between the first and second zones and between portions of the third and fourth were such that in view of competitive and other conditions, they would decrease rather than increase patronage and revenue to the company. Representatives of the city and the railway confirmed these results.

Bills Fail at Special Session of the Illinois Legislature

The railway bills presented in the special session of the Illinois General Assembly by the Chicago City Council have been shelved and there will be no legislation of the kind before the next regular session of the assembly in January, 1929.

The special session met on May 15 on the call of Governor Small to consider "Home Rule" and other bills enabling the City Council of Chicago to grant franchises to the railway system for a fixed period of more than 20 years. From the first there was a feeling that nothing could be accomplished at this session owing to the fact that Governor Small, who called it, had just been defeated for nomination in the Republican primary and Mayor Thompson, his political ally, had been rebuked by an overwhelming vote in Chicago against the Governor and the Mayor's whole slate.

In moving to postpone consideration of the bills indefinitely, Representative Elmer J. Schnackenberg, Chicago, declared that the special session "was born in uncertainty, clothed in mystery and viewed with suspicion by the press and the public."

It seemed likely that the General Assembly would complete its work before May 26 and adjourn after creating a special committee to study the situation in Chicago and report back to the next regular session of that body.

St. Louis Agreement Forwarded to Commission

The formal stipulation entered into by the executive committee of the St. Louis Public Service Company, St. Louis, Mo., the executive committee of the Local Amalgamated Association and the city of St. Louis, through City Counselor Muench, providing for arbitration of the wage dispute was formally forwarded to the Missouri Public Service Commission on May 21. The State body will decide the issues and fix a new rate of fare in St. Louis and St. Louis County sufficient to provide funds needed to pay any increase in wages granted to the workers.

In the meantime attorneys for the company and the union have prepared data for submission to the commission. Under the terms of the agreement between the company and the union the present wage scale and working agreement will continue in effect until the state commission hands down its decision.

Hearings Continue on Chicago Elevated Increase

Efforts of the Chicago Rapid Transit Company to obtain a flat 10-cent fare and to abolish its present \$1.25 weekly pass and three-for-a-quarter ticket rate received another set back on May 16 when the Illinois Commerce Commission continued the hearing on its application until Sept. 11. The initial hearing was held on April 26. Decision to postpone the hearings was in the form of an answer to the motion of John G. Drennan, assistant corporation counsel of Chicago, to exclude the valuation presented by the company on the ground that the railway based its demand for a fare increase on a valuation that was eight years old and consequently, erroneous. Mr. Drennan argued that the company must show present value, which he believed to be considerably higher. The reason given for the denial was that the commission was making an appraisal on its own account and, to exclude that presented by the elevated lines would prevent its introducing as evidence the results of its own inquiry.

Harry J. Dumbaugh, attorney for the company, declared that the railway would complete a new appraisal by June 12 and protested any further delay. He claimed that such delay meant a loss to the company of approximately \$200,000 a month; that the company now was running behind at the rate of \$7,000 a day at the present rates. He said a new valuation of the "L" properties could be made by the company's engineers within 30 days.

Reduced Wages Accepted by Gloversville Employees

Trainmen of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., accepted a 6 per cent reduction in wages, effective May 1. The new scale is to continue in force for a period of six months, after which time the old scale will be restored. Before automobile and bus competition summer traffic on this railway amounted to very near capacity business. Now the summer traffic is considerably lighter than the winter traffic.

Passes Increase Business on Alliance Line

Extensive use of weekly passes over the entire division has increased total revenue approximately 8 per cent so far this year compared with corresponding months of 1927, according to officials of the Stark Electric Railroad, Alliance, Ohio. During four weeks of April, 1927, the Stark Electric issued 3,119 passes for \$2,809. Reports for the four weeks of April, 1928, show that 4,119 passes were sold for \$4,014, an increase of 1,000 passes and more than \$1,200 in revenue.

The Stark Electric has a variety of passes in the cities it serves, between smaller communities and cities, and to shops and schools along the division.

One of the most popular is the weekly pass in Alliance, sold for 70 cents. The increase in the use of the weekly passes has not affected Sunday all-day passes. Business in the Sunday pass shows a steady gain so far this year.

Taking Testimony in Ottawa

Hearings are being conducted before the Board of Railway Commissioners on the application of the Ottawa Electric Railway, Ottawa, Ont., for an 8-cent cash fare. The present fare is 5 cents. Testimony of Robert M. Feustel, expert engaged by the city of Ottawa, at the hearing on May 4, favored the railway cars as the only quick and efficient means of handling passenger traffic. He complimented the company on maintaining its car mileage despite the falling off in the number of car rides.

Pay of Shop Men in Cleveland Boosted

An increase of \$85,000 a year in the shop payroll of the Cleveland Railway, Cleveland, Ohio, as a result of a new classification of positions and increases in pay, was announced recently by Joseph H. Alexander, president. A rise of a few cents an hour was awarded most of the shop workers, the highest being 7 cents an hour. The pay adjustments were made, according to Mr. Alexander, as a result of a change in the shop week from a 54-hour to a 44-hour basis. This amounted practically to a 20 per cent reduction in pay. The new rates are retroactive to May 1.

A 2-cent an hour increase was recently granted to trainmen and motor coach operators.

More Parleys in Poughkeepsie

The Common Council of Poughkeepsie, N. Y., has appointed a committee to meet with the highway committee of the Board of Supervisors, and the representatives of the Poughkeepsie City & Wappingers Falls Electric Railway to discuss the problem of removing the tracks of the railway in Market Street and in the South Road to the falls. The position of the company is that the rails cannot be removed unless, for instance, the line to Wappingers Falls is purchased by the County of Dutchess for the new state road. A representative of the city has explained that an agreement of this kind would not necessarily have any connection with the paving debt due the city, but expressed the belief that any agreement with the county may turn out to depend upon a settlement of the paving debt matter with the city. This spokesman said:

We strongly desire the removal of the tracks; we believe in the preservation of trees on the South Road—we think that buses would be better than trolley cars on the Wappingers and South Side lines—and we therefore urge that the city appoint a committee to see what can be done before it is too late.

Utility Inquiry May Aid States in Regulation, President Believes

President Coolidge believes that the Federal Trade Commission's investigation into the activities of the public utility companies may bring out facts which would call for legislation by Congress, although such information as the President has received so far with regard to the commission's inquiry makes it appear to him that the question is one for state action rather than for the federal government. This was stated officially on May 18. As expressed by the *United States Daily* President Coolidge's views are as follows:

But little information is in the President's possession relative to the investigation now being made by the Federal Trade Commission concerning power companies.

President Coolidge had talks more than a year ago with Professor Ripley of Harvard University, who had written several magazine articles regarding the organization of electric power concerns, and such thought as the President gave the subject at that time led the President to believe that the affair was entirely a matter of state action as distinguished from action by the federal government.

The investigation by the Federal Trade Commission now in progress may reveal perhaps in the President's opinion facts that will be helpful to state commissions in administering the powers for the regulation and control of electric power companies, and the commission may develop some facts that would call for national legislation.

Court Claims Waived for Omaha Franchise

So that there will be no interference in the negotiations concerning a new electric railway franchise to be voted upon next fall by the people of Omaha, Neb., all pending court claims and disputes regarding the present franchise of the Omaha & Council Bluffs Street Railway have by mutual consent been waived. This is in compliance with the suggestion of President Shannahan made to the City Commission. Mr. Shannahan told the Council that the company appreciated the willingness of the city to negotiate for a new franchise; that the company was anxious for a full discussion and exchange of opinion on all the provisions, and that it desired the public to be fully informed on all phases of the company's needs and the city's rights. If the voters grant a new franchise the company officials are willing to forego any rights that may exist to a permanent and perpetual franchise to operate cars in Omaha. At City Corporation Counsel Van Dusen's request, the company executed a written waiver of claims to franchise rights arising from operation of cars after May 22.

A ten-year lease on 6,300 sq. ft. of space in the Union State Bank Building, Omaha, was taken recently by the company and it will use the entire fifth floor and a part of the sixth. The lease becomes operative on June 1. The company has occupied its present quarters for 27 years.

Cause for Pause in Cleveland

Officials of the Cleveland suburb of East Cleveland claimed at the fare arbitration hearings concluded during the week ended May 19 that they are getting too much service from the Cleveland Railway. They asserted that more service than East Clevelanders require is put on the Euclid Avenue line for the convenience of Cleveland riders, and they voiced objections to paying the cost of that part of the service which they say is unnecessary.

This was one of two principal arguments advanced by East Cleveland against paying a higher rate of fare than the Cleveland rate. The other main argument was based on alleged wasteful and inefficient routing of a number of Cleveland car lines. Such routing tends to make the Cleveland rate of fare higher than it really ought to be, through no fault of East Cleveland. For many years the Cleveland Council has refused to consider the re-routing of the car lines on a more efficient plan.

The arbitrators, Ed. Doty, Charles M. Buss and Charles Higley, have the right to fix the East Cleveland rate of fare for the next five years. Briefs will be submitted within ten days and a decision is expected shortly thereafter. The Cleveland Railway contends that the East Cleveland fare should be 3 cents higher than the rate in Cleveland proper.

Ten-Cent Rate in Lorain Rejected

A proposal to increase car rates in Lorain, Ohio, to 10 cents, was rejected May 15 by the streets and sidewalks committee of the City Council. The Lorain Street Railway offered the Council a 7-cent rate for one year and a 10-cent rate for the next five years. The present city fare is 5 cents.

The Council committee has proposed a 7-cent rate for five years but railway officials will not consider it, according to F. W. Coen, head of the Lake Shore Electric Railway.

Electric Railway Issue of "Safety"

The March-April, 1928, number of *Safety*, published by the American Museum of Safety, is the electric railway issue, containing a full discussion of the Anthony N. Brady awards. The issue contains 64 pages, with 30 illustrations.

Savannah Appeal Unopposed

An appeal by the Savannah Electric & Power Company, Savannah, Ga., for increased fares was heard unopposed recently by the Georgia Public Service Commission. The company asked for a straight 10-cent cash fare unit instead of the 7-cent fare now in effect and proposed to sell six tickets for 50 cents; twenty school tickets for \$1 and 24 children's tickets for \$1. The school tickets would be available only during school hours, while the children's tickets

would be used only by children between the ages of six and twelve, inclusive. The present zone system of fares would be retained under the new schedule, while transfer would continue to be universal.

Officials of the company stated that the present 7-cent fare, established in 1920, does not yield a fair return on the investment and that a deficit of \$1,765,701 had been accumulated during the period between 1921 and 1927.

"Let's Go" in Louisville

"Let's Go!" a six-page magazine published "Each Week for Everybody" by the Louisville Railway, Louisville, Ky., made its initial appearance with a Derby Day edition containing special information about the Derby, together with the schedule of railway service for Derby Day. Copies were distributed on the city cars and several thousand copies were sent to railroad stations and hotels and to the Louisville Convention and Publicity League for distribution to Derby Day visitors. The new publication has as its purpose the entertainment and information of the street car riding public.

A Philosopher on the Interurban

PROGRESS does not always mean a net gain for every one.

Here is one effect of the automobile on my habits and convenience: For three years I was able to travel to and from my office and my farm in an interurban street car. I always had a seat and the roadbed was so smooth that I could read newspapers, magazines and books. In the two hours I spent on the car each day I was able to go through a vast amount of print.

Former patrons of the line drove to work in their own automobiles in increasing numbers each year. Then a bus line came into competition with the electric line. The income of the railway company was deduced to the vanishing point, and the line was discontinued.

The buses are dirty and riding in them is tortuous, so I am now compelled to drive. Traffic is so congested at the hours I am on the road that I have to give my entire attention to the task. I lose two hours of reading six days a week, and two hours of hard work are added to my day's grind. Further, the cost of transportation is at least \$1.25 more each day and this covers only parking, gasoline, tires and oil.

Private cars, buses and electric railways are all admirable accessories to civilization, but until each has finally found its proper place some of us are actually worse off than we were twenty years ago.—William Feather in the *Philadelphia Public Ledger*.

Wage Plea in Fort Wayne Denied

Operators of the Indiana Service Corporation at Fort Wayne, Ind., have lost their plea for increased wages by action of the Public Service Commission in deciding the wage dispute in favor of the company. Members of the commission said they felt the employees were entitled to more pay, but had found that the company's earnings would not permit an increase now. The attitude of the employees and company in submitting the dispute to the commission for arbitration was commended by the commission. Employees wanted the scale of 41 cents to 50 cents an hour increased to 65 to 70 cents an hour.

Portland's Advertisements in Folder Form

Into a saddle-stitched folder 19x24 in. thirteen transportation problems as advertised in the newspapers of Portland, Ore., by the Portland Electric Power Company, are reproduced from a series dealing with the daily mass transportation of the city. From copy institutional in aim the succeeding messages cover the bus developments by the company, its safety record, "services" by the salesmen and arguments for the trolley versus the private car. The advertisements are in the nature of a justification for the faith of the 250,000 people who rely on the Portland Electric Power Company to take them to their destinations daily.

Board of Control Suggested at Kansas City, Kan.

An ordinance creating a board of control, to be composed of the entire board of city commissioners of Kansas City, Kan., and to have supervision of all street car and bus transportation within the city, has been prepared by the legal department at the request of Commissioner F. LeRoy Cooke.

It provides the board be empowered to make and enforce orders for necessary extensions and additions to the railway system and that the Kansas City Public Service Company be prohibited from making any changes without the consent of the board.

Powell C. Groner, president of the company, has pointed out that the company has no franchise and that it must route its cars so far as possible to comply with the transportation needs of the greatest number of riders.

Perpetual Franchise Hearing in Denver Set

The city of Denver, Col., through its attorney, Thomas H. Gibson, appeared before the United States Supreme Court on May 11 and asked that its case against the Denver Tramway, locketed with the Supreme Court on appeal, be put over. The court then named July 9 as the date for hearing the plea against lower court's ruling sustaining the claim of the railway to a perpetual franchise.

Recommends Adoption of Rerouting Plan in Seattle

Immediate adoption of the rerouting plan proposed nearly two years ago by Clark R. Jackson, superintendent of public utilities, has been recommended by the Seattle Municipal Railway committee of the Municipal League, after a study of the railway system in Seattle, Wash., extending over several months. The Jackson plan calls for turning at Pike Street of Broadway, Eastlake and other cars from the north and east, which now make the Jackson Street loop. The committee declares that savings ranging between \$300,000 and \$400,000 annually could be effected by following this plan. When it was originally presented to Mayor Bertha K. Landes the plan was shelved after bitter opposition had been voiced by property owners in the older downtown section of the city.

D. W. Henderson, superintendent of railways, is opposed to the plan, which resulted, he said, when it was partly attempted two years ago, in a loss of revenue, although there was a saving in expenses.

The report outlines among the advantages of the Jackson line, the following: Fewer car hours; saving time of cars, men and power; release of many cars so that they could be made over into one-man cars, and shorter runs.

The Jackson plan of reducing service on First, Second and Third Avenues has been approved in principle by the Peter Witt report and by the report made by a representative of the Westinghouse Company, the committee adds. In view of the general approval given the plan, and the immediate needs of the system the committee recommends that the rerouting be put in effect in advance of such other changes as may be recommended later.

Bus Co-ordination in Florence

Four bus lines are now in operation by the municipal street railway system of Florence, Italy. These lines extend through those zones where tram lines do not reach. Gasoline buses formerly were used but the motive power has now been changed to current from storage batteries.

Electric Railways in Japan

The Imperial Government Railways of Japan spent approximately 12,016,119 yen (the yen is about 47 cents) for electrical equipment during 1927, by improving electric railway lines, extending generating facilities and building electric substations, according to a recent report. During the year, twelve locomotives and 89 tram cars were purchased from foreign countries.

There are 230 privately owned railways in Japan, comprising 2,917 miles. These railways are classified as follows: Steam, 1,317 miles; electric, 1,497 miles; steam and electric, 73 miles, gasoline, 30 miles.

Foreign News

Street Car Wins in Colombia

Narrow streets, rough pavements, public safety, and cost of installation were the factors which caused the Empresas Publicas Municipales, Medellin, Colombia, to decide to retain and improve the street railway system instead of substituting trackless trolleys.

The streets of Medellin are very narrow and are paved with rounded stones laid on top of the tamped earth. The Empresas, after due consideration of both methods of transportation, felt that its passengers would be more comfortable in street cars and also that, because of the narrow streets, a trolley confined to a given lane would be less dangerous to public life and property than the trackless trolleys.

The present street railway system of Medellin consists of eight lines, with two more projected, and its rolling stock consists of 34 Birney type safety cars with eight more on order. Within a year it is expected to increase the equipment to about 50 cars.

Railway Electrification in Silesia

Electrical operation has recently been started on the Breslau-Konigsvelt line, thus connecting the Silesian mountain railway, Gorlitz - Laban - Hirschberg-Konigsvelt, to the provincial capital and completing the electrification of this system. The conversion started in 1911, but the work on the first portions could not be finished before the end of the war and on account of great difficulties had to be continued on small sections, each of which was eventually opened for public service. The completion of this electrification makes the Silesian railway system, which is 351 km. in total length, second in Germany

to the Bavarian system only, both as to length and importance. It controls the main share of the tourist traffic in the Iser and Riesengebirge mountains as well as the Glatz mountain district of Silesia, and also provides for the extensive coal transport from the Lower Silesian colliery district.

Current for operating the railway system is derived from the Mittelsteine, county of Glatz, central station, owned by the state railway, where coal obtained in connection with clay working is used as fuel, at half the cost of ordinary locomotive coal. The current thus generated is supplied at a tension of 80,000 volts to various converter stations, where it is stepped down to 15,000 volts.

New Cars for Edinburgh

Expenditure of £31,000 for the purchase of new rolling stock has been approved by the Tramways Committee of Edinburgh, Scotland. Twelve new cars will be purchased soon, at an estimated cost of £1,800 each. The additional cars are required to meet increased traffic which is expected as a result of a substantial reduction in fares.

Bus Development in Germany

The German Post Office Department is one of the largest operators of motor buses in Germany. While the primary function of the department is to carry mail and packages, it finds there is economy in purchasing motor vehicles which can also transport passengers. On April 1, 1927, it had 1,504 bus routes in operation over a total length of 16,650 miles. The number of passengers carried during the first eleven months in 1926 was 23,100,000.

New Electric Railway Completed in Spain

Between Puertollano and Conquista, Spain, a new electric narrow-gage railway, 34 miles long, has been completed recently by the Sociedad Minera Penarroja. It forms an extension of the existing line between Penarroja and Puertollano, and is mainly intended for freight transport. Power is supplied from the steam-operated generating stations belonging to the company at Penarroja and Puertollano.

New Traffic Scheme for Manchester

Plans for the improvement of rapid passenger transit facilities in Manchester, England, and regions beyond, are being considered by the municipal authorities. Henry Mattinson, general manager and engineer of the Corporation Tramways, has suggested two comparatively short underground railways crossing the city at right angles, with an interchange station at the point of their intersection in the center of the city, and with interchange stations at all the main-line railway terminals. At their suburban ends these underground lines would come to the surface and form physical junctions with the existing steam suburban railways. To insure through running the suburban railways would have to be electrified.

Buses to Be Installed in Norway

Street car lines are to be gradually replaced by bus lines in Bergen, the second largest city in Norway, according to a recent decision of the Board of Aldermen of that city. Bergen has a population of about 100,000.

Recent Bus Developments

Trolley Bus Application Made in Salt Lake City

The City Commission of Salt Lake City, Utah, has granted an amended franchise to the Utah Light & Traction Company which permits the operation of trolley buses over all its existing lines within the city. Application has been filed by the company with the Public Utilities Commission of Utah for permission to operate trolley buses specifically over what is known as its Fourth East car line.

If this permission is granted ten buses will be ordered, and it is anticipated that operation on this line will commence about July 15. The trolley buses on this line will be operated on Main Street from North Temple or South Temple to Seventh South Street, east to Fourth East Street, and south 21st South Street, in accordance with the franchise.

The proposed route is about 4 miles long and serves a district that is well built up. The new line is to be so routed that cars over it will traverse the heart of the business district to the State Capitol.

Cleveland Suburb to Have Buses

Authorization was given by the City Council of Cleveland, Ohio, recently for the Cleveland Railway to operate three coach lines in Rocky River village, a suburb 8 miles from the center of Cleveland and separated from Cleveland by the city of Lakewood. The original ordinance drawn in the Council specified a 10-cent fare with free transfers to city car lines in Lakewood. Street Railway Commissioner C. M. Ballou pointed out that this would simply add to the losses on the Lakewood lines. Accordingly the ordinance was amended to permit transfers between the bus lines but not between the buses and street cars.

At present no buses are available, but the company next month will have twelve which are now used in chartered school service.

Property in South Bend Sold

Operation of the South Bend Motor Bus Company by a group of five men, including two officials of the Chicago, South Bend & Northern Indiana Railway was taken over on May 15. The purchasers of the bus company's stock are R. R. Smith, receiver for the railway; George R. Green, general superintendent; Alfred E. Dietrich, New York City; A. L. Kitselman, Muncie, and A. H. Plumb, Emporia, Kan.

Directors in the company are R. R. Smith, president and treasurer; George R. Green, vice-president and secretary, and O. A. Small.

Arrangements are being made for the

exchange of transfers between the bus and the electric railway lines.

Mr. Smith said that purchase of the bus line as individuals was based on the confidence in the future of South Bend and in the industrial expansion particularly in the western part of the city served by the bus line. The South Bend Motor Bus Company recently started service to the rapidly growing Belleville industrial district in the west part of the city.

Knoxville Company Rejects Demands of City

The City Council of Knoxville, Tenn., has passed a franchise granting the Knoxville Rapid Transit Company the right to operate nine bus lines as outlined by city planners. This ordinance must pass second reading and lie over seventeen days. The Rapid Transit

Company then will ask the state commission for its approval of the franchise.

General Cates for the Knoxville Power & Light Company, in a prepared statement, outlined his company's offer to operate buses and to stand half the cost of Kingston pike track changes. He said:

We are advised that the laws of the state prohibit unnecessary duplication of public utility operations and property, the result of which usually, if not always, comes to be borne by the consumers or patrons of the utilities.

In taking action the Council rejected Power-Light's reply to an ultimatum the Council bus committee placed before the company containing four demands: first, that the company relocate at its own expense its Kingston pike line, and maintain paving on the line after the city paved it; second, to change all other tracks as recommended in the Bartholomew transit survey; third, give free bus transfers, or vice versa; fourth, grant 5-cent fare to school children.

The company has explained at length the economic and other reasons which make it impossible for it to accede to these demands.

New Terms in Kansas City

Fares 15 cents on trunk lines under ordinance just passed. \$563,450 deficit after more than two years of operation. Company's memorandum to Council an interesting study

THE Council of Kansas City, Mo., on the night of May 21 granted a new motor coach permit to the Kansas City Public Service Company by a vote of eight to one. The plan of operation that was approved was about as first submitted. It provides for five trunk lines, one crosstown line and six feeders. The trunk line fare is increased from 10 to 15 cents, but the crosstown fare remains at 10 cents.

SERVICE GIVEN SINCE 1925

The present bus system in Kansas City was installed in the fall of 1925 in response to an apparent public demand for such facilities. Service was begun under the terms of an ordinance dated April 7, 1925, and expiring June 7, 1928. It was recognized at the time that the institution charged with the responsibility of furnishing city-wide public transportation was the logical one to supply this additional service and should be required to co-ordinate bus service with its existing facilities. It was admitted that competition was unsound and undesirable, and if bus service was to be considered, that feeder and crosstown service was an essential which could best be supplied by the railway company.

Due to the uncertainty surrounding bus transportation, a short term was specified until experience under actual operating conditions should determine what was best for the company, the car and bus riders, and the city. The

franchise provided that a seat be guaranteed every passenger and that pneumatic tires be used.

On March 30, 1928, the railway, through President Powell C. Groner, submitted to the Council a report and suggestions covering the present operation of buses and proposed rerouting and rearrangement of the system. This contained the operating figures for the two full years operation, 1926-1927, and estimates for the rearranged system based on experience and believed to be a very close forecast. Attention was called to the fact that the trend of expense will be upward, rather than downward, inasmuch as it might not be possible to renew a very favorable tire contract and that since buses have been in constant service their maintenance expense will increase.

It was suggested that on some lines night service be eliminated, and on some both night and non-rush day service to avoid expense out of all proportion to the patronage.

SERVICE ONLY WHERE LOGICAL

An effort was made in presenting the new proposal to lay out routes which would furnish service where logical or needed, and at the same time furnish revenues which would permit the system to exist. There are several places where service has been requested, but in the company's opinion these districts have not yet reached the point in population where bus service, unless on some sub-

LINES OPERATED UNDER OLD FRANCHISE

TRUNK LINE SERVICE

Route	One Way Mileage
No. 1 Northeast line.....	5.01
No. 2 Benton-Linwood line.....	6.09
No. 3 Armour-Paseo line.....	6.60
No. 4 Warwick line.....	6.18
No. 5 Express line.....	7.15

FEEDER SERVICE

No. 6 Blue Valley line.....	3.00
No. 7 Leeds line.....	2.57
No. 8 Thirty-ninth Street line.....	5.48
No. 9 South Troost line.....	3.00
*No. 10 Forty-third Street line.....	1.23
*No. 11 Rosedale line.....	1.40

*These two lines have only been in operation a short time, No. 11 being on a 60-day trial by agreement. *Trunk lines*—10-cent fare. Transfers to and from 39th Street crosstown line on payment of 5 cents. *Express line*—25-cent fare; 19¢-cent ticket fare good in non-rush period only. No transfers. *Feeder lines*—10-cent fare with transfer to street cars. *Thirty-ninth Street line*—10-cent fare with transfer to street cars. 5-cent transfer to intersecting bus lines.

Total number of buses owned:	
Double-deck.....	18
Large single-deck.....	40
Express buses.....	5
Small single-deck.....	6
Total.....	69

Average number of buses operated daily.....	60
Total investment in bus and garage equipment, exclusive of garages.....	\$740,981
	1922 1927

Number passenger-miles operated in Missouri, excluding Rosedale and 43rd Street lines and special sight-seeing and chartered bus service.....	2,456,560	2,606,824
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sidy basis, should be considered. The company said at that time:

These suggestions are submitted on the assumption that the Council will favor a continuation of bus service and that such continuance will serve the public interests and is desired by the people of the city. However, these suggestions should not in any manner be construed as an attempt to forecast the determination by the Council or the public as to whether or not bus service is desired after expiration of the present franchise in the coming June, or to preclude a full consideration of that question.

While the suggestions have been prepared after ample study and are believed to be sound, an actual test is necessary finally to determine that question. We therefore recommend that the rearranged system be given a fair trial for a reasonable period under some form of temporary or revocable license or permit, pending final determination.

Bus service in Kansas City falls into two classifications, namely trunk line service run direct from residential sections downtown, following the general course of railway lines and serving approximately the same territory; and feeder service, which consists of feeder and crosstown lines with transfer privileges, supplying transportation to outlying and unserved sections and connecting through paralleling street car lines.

As the company saw it, the operation of buses had demonstrated:

1. That Kansas City presents operating difficulties which bus and tire manufacturers have not experienced previously and which necessarily make operation more expensive than in flat, level cities.
2. That feeder lines entail a heavier loss than anticipated and that especially in non-rush and night hours these facilities are not needed nor used.
3. That trunk lines come much nearer to paying operating expenses than do the feeder lines.

4. That trunk line bus service creates very little new business and that at least 90 per cent of such patronage is taken from the street cars.

5. That, determined by carrying capacity and lack of short riding, 47th Street is about as far south as trunk line service should be operated.

6. That trunk line service guaranteeing a seat for every passenger and with pneumatic tires cannot be furnished for a 10-cent fare, except at an actual operating loss.

OPERATING RESULTS

The entire bus system has been operated at a heavy loss since its inception. Statistics of revenue passengers and transfer passengers, together with average fare data, for both Missouri and Kansas, follow:

Year	Revenue Passengers	Transfer Passengers	Average Fare
1926.....	5,571,003	987,531	\$0.0950
1927.....	5,219,703	691,390	0.0977

Note—The above includes 396,147 revenue and 405,626 transfer passengers carried on the Argentine, Kansas City, Kan., line, which was discontinued in November, 1926.

Operating expenses, revenues and deficit for all operations both Missouri and Kansas:

street car lines north of 31st Street and a 5-cent transfer to all intersecting crosstown bus lines. For feeder lines it

DEFICIT WITHOUT INTEREST CHARGES

Year	Revenues	Operating Expenses and Taxes	Depreciation	Deficit
1926.....	\$627,356	\$788,883	\$88,154	\$249,681
1927.....	594,073	646,324	86,674	138,925

DEFICIT WITH INTEREST CHARGES

Year	Revenues	Operating Expenses Taxes—Depreciation	Interest	Deficit
1926.....	\$627,356	\$877,038	\$70,108	\$319,790
1927.....	594,073	732,999	71,278	210,204

The total bus deficit from installation to Dec. 31, 1927, was \$617,645. Note—The large reduction in operating expenses in 1927 was largely due to a favorable tire contract which expires in 1928 and which there is no assurance of renewing.

These figures are for all operations both in Kansas and Missouri, including special bus service, advertising privileges, the Argentine, Kansas City, Kan., line discontinued in November, 1926, and the 43rd Street and south Rosedale lines added in December, 1927.

The losses incurred in furnishing bus service necessarily have to be made up by the railway lines, already faced with a 17 per cent decrease in revenue since 1922, and a decrease continuing at a rate of about 5 per cent per annum.

The comparison between 1922 and 1927 shows the seriousness of the situation facing the company:

Year	Revenue Passengers Carried	Per Cent Decrease	Passenger Receipts	Per Cent Decrease	Car-Miles 1,000 Passengers	Per Cent Increase Car Service
1922.....	136,076,541	.....	\$10,213,928	.....	184	.....
1927.....	113,542,693	16.56	8,484,611	16.93	214	16.3

The company suggested that these considerations were essential if a continuation of bus service at the expiration of the franchise seemed desirable:

1. That the bus system as a whole should be self-supporting.
2. That the trunk lines should be routed to give the most direct and the quickest service between the residential and business districts.
3. That feeder service should provide crosstown facilities and give transportation

was suggested that the fare continue as at present at 10-cents with free transfers to intersecting or connecting street car lines or crosstown bus lines. The fare suggested for the 39th Street crosstown was 10 cents as at present, with free transfers to intersecting or connecting railway lines and with transfers to intersecting trunk lines upon payment of 5 cents.

The opinion was advanced by the company that 15 cents was not too much for a trunk line bus ride, based upon its cost and the service rendered. All the territory in which there is trunk-line bus service is served by railway lines

and passengers have a choice of service.

It was contended by the company that transfers should not be given to or from trunk lines, except that the railway was prepared to give free transfers from trunk lines to intersecting crosstown car lines north of 31st Street. These trunk lines are in addition to existing facilities, as every district reached by them is served by car lines. They are operated to supply a demand for a high-class, seat-for-every passenger service,

and cannot meet transfer requirements. The idea was that feeder lines should feed primarily to car lines, not bus lines. Street cars are provided with sufficient capacity for all transferring passengers. There is no intent or purpose to supplant them or cripple them by taking passengers from their territory except where the fare secured makes it reasonable so to do.

The routes that were proposed were laid out to form insofar as possible to the principles outlined in the company's proposal and represented an effort to provide trunk line bus service through heavily populated territories, to supply a demand for luxury service and also by feeder and crosstown service to meet the transportation needs of the city.

ESTIMATED FINANCIAL RESULTS

The results of operation under the proposed plan were estimated for a year. On the trunk lines a 10 per cent decrease in riding was estimated as the result of an increased fare. The average revenues for the feeder lines were taken with the exception of 39th Street and South Troost, where no changes were made. Actual operating expenses were set up, based upon the present equipment and the kind to be placed upon each line.

From the foregoing it is apparent that the proposed plan will not make the bus system self supporting. This is due to the large amount of feeder mileage. It is very doubtful if for years

STATEMENT OF BUS OPERATION OF KANSAS CITY PUBLIC SERVICE COMPANY FROM INSTALLATION TO DEC. 31, 1927, MISSOURI OPERATIONS ONLY

	1925	1926	1927	Total to Dec. 31, 1927
Passenger revenue.....	\$124,742	\$570,963	\$577,483	\$1,273,189
Special bus revenue.....	751	4,601	14,102	19,455
Advertising.....			2,487	2,487
Total revenue.....	\$125,494	\$575,564	\$594,073	\$1,295,132
Maintenance and operating expense				
Way and structures.....	\$6,068	\$5,537	\$9,366	\$20,973
Equipment.....	33,195	197,908	177,340	408,444
Total maintenance.....	\$39,264	\$203,446	\$186,707	\$429,417
Conducting transportation.....	97,061	417,602	375,400	890,064
Traffic.....	4,715	4,853	4,262	13,831
General and miscellaneous.....	13,920	57,444	40,701	112,066
Injuria and damages.....	5,553	24,875	26,648	57,076
Total operating expense and maintenance.....	\$160,515	\$708,221	\$633,719	\$1,502,457
Depreciation.....	14,075	80,511	86,674	181,261
Taxes.....	2,071	12,265	12,604	26,941
Interest on investment (8 per cent of actual costs)...	8,684	52,625	59,278	120,588
Garage rental.....	3,333	12,000	12,000	27,333
Total maintenance, operating taxes and fixed charges.....	\$188,680	\$865,624	\$804,277	\$1,858,582
Deficit.....	\$63,186	\$290,059	\$210,204	\$563,450

Interest charges are based on actual cost of buses and garage equipment only, and do not include the garage building and real estate or materials and supplies in store.

illogical and unfair, and economically unsound, to require the railway patron to bear the loss of providing a preferred and more luxurious service to a comparatively small number. The demand from a considerable number for downtown transportation affording more luxury and guaranteeing a seat for every passenger should be met, but those availing themselves of such service should pay its cost. There was no equity in giving 3 per cent of the total passengers

to offset the bus losses. On that account it was suggested feeder line fares remain as at present and that trunk line fares be increased to meet the cost of the service.

BUS STILL IN ITS INFANCY

The company believes bus transportation is still in its infancy and may be considered in the experimental stage, and expressed the opinion that the grant either be in the nature of revocable permits or for a period of not more than five years. This would give sufficient stability to justify the investment and not unduly tie the hands of the city or the company. It was suggested that before any definite franchise or operating agreements are entered into, the lines proposed by the company should be put to the test of actual experience for a short time, under a temporary or revocable form of license or permit.

Since the bus is ideally adapted by its very mobility to meet the shifts in conditions and population, the company recommended that, in the working out of this problem, the company be not "strait-jacketed" by hard and fast provisions as to routes and service which might shortly become entirely out of date, but that a reasonable latitude be allowed for shifting existing lines and extending or curtailing operation as conditions from time to time justify.

ESTIMATE OF RESULTS UNDER OPERATION AS PROPOSED

No.	Miles	Revenues	Operating Expenses, Depreciation, Taxes and Interest	Profit or Deficit*
1. Linwood-Benton.....	359,557	\$147,274	\$134,491	\$12,782
2. Armour-Paseo.....	335,294	140,219	125,415	14,803
3. Warwick.....	456,553	123,451	133,582	*10,134
4. Broadway.....	399,900	108,132	119,501	*11,360
5. Chestnut.....	240,365	29,156	64,693	*35,538
6. Van Brunt.....	201,770	24,474	54,307	*29,837
7. 39th Street.....	312,060	62,755	92,997	*30,242
8. 43rd Street.....	30,690	3,722	6,747	* 3,024
9. South Troost.....	165,780	17,622	36,458	*18,835
10. Oak Street.....	98,655	11,966	26,553	*14,586
11. 63rd Street.....	92,780	11,254	20,402	* 9,148
12. South Rosedale.....	55,880	6,778	12,288	* 5,509
Total.....	2,749,284	\$686,810	\$827,438	*\$140,628

ESTIMATE OF RESULTS UNDER FULL EIGHTEEN-HOUR OPERATION

All routes.....	Miles	Revenues	Operating Expenses, Depreciation, Taxes and Interest	Profit or Deficit*
	2,911,450	\$724,246	\$902,969	*\$178,723

\$38,095 will be saved by reducing or eliminating service in the hours not used.

Compared with present operations:

	Miles
Present mileage yearly.....	2,606,824
Proposed mileage yearly.....	2,749,284
Deficit for 1927.....	\$210,204
Deficit as estimated.....	\$140,628
Deficit with eighteen-hour service on all lines.....	\$178,723

these feeders will pay operating costs, and it is certain the losses incurred in this operation will never be recouped.

In elucidating the general principles covering bus operation which it advanced, the company held that the large losses resulting from feeder lines should be met, if possible, by such profits as the trunk lines on a proper fare basis can earn. Its idea was that it was

service at the expense of the 97 per cent who use street cars. In the face of constantly declining revenues it was apparent that if the street cars were continually called upon to carry the burden of bus losses, as well as non-paying car lines, the company's resources would be drained and its credit impaired. The result would inevitably be either decreased service or an increase in fare

New Plans in Springfield

Plans are being made by the Springfield Street Railway, Springfield, Mass., to use buses for private parties on special trips to Boston, New York, Providence, and other points. General Manager Flanders aims to go strenuously after this type of business with the early arrival of six new buses. Co-operation with the Worcester Consolidated Street Railway's bus division in this type of service is under consideration.

The Springfield company is also arranging for bus substitution on the Bucham Bend line.

Financial and Corporate

Holding Company Issue Offered

Details of financing of Allied Power & Light Corporation under which Stevens & Wood-Hodenpyl, Hardy merge

Bonbright & Company, New York, is offering for subscription at \$105 a share and accrued dividends from May 15 first preferred stock, \$5 series, of no par value of the Allied Power & Light Corporation, each share of preferred being accompanied by one share of common. As noted in the ELECTRIC RAILWAY JOURNAL for May 12, page 785, Allied Power has contracted to acquire the business, assets and contracts of Hodenpyl, Hardy & Company, Inc., and the entire capital stock of Stevens & Wood, Inc., together with substantial stock interests in Commonwealth Power Corporation, Penn-Ohio Edison Company, Northern Ohio Power Company and other power and light systems.

The new company, either directly or through others, will act in a supervisory capacity for a number of power and light companies and will supply engineering, supervisory and financial assistance in connection with the development and operation of these companies and the construction of additions to their properties. It will take a financial interest in electric power and light and other companies through the purchase of their securities and will be prepared to supply the necessary capital and direction for the re-organization or consolidation of properties of the aforementioned character. It will also furnish engineering services and do general construction work.

The proceeds from the sale of the first preferred stock, together with the proceeds from the sale of preference stock and common stock, will be used to acquire interests previously described and for general corporate purposes.

Based on the earnings of Hodenpyl, Hardy & Company, Inc., for 1927, excluding dividends and interest received, and on the earnings of Stevens & Wood, Inc., for 1927, and adding dividends at the rates paid during the twelve months ending May 1, 1928, on stocks acquired by the corporation and interest on cash to be presently realized at the rate of 4½ per cent per annum, the annual net income after expenses and taxes is computed to be not less than \$1,500,000, or more than twice the annual dividend requirement on the 150,000 shares of first preferred stock.

This first preferred stock will be followed by 100,000 shares of preference stock, \$3 series, and 1,250,000 shares of common stock. Upon the completion of this financing the securities owned by the corporation, at present market prices, together with cash in its treasury, will amount to more than \$25,000,000.

B. C. Cobb is chairman of the board of the new company and R. P. Stevens is the president. The board of directors is composed of B. C. Cobb, J. T. Harrington, vice-president of Penn-Ohio Edison Company; Jacob Hekma, vice-president of Commonwealth Power Corporation; Alfred L. Loomis, vice-president of Bonbright & Company, Inc.; Horace S. Scarritt, vice-president of Bonbright & Company, Inc.; Ray P. Stevens, president of Allied Power & Light Corporation, and Landon K. Thorne, president of Bonbright & Company, Inc.

Stock Increase Proposed at Philadelphia

A special meeting of the stockholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will be held on June 18 for approval or disapproval of an increase of stock.

The proposed increase amounts to \$5,000,000 preferred. City Council approved the issue on March 22, making the authorized capital \$65,000,000.

Proceeds from the sale of \$5,000,000 additional preferred will be used to relocate the Market Street subway tracks under City Hall, for a bus terminal on Locust Street and for a garage terminal near the northern end of the Broad Street subway.

Net of Detroit Municipal Lower

Net income of the Detroit Municipal Railway, Detroit, Mich., in April was \$25,225 after taxes, charges and sinking fund had been deducted, comparing with \$75,206 in April, 1927. For the first four months this year net income totaled \$346,914 against \$589,808 during a similar period the previous year.

Far from Being Moribund

THE electric railway systems in our cities remain vital necessities. They will for years to come, probably always, have a real place to fill. As the parking problem becomes more and more acute and the traffic congestion becomes greater we may expect the facilities of our street transportation systems to be subjected to an even greater strain. The tendency of an increasing number of people who work in the downtown districts to live as far as possible from the noise, the dirt and the confusion has unquestionably been a big factor in supplying traffic for the street cars. Transportation, under modern conditions, becomes all the time a more vital phase of our social and economic life. Assuredly the street car systems are far from being "moribund industries." — Nashville *Tennessean*.

Stock of Pennsylvania Company Offered

Reinhart & Bennet, New York, are offering at \$47.50 for each share, to yield 7.37 per cent, cumulative preferred stock of the Lackawanna & Wyoming Valley Railroad. The par value is \$50 per share. The company owns properties in Scranton and in Wilkesbarre, Pa., adjacent to the business centers of each city.

Another Power Property for Maryland Interurban

With the approval of the Public Service Commission the Chesapeake Bay Power Company, a subsidiary of the Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., has bought the Severna Company, which supplies current to Severna Park and other settlements in Anne Arundel County. With the acquisition of the Severna Company the Chesapeake Bay Power Company, controlling interest in which, as well as in the railroad, is now held by the Consolidated Gas, Electric Light & Power Company, Baltimore, now controls the electrical service for all of Anne Arundel County, Prince Georges County as far as Laurel and part of Montgomery County, under an agreement with the Potomac Electric Power Company, Washington, D. C.

Successor in British Columbia

As a result of the purchase of control of the British Columbia Electric Railway, Vancouver, B. C., Canada, by Holt, Gundy, Nesbitt, Thomson and Rothermere interests the name will be changed to British Columbia Power Corporation. Offering is being made in Canada and England by Wood, Gundy & Company and Nesbitt, Thomson & Company of 1,000,000 shares of class A stock of the new company at \$60 a share, with bonus of one class B share for each four shares of A purchased. Class A shares are preferred as to dividends up to \$2 a share. The directors include Sir Herbert Holt, Lord Rothermere, A. J. Nesbitt, J. H. Gundy, J. B. Woodyatt and S. Godin, Jr., representing the new interests. George Kidd of Vancouver will be president. The new company has a Canadian charter.

Segregation Before Delaware & Hudson Holders

Further progress in the plans for segregation of the activities of the Delaware & Hudson Company, New York, is indicated in the announcement that a special stockholders' meeting has been called for June 26.

The purpose of this meeting is to have stockholders authorize the board of managers, at any time not later than May 8, 1931, "to transfer to a new corporation to be organized under the railroad law of the state of New York any or all of the railroad properties

and stock of subsidiary properties, boat lines, electric railways, motor bus lines and hotels except any stock interest in any company engaged in the anthracite industry."

The consideration, it is explained, will be "in cash or in stock, bonds or other securities of the purchasing company, as the managers may approve."

Thus, the D. & H. proposal is to make

the present company a holding concern to own all stock issues of the railroad and anthracite company. By this means the railroad will obtain all legal powers of a railroad organized under the general railroad act of New York, whereas heretofore the D. & H. as a railroad has been limited to powers conferred by its charter of 1823 and subsequent amendatory acts.

More Passengers on Main Line

North Shore report for 1927 shows operating revenues increased over 1926 but Skokie Valley charges lowered net income. Freight business satisfactory

IN HIS message to the stockholders Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., stated that the business of the company for the year 1927 was the largest in volume in the history of the railroad. Gross operating revenue of \$7,829,592 compares with \$7,568,361 for 1926. On this point he says:

Although the increase is not as great as was expected from the showing made in the early part of the year nevertheless there is reason for gratification in the fact that an increase was shown in a year when the general business of the country showed a falling off from that of the previous year.

The gross income after deducting operating expenses and taxes was \$1,794,405 in 1927, a decrease of \$19,886 from the previous year. The net income was \$496,044 compared with \$731,427 in 1926. These facts were also disclosed in the annual report for the year ended Dec. 31, 1927. The decrease in the net income was due to the increased fixed charges under a full year's operation of the Skokie Valley Route. In the previous year the interest charges on the capital invested in the new railroad were not charged against operation until the opening of the line in June, 1926.

Along the entire 23 miles of road new municipalities have been created or corporate limits of old-established towns and villages have been extended. Practically the entire territory adjacent to the railroad is now within the corporate limits of cities and villages. This suburban area, brought by the new line within a few minutes' ride of the business center of Chicago, embraces thousands of acres of highly desirable home sites, capable when fully settled of housing a large population. With the completion during the year of arrangements with the steam railroads for the interchange of cars, a profitable carload freight business is being developed.

At the beginning of the year passenger rates were on the basis of 3 cents a mile. After application to the Interstate Commerce Commission, authority was granted to increase interstate rates to 3.6 cents a mile in March, 1927. The intrastate rates remained at 3 cents a mile, but on a further application to the Interstate Commerce Commission an order was issued Dec. 12,

1927, directing the company to increase its intrastate rates to 3.6 cents a mile. This order was made effective on Jan. 15, 1928. The increase in interstate passenger rates placed the company in a position to participate in through interline passenger traffic with steam railroads. As a result arrangements were perfected through which travelers may purchase tickets at North Shore stations for any part of the United States, Canada and Mexico over any railroad.

Passenger traffic on the main line showed a substantial increase over the previous year, notwithstanding the less favorable business conditions and the fact that in the last four months the railroad had keen motor coach competition between Chicago and Milwaukee. The company carried on its main line a total of 10,865,823 revenue passengers

INCOME ACCOUNT OF CHICAGO NORTH SHORE & MILWAUKEE RAILROAD

Operating revenue:		
Passenger and special car revenue.....	\$6,008,148	
Freight and express revenue.....	1,388,051	
Miscellaneous revenue.....	433,392	\$7,829,591
Operating expenses:		
Way and structures.....	\$491,629	
Equipment.....	458,172	
Power.....	574,469	
Conducting transportation.....	2,539,792	
Traffic.....	284,327	
General and miscellaneous..	1,392,475	5,740,867
Net revenue from railway operation....	\$2,088,724	
Net auxiliary operating revenue.....	68,477	
Net revenues from operations.....	\$2,157,201	
Taxes assignable to railway operation...	420,084	
Operating income.....	\$1,737,116	
Non-operating income.....	57,287	
Gross income.....	\$1,794,404	
Deductions from gross income.....	1,298,360	
Net income.....	\$496,044	
Statement of Surplus		
Surplus, Jan. 1, 1927.....	\$919,507	
Add sundry adjustments, net.....	163,043	
	\$1,082,551	
Net income, Jan. 1 to Dec. 31, 1927.....	\$496,044	
Profit on sale of real estate....	333,597	
	\$829,641	
Dividends paid.....	784,083	45,558
Surplus, Dec. 31, 1927.....	\$1,128,109	

in 1927, compared with 10,714,458 in 1926—a gain of 151,365. The increase was a steady growth as there were no outstanding occasions such as the Eucharistic Congress the year before. The total number of passengers carried on all rail and motor coach lines was 19,161,925, compared with 19,461,426 the previous year. The decrease of

Conspectus of Indexes for May, 1928

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares*	May 1928 7.62	April 1928 7.61	May 1927 7.44	May 1920 7.62	May 1923 6.88
Electric Railway Materials*	May 1928 140.4	April 1928 140.0	May 1927 144.2	Sept. 1920 247.5	Feb. 1928 139.5
Electric Railway Wages*	May 1928 229.2	April 1928 228.8	May 1927 227.4	Sept. 1920 232	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	May 1928 202.7	April 1928 201.2	May 1927 201.0	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	May 1928 210.0	April 1928 206.4	May 1927 206.8	June 1920 273.8	March 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities† 1926 = 100	April 1928 97.4	March 1928 96.0	April 1927 93.7		
Bradstreet Wholesale Commodities 1913 = 9.21	May 1 1928 13.44	Apr. 1 1928 13.42	May 1 1927 12.44	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	April 1928 152.1	March 1928 151.4	April 1927 153.6	July 1920 219.2	March 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	April 1928 160.8	March 1928 161.1	April 1927 163.7	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Apr. 30 1928 3.872	Mar. 31 1928 4.335	Apr. 30 1927 3.456	July 31 1920 11.118	May 31 1927 3.051
Bank Clearings Outside N. Y. City (Billions)	April 1928 19.00	March 1928 19.72	April 1927 18.55	Oct. 1925 20.47	Feb. 1921 10.43
Business Failures Number	April 1928 1712	March 1928 2007	April 1927 1659	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	April 1928 41.14	March 1928 51.64	April 1927 56.15	Jan. 1924 122.95	Aug. 1925 27.22

*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.

†This index is changed to a base of "1926 = 100." That notation replaces the former basis of "1913 = 100." Inasmuch as the bureau has not calculated the index on this new base any further back than January, 1923, no figures are shown in this tabulation for the high and low points since the war. It is planned to compute the index on the new basis as far back as January, 1913. Until such time as the bureau makes public these figures for the earlier years this information will be lacking.

299,501 passengers on the Milwaukee and the Waukegan City Lines, and the motor coaches during the latter months of the year, is accounted for by a general slackening in industrial activities and considerable unemployment.

The company operated 13,746,370 car-miles compared with 13,485,302 the previous year and 1,299,313 bus-miles compared with 1,434,612 miles in 1926. The car-miles operated on the Milwaukee city lines were 477,615 compared with 543,207 the previous year.

FREIGHT TRAFFIC INCREASED—NEW L. C. L. METHOD

A satisfactory feature of the year's operations, was the substantial increase in the freight business. The freight and merchandise despatch business amounted to 843,000 tons, an increase of 186,000 tons over the year 1926. The increase was all in carload freight, a branch of service made possible by operation of the new Skokie Valley route.

During the year the company introduced a new method of handling less than carload freight, which is known as "ferry truck service." This service consists of a door-to-door pickup and delivery in Chicago and Milwaukee. Goods are loaded in a special steel trailer at the warehouse of the shipper and are not touched by hand until unloaded at the door of the consignee. Shipments are handled in equipment developed on the North Shore Line.

New track construction amounting to 16,500 lin.ft. was completed during the year. The new trackage mainly consists of sidetracks into industrial yards to increase facilities for handling carload freight.

CONCESSION PRIVILEGES VALUABLE

Concessions operated by the company in various stations produced a gross revenue for the year of \$586,351, compared with \$545,453 the previous year and net income of \$68,934 for the year.

The "Better Business Campaign" to enlist the interest and support of employees in procuring new business for the railroad was continued. A total of 16,654 business "tips" was received from 815 employees. These "tips" on business often result in the development of new business.

During the year the company sold \$2,500,000, three-year 5½ per cent gold notes to retire floating indebtedness and reimburse the treasury for expenditures made for additions and betterments. Equipment trust certificates to the amount of \$804,000 were sold for the purchase of fifteen steel passenger cars, two steel dining cars, one steel parlor-observation car, ten steel city cars for service on the Milwaukee City Lines, and two 65-ton combination storage battery and trolley electric locomotives. First and refunding mortgage 6 per cent gold bonds to the amount of \$156,400, and \$92,300 of first and refunding mortgage 5½ per cent gold bonds were acquired through the operation of the sinking fund. During the year \$271,000 in equipment trust certificates were retired.

Holders at Milwaukee Urged to Convert Preferred Stock

Holders of the 7 per cent preferred stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., series of 1921, are being urged to exchange that stock for the 6 per cent issue of the company. There has been no formal call of the 7 per cent stock for retirement, but the holders, many of them patrons of the company, are being reminded that the stock is callable on 30 day's notice on any dividend date at 105 and dividend. The point is made that the 6 per cent issue is not callable except at \$110 a share.

As part of the program of keeping stockholders informed about its affairs, the company has recently reprinted for distribution among them the series of articles "Service First Is Milwaukee's Transportation Slogan," contributed to the issues of the ELECTRIC RAILWAY JOURNAL for Feb. 25 and March 3, 1928, by Charles Gordon, the editor.

Drop in Receipts in Kansas City

Electric railway and bus receipts for the Kansas City Public Service Company, Kansas City, Mo., for the period between Jan. 1 and May 6 were \$139,034 less than the receipts for the corresponding period of last year. There was a decrease of 1,444,606 in street car passengers in that period, and an increase of 92,585 in bus passengers. Total business decreased 4.26 per cent.

Value of Trolleys Written Down by Delaware & Hudson

According to the *Wall Street Journal* the Delaware & Hudson Company wrote down the book value of investments in stock of affiliated companies approximately \$7,000,000. This is largely due to a reduction in book value of stock of United Traction Company, Albany, N. Y., from \$12,499,600 to \$7,499,600 and a reduction in book value of stock of the Schenectady Railway from \$2,050,000 to \$1. These adjustments were concurrently debited to profit and loss.

The Delaware & Hudson Company and New York State Railways, controlled by the New York Central, own equally the 41,000 shares of Schenectady Railway common stock. United Traction Company's stock, consisting of 125,000 shares, is owned entirely by the Delaware & Hudson. This company controls the Hudson Valley Railway.

Increased Valuation of Peoples Company in Indianapolis

The Indiana board of tax commissioners has increased by \$86,000 the valuation of the Peoples Motor Coach Company, Indianapolis, Ind., a subsidiary of the Indianapolis Street Railway. Its valuation has been fixed at \$200,000 for tax purposes for 1928. The increase was made in spite of a representation by the railway officials that the

value of the company's plant, less depreciation from original cost at the rate of 30 per cent a year on bus equipment, was barely \$72,300. When the railway officials were seeking to buy the coach company for \$500,000 some months ago, experts testified before the commission for the company that a 15 per cent annual depreciation charge was adequate and finally gained commission and court approval to make the purchase. The Peoples Motor Coach Company reported a net income of approximately \$14,000 for 1927, about \$50,000 lower than the railway officials anticipated when they made the purchase.

Action on Washington Merger Postponed

Action on the plan to merge the Capital Traction Company, the Washington Rapid Transit Company and the railway lines of the Washington Railway & Electric Company, Washington, D. C., was laid aside definitely until the next session of Congress when the Senate District committee decided on May 22 to appoint a subcommittee to go into the question during the summer.

The committee instructed Chairman Capper to prepare a resolution, to be introduced in the Senate immediately, asking for a special fund of \$10,000 with which to employ experts to assist the subcommittee in its study of the merger agreement. It was indicated that this inquiry will revolve principally around the valuation, which has been placed at \$50,000,000 in the merger agreement.

Senator James Couzens, Republican, of Michigan, is not a member of the District committee, but was invited to the meeting on May 22 at the suggestion of Senator Vandenberg, because of the experience he had as Mayor of Detroit in dealing with electric railway problems.

The merger resolution, authorizing the railways to consolidate in accordance with the terms of the agreement worked out, was reported favorably by the House District committee more than a week ago.

\$129,754 Net in Buffalo for Quarter

A substantial improvement was made by the International Railway, Buffalo, N. Y., for the three months ended March 31. Operating revenue was \$2,804,621 compared with \$2,706,384 for a similar period last year. This improvement, with a decrease of \$147,000 in operation and taxes and an increase of more than \$7,000 in non-operating income, brought the gross income to \$489,782. After deduction of fixed charges there remains a net income of \$129,754 compared with a deficit of \$123,167 over a similar period in 1927.

The consolidated statement bears a footnote that the 1927 figures include an amortization charge of \$83,182. With the approval of the Public Service Commission this charge has been discontinued, effective Jan. 1, 1928.

Personal Items

W. H. Burke President of Southwestern Association

W. H. Burke, district manager of the Stone & Webster properties in the Southwestern district, was elected president of the Southwestern Public Service Association at the meeting in Dallas May 2 to May 5. In Texas, Louisiana, New Mexico and Mexico Mr. Burke is well known. In 1925 he was appointed manager of the Northern Texas Traction Company of Fort Worth and the Tarrant County Traction Company. Previous to that connection he had been with the Houghton County Traction Company. He has been identified with the Stone & Webster organization for many years, entering the statistical department of



W. H. Burke

the Boston office in 1910. Later he served in Dallas.

For a while he left Stone & Webster management to go to Milwaukee and assume the position of manager of the light and power operations of the Milwaukee Electric Railway & Light Company. In 1915 he was back in the Boston office of Stone & Webster as assistant to M. M. Phinney, who was vice-president of Stone & Webster Management Association. His next move was to Keokuk, Iowa, with the Stone & Webster organization.

Mr. Burke was born in Maine. He was graduated from the University of Maine in 1906. After his graduation he spent about two years with various companies in New York and Pennsylvania on power house and substation operation and maintenance.

C. C. Phares in New Post at Akron

C. C. Phares, formerly foreman at the Brittain carhouse of the Akron property, has just been appointed to the superintendency of the Akron garages of the Northern Ohio Power & Light Company.

Mr. Phares was born at Gilman, W. Va. After he left school Mr. Phares was in the lumber business for eight or ten years. He was a member of the 54th Artillery from Boston in the World War, and was over seas for six months. When he returned to Akron he entered the employ of the International Harvester Company, and served that company more than nine years as a foreman.

For two years prior to his recent appointment he was in charge of maintenance for the Zeno Transportation Company, now included in the system of the Northern Ohio Power & Light Company.

P. J. Farrell Named to I.C.C.

President Coolidge has sent to the Senate for approval the name of Patrick J. Farrell for appointment to the Interstate Commerce Commission. The nomination is regarded as being based on his long and successful service with the commission. Mr. Farrell has been arguing cases before the Supreme Court for the commission for twenty years.

Mr. Farrell was born in Stanstead, Quebec, in 1861. He received his formal education at Wells River and Newport, Vt., but private study was his chief means of advancement. In 1880 he was a clerk for the Connecticut & Passumpsic River Railroad at Newport, Vt., later filling the positions of train dispatcher, station agent and passenger train conductor for the road. He began to study law in 1884 and was admitted to the bar and became a railway postal clerk in 1887. He resigned as chief clerk of the Railway Mail Service with headquarters at Boston in 1889 and formed a law partnership with C. A. Prouty, who later became an Interstate Commerce Commissioner.

Mr. Farrell became treasurer of the Orleans Trust Company when it was organized at Newport in 1891. He was the commission's first chief examiner and as head of the law division held the office of solicitor for several years. He was appointed chief counsel in charge of all legal matters, including those of the Bureau of Valuation, in 1918.

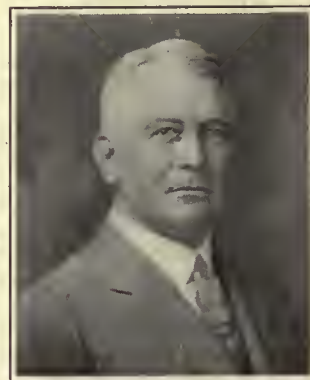
Mr. Farrell would succeed John J. Esch, now serving under a recess appointment.

PATRICK H. MOYNIHAN, since 1921 a member of the Illinois Commerce Commission, was appointed chairman of that body May 10 by Governor Len Small, succeeding David H. Jackson, who resigned April 25 at the request of the state executive.

RAY BAUMGARDNER has become director of public information for the Central and Southwest Public Utilities Company. In this work he succeeds the late George McQuaid.

J. P. Griffin Honored by Southwestern Association

James P. Griffin, vice-president in charge of all operations, Texas Electric Railway, Dallas, Tex., was elected chairman of the railway section of the Southwestern Public Service Association and vice-president of the association itself at the meeting in Dallas May 2-5. Mr. Griffin went to Dallas 23 years ago with J. F. Strickland as secretary of the Texas Traction Company, then engaged in building an interurban from Dallas to Sherman. The line was put in operation in 1908 and Mr. Griffin served as secretary, general passenger agent and auditor. Four years later he became secretary of the Southern Traction Company, then building the interurban line from Dallas to Waco and Dallas to Corsicana. When these lines were put in operation in October, 1913, Mr. Griffin also served as general passenger agent. Upon the consolidation of the Texas Traction Company and the



James P. Griffin

Southern Traction Company, under the name of the Texas Electric Railway in 1917, Mr. Griffin was elected secretary and general passenger agent, and in 1923 he was elected vice-president. Effective July 1, 1926, he was given the title of active vice-president in charge of all operations. This change became operative upon the resignation of Burr Martin, vice-president and general manager because of ill health.

Mr. Griffin was born at Waxahachie, Tex., in 1881. He was graduated from the high school there in 1900 and took special work at the University of Texas in 1903. His first railway experience was at Waxahachie in the general freight and passenger office of a subsidiary of the Southern Pacific.

THOMAS STANION, who was in charge of public relations with the St. Louis Public Service Company, St. Louis, Mo., has resigned to accept a position with the sales department of the Mutual Benefit Life Insurance Company, New York City. He will be located at 225 Broadway. Mr. Stanion has been associated with the St. Louis utility since the company was formed as the successor to the United Railways.

**Men Promoted at Providence
Long with Property**

R. Roscoe Anderson, Joseph A. Lockhart and James A. Hackett have taken on their new duties with the United Electric Railways, Providence, R. I. The announcement of their appointments was referred to in *ELECTRIC RAILWAY JOURNAL*, issue of April 28, 1928.

Mr. Anderson, who has been promoted to the post of general superintendent of operations, has been superintendent of transportation since 1907. At that time he succeeded Samuel Riddell, who was made general manager of the Chicago, South Bend & Northern Indiana Traction Company. Mr. Anderson entered the service of the Rhode Island Company in 1894 as a clerk, reporting to A. T. Potter, who at that time was general manager of the company but later became vice-president. When Mr. Potter became vice-president Mr. Anderson became chief clerk in the office of the superintendent of transportation. Mr. Anderson was born in Utica, N. Y., 55 years ago. He has lived in Providence practically all his life.

Joseph A. Lockhart, who has taken on the duties of assistant superintendent of transportation, has been an employee of the United Electric Railways for about 23 years. Early in his career he was in charge of the North Main Street carhouse and during the first years of his employment worked in various capacities. Twenty-one years ago he was assigned to the claim department and for fifteen years was assistant to Charles E. Redfern, general claim agent. Before he went to Providence he was division superintendent of the Newport-Fall River Street Railway under E. P. Shaw. This was a small company but Mr. Lockhart's duties were many. In addition to his managerial work he was purchasing agent, had charge of the power station, the track work and the line repairs, the employees of these divisions being subject to his direction.

Mr. Hackett, who becomes supervisor of traffic, has been employed by the United Electric Railways for 39 years, working during that period of time as hill boy, horse-car driver, motorman, inspector, chief inspector and supervisor of traffic. Mr. Hackett has lived in Providence all his life. He was born there on June 13, 1873.

Obituary

ERNEST HATTON, who retired two years ago from the post of general manager and engineer of the Newcastle-on-Tyne Corporation Tramways after 21-years' service, died on April 26. He had rendered notable services in regard to extension of the Newcastle tramways in the starting and carrying on of the large municipal bus undertaking. At one time he took a prominent part in the two British tramway associations' proceedings.

Manufactures and the Markets

**A.E.R.A. Exhibit Committee Makes
Space Assignments**

SPACE was assigned at the meeting in Cleveland, May 16, by the exhibit committee of the American Electric Railway Association to 176 exhibitors for the 47th Annual Convention which will take place in that city, September 22nd to 28th inclusive. An assignment of 102,170 net square feet of space was disposed of, this exclusive of any track space for the display of street cars. The space demand has exceeded all expectations, according to Fred C. J. Dell, director of exhibits.

"The exhibit of the American Electric Railway Association has grown in size each year. Likewise has the association added to its membership roster and convention registration," said Mr. Dell, in commenting on the recent meeting.

A list of the manufacturer member companies which will exhibit, together with the spaces to be occupied follows:

Name	Booth No.
Adams & Westlake Company	604
Ahlberg Bearing Company	605 and 606
Aluminum Company of America	141
American Brake Materials Corporation	277
American Brake Shoe & Foundry company	249
American Brass Company	1/2 of 205
American Car & Foundry Company	1/2 of 120
American Car & Foundry Motors Company	618 to 623
American Crucible Products Company	310
American Steel & Wire Company	206
Anaconda Copper Mining Company	1/2 of 205
Anderson Brake Adjuster Company	232
Areo Company	498 and 499
Art Rattan Works	404
Association of Manufacturers of Chilled Car Wheels	210A
Baldwin Locomotive Works	208A
Bender Body Company	600 to 603 inclusive
Bendix Brake Company	407
Bethlehem Steel Company	283 to 289 inclusive
Binks Spray Equipment Company	425 and 427
Robert Bosch Magneto Company	617
Bragg-Kliesrath Corporation	406
J. G. Brill Company	1/2 of 120
Brown-Lipe Gear Company	437
Budd Wheel Company	480
Bus Age	520
Bus Transportation	102
C. G. Spring & Bumper Company	513 and 514
Canadian Cleveland Fare Box Company	665
Philip Carey Company	258 and 260
L. C. Chase & Company	405
Cheatham Electric Switching Device Company	263
Chillingworth Manufacturing Company	616
Chilton Class Journal Company	502
Christensen Air Brake Company	423
Clark Equipment Company	607
Cleveland Fare Box Company	664
Cleveland Frog & Crossing Company	278-279-280
Cleveland Pneumatic Tool Company	452
Collier, Barron C., Inc.	104
Collier Construction Company	311
Consolidated Car Heating Company	118 and 119
Continental Motors Corporation	497
Cowdrey Brake Tester Organization	1/2 of 663
Crew Levick Company	492
Curtin Howe Corporation	225
Dayton Mechanical Tile Company	257 and 259
De Luxe Products Corporation	454
DeVillbiss Company	500
C. L. Downey Company	666
Eagle-Ottawa Leather Company	1/2 of 501
C. I. Earll	615
Eberhard Manufacturing Company	627
Eclipse Railway Supply Company	248
Eebnomy Electric Devices Company	Portion of 116

O. M. Edwards Company	671
Electric Railway Improvement Co.	330 and 331
ELECTRIC RAILWAY JOURNAL	101
Electric Service Supplies Company	202 and 203
Electric Traction	103
Erie Malleable Iron Company	625
Federal-Mogul Corporation	519
Feralite Corporation	629
Ferodo & Asbestos, Inc.	421
FitsJohn Manufacturing Company	402 and 403
Four-Way Lock Company	668
Fuller & Sons Manufacturing Co.	424
General Electric Company	113
General Motors Truck Company	412-413-414-415-416-417-418-419
A. Gilbert & Sons Brass Company	679
Glidden Company	449 and 451
Globe Ticket Company	233
W. S. Godwin Company	125
Gold Car Heating & Lighting Co.	234
Graham Brothers	420
Gramm Motors, Inc.	659
Griffin Wheel Company	106
Guide Motor Lamp Company	685
Hals & Killburn Company	215-216-217
Hannum Manufacturing Company	631
Haskelite Manufacturing Company	401
Hercules Motors Corporation	495
Heywood-Wakefield Company	206A
Hunt-Spiller Manufacturing Co.	408
Hyatt Roller Bearing Company	633 and 635
Hynson Westcott & Dunning	332 and 333
Illinois Motive Equipment Co.	121
International Motor Company	440-442-444
International Register Company	127
International Steel Tie Company	300 to 309, inclusive
Irving Iron Works Company	684
Johns-Manville Corporation	411
Johnson Fare Box Company	652
R. F. Johnston Paint Company	123 and 124
Kelton Aurand Manufacturing Co.	426
Lang Body Company	447
Leece-Neville Company	1/2 of 624
Lorain Steel Company	207 and 208
MaeDonald Manufacturing Company	681 and 682
Mack-International Motor Truck Corporation	441-443-445
Mack Motor Truck Company	446
Mack Trucks, Inc.	439
Malleable Screw Products Company	335
Manganese Steel Forge Company	295
Martindale Electric Company	312
Massillon Steel Casting Company	489
Jae. H. Matthews & Company	667
McGill Metal Company	409
Metal & Thermit Corporation	324 to 329, inclusive
Money-Meters, Inc.	122
Naehod & U. S. Signal Co., Inc.	262
National Brake Company, Inc.	610
National Carbon Company	226 and 228
National Cash Register Company	611 and 612
National Malleable & Steel Castings	465
National Pneumatic Company	107-109-111
National Railway Appliance Company	Portion of 117
New Departure Manufacturing Co.	1/2 of 624
Nichols-Lintern Company	672
Norma-Hoffmann Bearings Corporation	613-614
North East Electric Company	608 and 609
R. D. Nuttall Company	110
Ohio Brass Company	115
Ohmer Fare Register Company	250 to 256, inclusive
Oil Jack Company, Inc.	410
Okonite Callender Cable Company	1/2 of 219
Okonite Company	1/2 of 219
Pantaseote Company, Inc.	204
Perey Manufacturing Company	223 and 224
Radel Leather Manufacturing Co.	670
Rail Joint Company	209
Railway Age	464
Railway Materials Corporation	291 and 293
Railway Purchases and Stores	669
Railway Track-Work Company	320 to 323, inclusive
Railway Utility Company	313 and 314
H. H. Robertson Company	296

Root Spring Scraper Company.....	315
Ross Gear and Tool Company.....	626
Russell Manufacturing Company.....	429
S K F Industries, Inc.....	218
St. Louis Car Company.....	105
Safety Car Devices Company.....	1 of 108
Safety Equipment Service Company.....	637
Saf-T-Cab Corporation.....	422 and 448
Sattley Company.....	126
Peter Smith Heater Company.....	338
Snap-On Wrench Company.....	428
South Bend Lathe Works.....	453 and 455
Standard Steel Works Company.....	207A
Standard Underground Cable Co.....	290
Studebaker Corporation of America.....	474-475-476
Swartwout Company.....	264-266
Texas Company.....	128 and 130
Timken-Detroit Axle Company.....	400
Timken Roller Bearing Company.....	482 and 484
Tool Steel Gear & Pinion Company.....	Portion of 116
Tuco Products Company.....	644
Twin Coach Corporation.....	466 to 473, inclusive
Una Welding & Bending Company.....	336 and 337
Union Metal Manufacturing Co.....	651
Universal Lubricating Company.....	292 and 294
Van Dorn Coupler Company.....	261
Versare Corporation.....	660
Walter Motor Truck Company.....	1 of 663
Waukegan Motor Company.....	493
Westinghouse Companies.....	114
Westinghouse Electric & Manufacturing Company.....	112
Westinghouse Traction Brake Co.....	1 of 108
William Wharton, Jr., & Company.....	222
Wheel Truing Brake Shoe Company.....	282
White Company.....	653 to 658
Willard Storage Battery Company.....	639
Wilson Imperial Company.....	129
Alan Wood Iron and Steel Company.....	1 of 501
Zenith Detroit Corporation.....	628

The following member companies have made application for track space upon which cars will be shown.

- Cincinnati Car Company
- Cleveland Southwestern Railway & Light Co.
- Illinois Traction System
- St. Louis Car Company

Rubber Institute Organized

Manufacturers of rubber goods in America will be placed on a sound economic basis and the present financial stringency within the industry will be removed if the Rubber Institute, organized in New York City on May 23 by a group of leading manufacturers, achieves its purpose. Gen. Lincoln C. Andrews, former Assistant Secretary of the Treasury in charge of prohibition, will be director general, and every rubber manufacturer in the country has been invited to become a member.

The institute will attempt, it is said, to eliminate overproduction. It will make a study of import laws on crude rubber and trading methods. It also will study scientific manufacturing methods and the means of eliminating waste.

General Andrews is well known among electric railway men. He has been receiver of the New York & Queens County Railway, Long Island City, since 1923. For two years previous he was chief executive officer of the New York Transit Commission. In 1925 he was made assistant secretary of the United States Treasury, succeeding Eliot Washworth, Boston, resigned.

Final Specifications Twin City Cars

Information received subsequent to the publication of specifications on the 25 new cars for the Twin City Rapid Transit Company in the March 31, 1928,

issue of the JOURNAL indicates several revisions of the previously published specifications. The cars are single-end and are equipped with four GE-258K motors. The total weight is 28,038 lb. and is divided: Body 12,100 lb.; trucks, 8,200 lb.; equipment, 7,738 lb. The door engines are furnished by Consolidated Car Heating Company.

Oklahoma Improvements Under Way

Oklahoma Railway, Oklahoma City, Okla., is expending about \$14,000 in improvements on its Seventeenth Street station. Work on its industrial freight line, details of which were given in the March 10 issue of the JOURNAL, to cost approximately \$1,250,000, is progressing rapidly. Construction of a new bus building and shops, south of Exchange Avenue, will be started soon.

Japan Railway to Improve

Japanese Government Railways, Tokyo, Japan, will expend \$85,195,500 during 1928 on railway improvements, including electrification, improvement of stations, installation of heavier rails and work on tunnels. About \$25,780,000 will be spent on the construction of new railway lines.

Twenty-five Articulated Cars for Cleveland

Cleveland Railway, Cleveland, Ohio, will receive in June 25 articulated, three-truck, city-type cars now being built by the G. C. Kuhlman Car Company, Cleveland, Ohio. The cars are for two-man, single-end operation and seat 104 passengers. They are 101 ft. long, 8 ft. 4½ in. wide and weigh 76,080 lb.

The bodies are of the all-steel type with arch roofs. They are finished with an orange and cream color scheme. The interior trim is mahogany and the seating material is leather. The motor resistances are utilized for heating the front section in addition to the standard heating units. Complete specifications are given below.

Weights:	
Car body.....	42,210 lb.
Trucks.....	19,620 lb.
Equipment.....	14,250 lb.
Total.....	76,080 lb.
Bolster centers.....	37 ft. 6 in.
Length over all.....	101 ft.
Length over body posts.....	88 ft. 2½ in.
Truck wheelbase.....	6 ft. 1 in.
Width over all.....	8 ft. 4½ in.
Height, rail to trolley base.....	10 ft. 10½ in.
Window post spacing.....	29½ in.
Doors.....	Center and end
Air Brakes.....	Westinghouse Traction Brake Company
Armature bearings.....	Plain
Axles.....	Brill
Car signal system.....	Consolidated Car Heating Company
Compressors.....	Westinghouse DH-25
Conduit.....	Duratube
Control.....	HL
Curtain fixtures.....	National Lock Washer Company
Curtain material.....	Fabrikoid
Destination signs.....	Hunter
Door mechanism.....	Consolidated Car Heating Company
Doors.....	Folding and sliding
Energy saving device.....	Economy meter
Fare boxes.....	Cleveland
Finish.....	G.M.F.
Floor covering.....	Kaas treads in aisles
Gears and pinions.....	Nuttall helical
Glass.....	Protex

Hand brakes.....	Peacock staffers
Heaters, Consolidated Car Heating Company, electric	
Headlights.....	Golden Glow
Headlining.....	Agasote
Interior trim.....	Mahogany
Journal bearings.....	Timken roller
Journal boxes.....	Brill
Lamp fixtures.....	Dome—Graybar Electric Company
Motors.....	Six Westinghouse 340-P, inside hung
Painting scheme.....	Orange and cream
Roof material.....	Poplar, canvas covered
Safety devices.....	Safety Car Devices Company
Sash fixtures.....	National Lock Washer Company
Seats.....	Hale-Kilburn
Seat spacing.....	29½ in.
Seating material.....	Cleat leather
Slack adjusters.....	Brill
Steps.....	Stationary
Step treads.....	Kaas and treadle door
Trolley catchers.....	Ohio Brass
Trolley base.....	O-B, Feist patent
Trolley wheels.....	Three Brill, 68-E-2
Trucks.....	Ni-hole-Lintern, low type
Ventilators.....	Roller steel, 26-in. diameter
Wheels, type.....	H-B type
Wheelguards or fenders.....	H-B type

Osborne Re-elected Chairman of Industrial Board

National Industrial Conference Board at its twelfth annual meeting re-elected Loyall A. Osborne, president of the Westinghouse Electric International Company, as chairman of the board for the ensuing year.

Fred I. Kent, a director of the Bankers Trust Company, was re-elected treasurer of the Conference Board; and the following vice-chairman were elected: Charles Cheney, president of Cheney Brothers, South Manchester, Conn.; Irene du Pont, chairman of the finance committee of E. I. du Pont de Nemours & Company; Wilmington, Del.; Herbert F. Perkins, first vice-president of the International Harvester Company, Chicago, Ill., and George S. Harris, president of the Exposition Cotton Mills, Atlanta, Ga.

The executive committee for the ensuing year will be composed of the following: William D. Baldwin, chairman of Otis Elevator Company, A. Farwell Bemis, chairman of Bemis Brothers Bag Company, Boston, Mass.; Cornelius F. Kelley, president of Anaconda Copper Mining Company; William H. Nichols, Jr., president of General Chemical Company; as well as the officers.

Seattle Specifications Issued

Seattle Municipal Street Railway, Seattle, Wash., has issued specifications on the 100 cars to be purchased from the St. Louis Car Company, as mentioned in the April 28 issue of ELECTRIC RAILWAY JOURNAL.

The cars are to be of the one-man, two-man, single-end type. Each car will be built with straight sides, round ends, arch roof, platform floor on the same level as body floor with 3-in. ramp, open bulkheads, double sash—top sash to be stationary, lower sash to raise—and folding doors at front right and center right.

There are to be eighteen windows on one side of the car and fourteen on the other, all equipped with double sash, top sash to be one continuous length. Each set of doors is to have a 4-ft. 6-in. opening and is to be hung on pipe shaft ball bearing hinges bolted in place. The joining hinges are to be Feist self-

lubricating No. 372 on the center and 373 on the front.

The closed side of the car is to be fitted with fourteen cross seats and one longitudinal seat and the opposite side to be fitted with seven cross seats, one longitudinal seat and one folding conductor seat. The rear is to have two stationary seats and one folding seat.

Specifications for these cars are given; below:

Type of unit.....	One-man, two-man; motor; passenger city; single end; double truck	
Number of seats.....	.....	58
Bolter centers.....	.....	26 ft. 2 in.
Length over all.....	.....	47 ft. 0 in.
Truck wheelbase.....	.....	5 ft. 4 in.
Width over all.....	.....	8 ft. 8 in.
Height, rail to trolley base.....	.....	12 ft. 8 in.
Window post spacing.....	.....	28½ in.
Body.....	.....	Semi-steel
Doors.....	.....	Arch
Air brakes.....	.....	Center and end
Car signal system.....	.....	Westinghouse variable load
Conduit.....	.....	Faraday
Control.....	.....	Duraduct
Couplers.....	.....	K35-KK
Curtain material.....	.....	Drawbar
Destination signs.....	.....	Pantasote, pattern.....X2, color 74
Door mechanism.....	.....	Hunter
Doors.....	.....	National Pneumatic
Energy saving device.....	.....	Folding, one center treadle
Fare boxes.....	.....	Economy meter
Fenders.....	.....	Johnson DM-3
Finish.....	.....	H-B life guard and company's standard
Floor covering.....	.....	Sherwin-Williams enamel
Gears and pinions.....	.....	Wood, aisle grooved
Glass.....	.....	Tool Steel
Heaters.....	.....	DSAA
Headlights.....	.....	Consolidated No. 303
Interior trim.....	.....	One O-B style Z-28645
Motors.....	.....	Mahogany, bronze trimmings
Painting scheme.....	.....	Four Westinghouse 510-A or G-E 265
Roof material.....	.....	Orange
Sash fixtures.....	.....	Haskelite
Seats.....	.....	Bronze
Seat spacing.....	.....	Steel
Seating material.....	.....	28½ in.
Trolley catchers.....	.....	Leather
Trolley base.....	.....	O-B
Trolley wheel.....	.....	U.S.-15
Ventilators.....	.....	5 in.
Wheels.....	.....	Sixteen, small type
	.....	Steel, 26 in. diameter

ROLLING STOCK

NORTHERN OHIO POWER & LIGHT COMPANY, Akron, Ohio, has just ordered fifteen more Twin Coaches from the Twin Coach Corporation, Kent, Ohio.

CHICAGO, SOUTH SHORE & SOUTH BEND RAILROAD, Michigan City, Ind., has ordered ten all-steel motor cars from the Standard Steel Car Company, Hammond, Ind. The cars are practically duplicates of the previous fleet put in service last summer.

CINCINNATI STREET RAILWAY, Cincinnati, Ohio, has ordered eight Twin Coaches at an approximate cost of \$90,000.

ILLINOIS CENTRAL RAILROAD, Chicago, Ill., has ordered ten suburban type motor cars and ten trailer cars from the Pullman Car & Manufacturing Company.

BRITISH COLUMBIA ELECTRIC RAILWAY, Vancouver, B. C., Canada, will be asked by the City Council to replace at least part of the present new Westminster Street car system with bus service.

CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD, Chicago, Ill., has received five of the fifteen all-steel cars ordered last fall from the Pullman Car & Manufacturing Corporation.

ST. LOUIS PUBLIC SERVICE COMPANY, St. Louis, Mo., has received four urban

type Twin Coaches and has ordered two more coaches from the Twin Coach Corporation.

WINNIPEG ELECTRIC COMPANY, Winnipeg, Man., Canada, has purchased two more coaches from the Twin Coach Corporation.

CHICAGO, SOUTH SHORE & SOUTH BEND RAILROAD, Michigan City, Ind., has ordered two more 80-ton Baldwin-Westinghouse electric locomotives, to be delivered in the fall.

QUINCY STREET RAILWAY, Quincy, Ill., has been granted a permit to operate buses to Public Square and Soldiers' Home.

ILLINOIS POWER & LIGHT CORPORATION, Chicago, Ill., has purchased four 21 passenger city type Yellow buses.

BROOKLYN CITY RAILROAD, Brooklyn, N. Y., has added four White Model 50-B buses to its fleet.

TRACK AND LINE

STARK ELECTRIC RAILROAD, Alliance, Ohio, is installing an automatic signal system and new portable substations between Canton and Alliance.

PACIFIC ELECTRIC RAILWAY, Los Angeles, Cal., is co-operating with the city of Long Beach in putting through the Pacific Avenue extension. Plans for the underpass of the tracks are now being revised. The cost of the project will be about \$142,000 in which the city, the county and the Pacific Electric will share.

SHOPS AND BUILDINGS

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, New Haven, Conn., has let a contract to Babor-Comeau & Company, New York, for the extension of the facilities at the Van Nest shops, New York City. The work includes a steel and brick structure 106x375 ft. and will cost approximately \$250,000.

PACIFIC ELECTRIC RAILWAY, Los Angeles, Cal., will construct new carhouses just west of Loma Vista Drive between Seventh and Anahaim Streets, Long

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

	May 22, 1928
Metals—New York	
Copper, electrolytic, cents per lb.....	14.275
Copper wire, cents per lb.....	16.5
Lead, cents per lb.....	6.10
Zinc, cents per lb.....	6.475
Tin, Straits, cents per lb.....	51.5
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	4.20
Somerset mine run, f.o.b. mines, net tons... ..	1.875
Pittsburgh mine run, Pittsburgh, net tons... ..	1.95
Franklin, Ill., screenings, Chicago, net tons... ..	1.65
Central, Ill., screenings, Chicago, net tons... ..	1.575
Kansas screenings, Kansas City, net tons... ..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	5.65
Weatherproof wire base, N. Y., cents per lb.....	17.00
Cement, Chicago net prices, without bags... ..	2.05
Linseed oil (5-bbl. lots) N. Y., cents per lb.....	10.7
White lead in oil (100-lb. keg), N. Y., cents per lb.....	13.75
Turpentine (bbl. lots), N. Y., per gal.....	\$0.57

Beach, Cal. This improvement will cost about \$250,000.

TRADE NOTES

H. R. SYKES has been appointed manager of the locomotive division of the Cincinnati Car Company, Cincinnati, Ohio.

WAGNER ELECTRIC CORPORATION, St. Louis, Mo., announces that E. D. Pike, heretofore in charge of Wagner Electric Pacific Coast service operation is now manager of the San Francisco branch sales office.

MANGANESE STEEL FORGE COMPANY announces the removal of its Chicago office from the Old Colony Building to the Builders' Building, La Salle Street and Wacker Drive.

BILLINGS & SPENCER COMPANY, Hartford, Conn., has appointed J. V. Moore, formerly with the Simonds Saw & Steel Company, as its representative in Pennsylvania, Delaware and New Jersey, with headquarters in Huntingdon, Penn.

CURTIN-HOWE CORPORATION, New York, has appointed B. Kuckuck as its chief engineer. Since 1904 he has been working in wood preservation, first with Hulsberg & Company, Berlin, and later in this country in connection with the designing of the Santa Fe treating plant at Somerville, Tex., and with the general introduction of the Rueping process. Since 1918 he has been chief engineer of Gebr. Himmelsback, a wood preserving company in southern Germany.

ADVERTISING LITERATURE

GLOBE-WERNICKE COMPANY, Cincinnati, Ohio, has published a booklet on a system for the filing and indexing of maps, plans, drawings and similar large sheets.

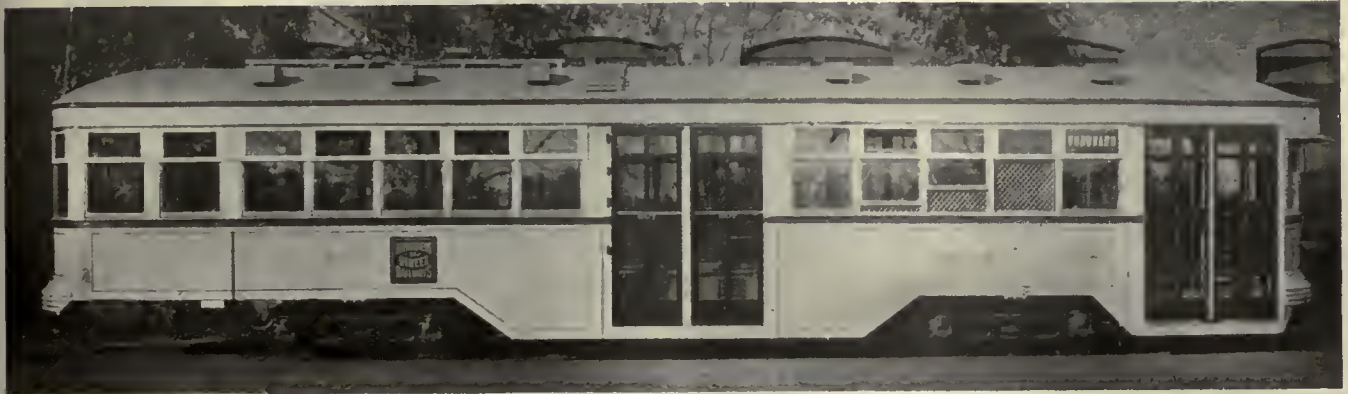
MARTINDALE ELECTRIC COMPANY, Cleveland, Ohio, has issued a folder announcing a 27 per cent average price reduction on Martindale commutator stones.

PARKER APPLIANCE COMPANY, Cleveland, Ohio, has issued a desk folder giving technical data and price list of Parker tube couplings and a bulletin of specifications on installations in buildings and power plants.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has issued the following bulletins: 252A on type M control system for railway service, 19D on enclosed magnetic switches, 468A on drum type controllers, 743A on drum controllers, 881 on gas engine driven arc welder, 949 on temperature overload relays, 569A on constant potential arc welding sets, 874 on type WD-200A arc welder, 823A on atomic hydrogen arc welding equipment and 980 on enclosed speed-regulating rheostats.

ELWELL-PARKER ELECTRIC COMPANY, Cleveland, Ohio, has published a catalog describing its outstanding types of electric industrial trucks and tractors.

This
is
the car—



One of the new 125 Peter Witt cars for the Department of Street Railways of the city of Detroit

and
this
is the
brake

Detroit bought—



The
"Peacock"
(Reg. U. S. Pat. Off.)
Staffless

We've mentioned it before but it's worth repeating! And the picture shows that Detroit's Department of Street Railways believes in the Peacock Staffless for 36,000 lb. big capacity city cars. As a hand brake it will develop a braking force practically equal to the air braking and its almost unlimited chain winding capacity assures positive braking under every possible condition.

National Brake Company, Inc.
890 Ellicott Square Buffalo, N. Y.

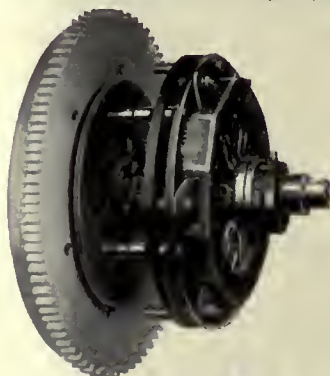
Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.

Stamina

Covering 5,000 miles in less than 4,800 consecutive minutes, a stock model Studebaker Dictator with Long Clutch recently completed another endurance record for stock cars. For nearly 80 hours an average speed of over 63 miles per hour was maintained with the Long Clutch performing satisfactorily all the way.

LONG MANUFACTURING COMPANY
DETROIT MICHIGAN

LONG PRODUCTS
AUTOMOTIVE
RADIATORS
AND CLUTCHES



LONG

The C. S. B. & N. I. R. R.



- ① Lowers Capital Investment
- ② Operates More Equipment
- ③ Gives Better Service

This new Studebaker Street Car Bus was bought as a result of the economy shown by this railway's fleet of 5 Studebakers

With **STUDEBAKERS**

Making 50c Do the Work of a Dollar!

In further support of the evidence this letter contains, Mr. R. R. Smith, Vice President and General Manager of this railway company states: "We selected Studebakers over two years ago following an exhaustive examination made by our engineers of the operating costs of all busses on the market. Studebakers were selected as most economical, both for purchase and operation and the most satisfactory for supplying swift and comfortable transportation.

"We picked 21-passenger busses because this size has proved most satisfactory for supplying frequent, comfortable and prompt service, plus its obvious economical features. Our Studebakers have proved more economical than the heavy type busses previously operated, and *the initial cost is considerably less,** so we can afford to provide a sufficient number of busses to meet peak demands with considerably less invested capital."

*Actually 50% less so that the C. S. B. & N. I. Ry. now makes 50c do what formerly required \$1.00 in buying equipment.

Monday, April 2, 1928

Studebaker Corporation of America,
Attention Mr. J. L. Engels,
Commercial Car Division,
South Bend, Indiana.

Dear Mr. Engels:

After operating the Studebaker street car type bus mounted on the new "75" chassis, for one year, we felt that you would be interested in our opinion regarding the manner in which it has performed and the cost of operation.

We are extremely well pleased with the operation of this bus. It has met every service demand that we have encountered and there is no doubt but that each of its mechanical units is made to withstand the hard usage of city bus service as well as the over-loads which are encountered.

Below I am giving you the entire cost figures on this bus since it has been in service. In explanation of some of these accounts wish to advise that body maintenance covers battery, lights and all expenses to body repairs. Mechanical maintenance includes cost of engine, radiator, brakes or chassis adjustments. Proportion of accounts includes garage expense, such as washing material, small tools, oiling of garage and incidentals which cannot be charged to any one bus, so consequently are prorated against each bus according to the miles operated.

Mechanical Maintenance	.0112 per mile
Body Maintenance	.0082 " "
Gasoline	.0248 " "
Greases	.0018 " "
Engine Oil	.0008 " "
Tires	.0005 " "
Washing and Oiling	.0037 " "
Inspection and Oiling	.0113 " "
Proportion of Accounts Total	.0031 " "
	.0624 " "

Miles operated 25,506; miles per gal. of gasoline 5.96; miles per qt. of engine oil 59.87.

Trusting this information may be of value to you, and assuring you that in our opinion the "75" bus chassis is worth a good many more dollars to the operator than its original cost.

Yours very truly,
Geo. R. Green
General Supt.

CHICAGO, SOUTH BEND AND NORTHERN INDIANA RAILWAY COMPANY



STUDEBAKERS

ARE PROFIT MAKERS

AUTOMATIC highway crossing gates



long considered hopelessly impractical
ARE NOW AN ACCOMPLISHED FACT
 New basic principle makes possible a form of crossing protection always preferred but never before available with triple warning protection light, bell and barrier. Gate arms swing gently if struck and is lowered damage to car or gate. No chance of operation on steam and electric lines. *More reliable than manual gates," says one operating officer.* *May we send descriptive literature?*

Standard Automatic Signal Corporation, 208 S. La Salle St. CHICAGO

Montreal Tramways Company

buys

YELLOW COACHES

six times and

more than doubles its passengers,
increases mileage and profits ~



60 Yellow Coaches ear

High Spots that Point to Steady Growth and Success

- In August, 1925, the Montreal Tramways Company inaugurated motor coach service in the City of Montreal.
- Unusually severe operating conditions were faced from the start—narrow winding streets permitting for the most part but one lane of traffic each way, heavy grades, deep snows, horse drawn traffic and liberal parking habits.
- With few exceptions the type of vehicle selected to buck these conditions and put the operation on a revenue earning basis was Yellow Coaches.
- On December 31, 1925, the company owned 28 motor coaches.
- By the end of 1926, 45 were needed.
- By the end of 1927, the length of bus routes had been extended to 70.41 miles and the equipment expanded to 76 motor coaches, *60 of which were Yellows*.
- And in one year the company increased its motor coach passengers from 5,370,475 in 1926 to 10,728,326 in 1927.
- Since the original shipment of 4 Z-29 passenger Yellow Coaches in June, 1925, Montreal Tramways has reordered Yellow Coaches *six times*.
- From the start earnings have increased, operating expenses reduced, passenger carriage doubled and mileage increased—with Yellow Coaches carrying the bulk of responsibility.
- This year, benefiting by experience, the company is increasing speed and adding to the length of routes without increasing time. Continuous familiarity with Yellow Coaches and the performance rendered by the 60 now in use is bound to set new standards when the 1928 story is written on the cost sheets.

Big PROFITS for *Montreal Tramways*

How the 60 were ordered

1925	
June 18, Type Z-29 passenger coach	4
November 25, Type Z-29 passenger coach	4
1926	
February 15, Type Z-29 passenger coach	10
March 14, Type Z-29 passenger coach	5
October 21, Type Z-29 passenger coach	4
October 21, Type Z-29 passenger coach	1
October 21, Type X-21 passenger coach	6
October 21, Type X-21 passenger coach	1
December 20, Type Z-33 passenger coach	10
1927	
October 19, Type Z-33 passenger coach	10
October 19, Type Z-33 passenger coach	5
Total	60

and what 42 did last year on these routes served exclusively by

YELLOW COACHES

OPERATION OF YELLOW COACHES ON Sherbrooke St. Hubert Outremont ROUTES

1927		EXPENSES	Per Bus Mile
Total buses assigned to these routes including spare equipment	42	Maintenance, Including Depreciation of Equipment	
Type X-21 passenger coach	5	— Tools, Machinery and buildings	8.39
Type Z-29 passenger coach	27	Transportation	13.76
Type Z-33 passenger coach	10	General Expense and Administration	2.00
	42	Interest	2.13
REVENUE		Advertising	.17
Total passengers carried	5,734,616	TOTAL	26.45c
Total mileage	1,685,838	NOTE:—Motor coach operation in Canada, due to taxes, higher cost of material and other factors, is approximately 5c higher per bus mile than in the "States."	
Average fare	8.58		
Passenger per bus mile	3.4		
Revenue per mile	29.4		
Misc. revenue per mile	.17		
Gross revenue per mile	29.57		



Successful Operations are built by **YELLOW COACH** fleets

In Montreal and Toronto; in Washington, D. C., in Portland, Oregon, Danbury, Conn., and scores of other operations strung from coast to coast, Yellow Coaches are building successful operations. Montreal Tramways Company is only one of many who are finding that it pays to repeat on Yellow.

The New 8 million dollar General Motors Truck plant at Pontiac, Michigan, in which are now being built General Motors Trucks, Yellow Taxicabs and Yellow Coaches, testifies to the confidence held by General Motors in the future of commercial transportation; a structure embodying every new and modern improvement in manufacture, test and assembly—built to meet the demands of tomorrow as well as today.

General Motors Truck Company
Pontiac, Michigan

102 YEARS OF MANUFACTURING EXPERIENCE

Rattan car seat webbing may be ordered through any H-W sales office



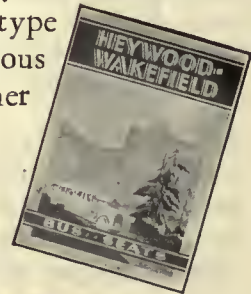
No. 55 P-X

BRINGS PULLMAN COMFORT TO THE INTERURBAN CAR!

THIS beautiful de luxe seat, mounted on our new revolving base, brings to the interurban car all the comfort and convenience of the finest parlor car chair. Deep, spring-filled seat cushions and backs, make this the most luxurious and comfortable car seat made today.

The seat revolves easily by pressing the foot pedal which is handily located on the steel base. The revolving mechanism has been purposely made as simple and as strong as possible so that there is nothing to get out of order. If you are interested in making your interurban cars the finest and most comfortable type in use today, by all means give the 55 P-X, as shown, your serious consideration. The base illustrated will also accommodate other car seats which we make.

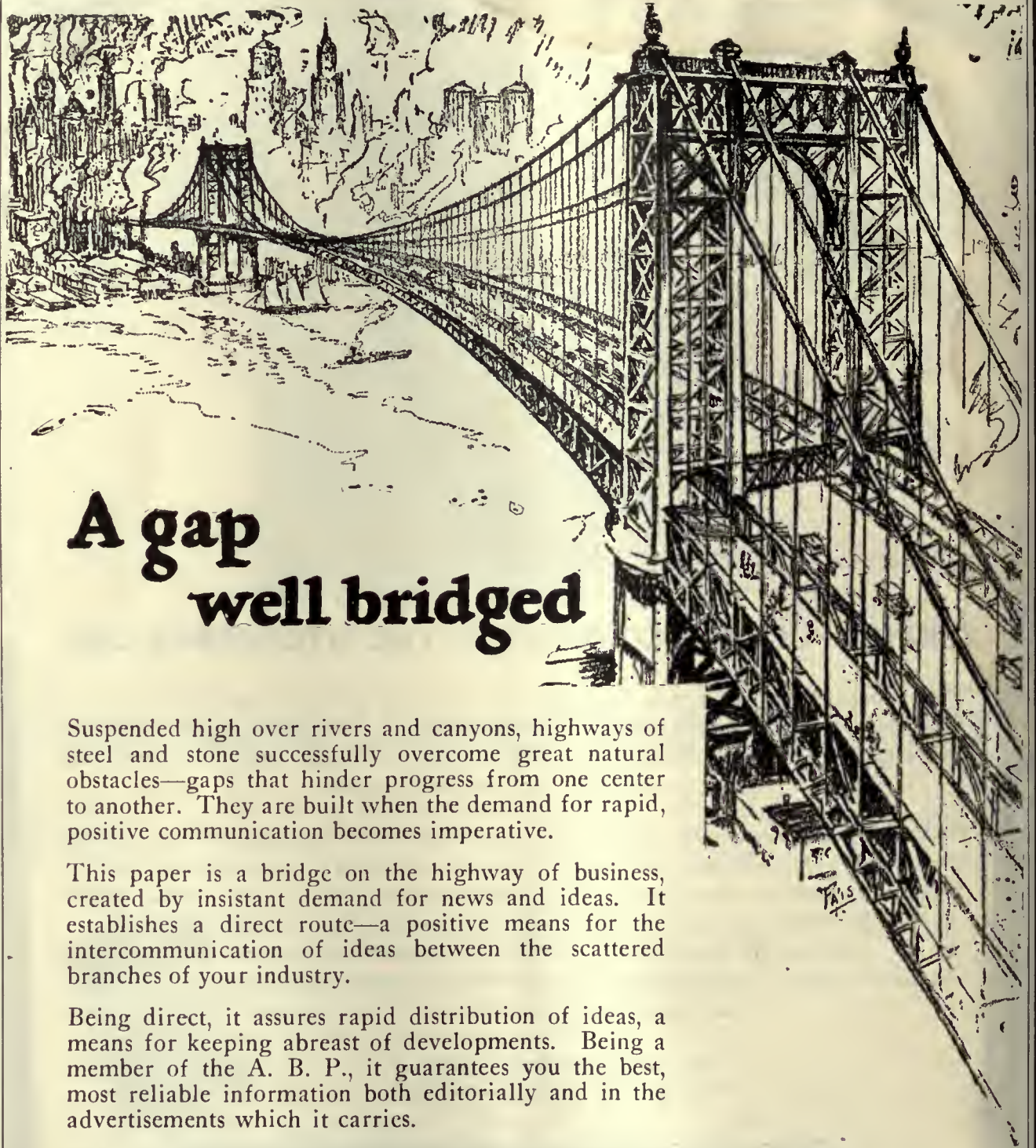
If you have not received a copy of our new Bus Seat Catalogue, write for it.



Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Company, Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Company, Houston, Texas. John R. Hayward, Liberty Trust Building, Roanoke, Va. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.





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This paper is a bridge on the highway of business, created by insistant demand for news and ideas. It establishes a direct route—a positive means for the intercommunication of ideas between the scattered branches of your industry.

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TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



CANDLER BUILDING,
NEW YORK, N. Y.



Combat the Underground Lines Agitation

CHANGING from the ordinary type to fluted steel poles for transmission and distribution lines accomplishes more than just replacement of old style equipment with a new and more efficient type. When you install Union Metal poles on your lines you are creating good will for your company, for these poles present a beautiful and dignified appearance which harmonizes with the architecture of city streets.

Thus the agitation for underground lines can be adequately combated with these poles—for people do not object to wires overhead, they object to the unsightly poles which crowd the curbs of so many cities.

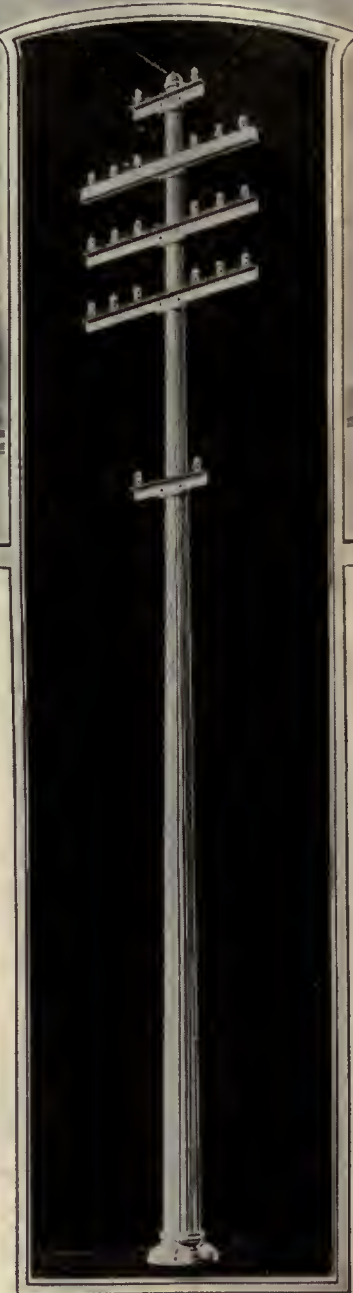
Clean cut, straight and true, Union Metal Fluted Steel Poles possess all the desired engineering advantages. They withstand heavy transverse strains, eliminate ground-line corrosion, are simple to erect and maintain, and can be quickly installed and properly lined up. In every respect, these poles are an outstanding example of the scientific progress of the twentieth century.

Let us help you build good will with your transmission and distribution lines. Complete information will be sent on request.

THE UNION METAL MANUFACTURING CO.

General Offices and Factory, Canton, Ohio

Branches—New York, Chicago, Philadelphia, Cleveland,
Pittsburgh, St. Louis, Los Angeles, San Francisco, Jacksonville.



Typical Union Metal Fluted Steel Pole for transmission and distribution service. The upper picture shows a Union Metal Pole installed in Canton, Ohio. It carries a secondary rack and supports the center suspension traffic signal.

UNION METAL

DISTRIBUTION AND TRANSMISSION POLES

Versare
TRACKLESS
TROLLEYS

for **Salt Lake City**

Utah Light and buys **VERSARE**

The Utah Light & Traction Co., Salt Lake City, has awarded the Versare Corporation a contract for 10 6-wheel Versare Trackless Trolleys.

This order went to Versare because the engineering principles of Versare patented structure were more in line with the type of equipment suitable for the mounting of the high power electrical equipment to be used.

Versare

Traction Co.

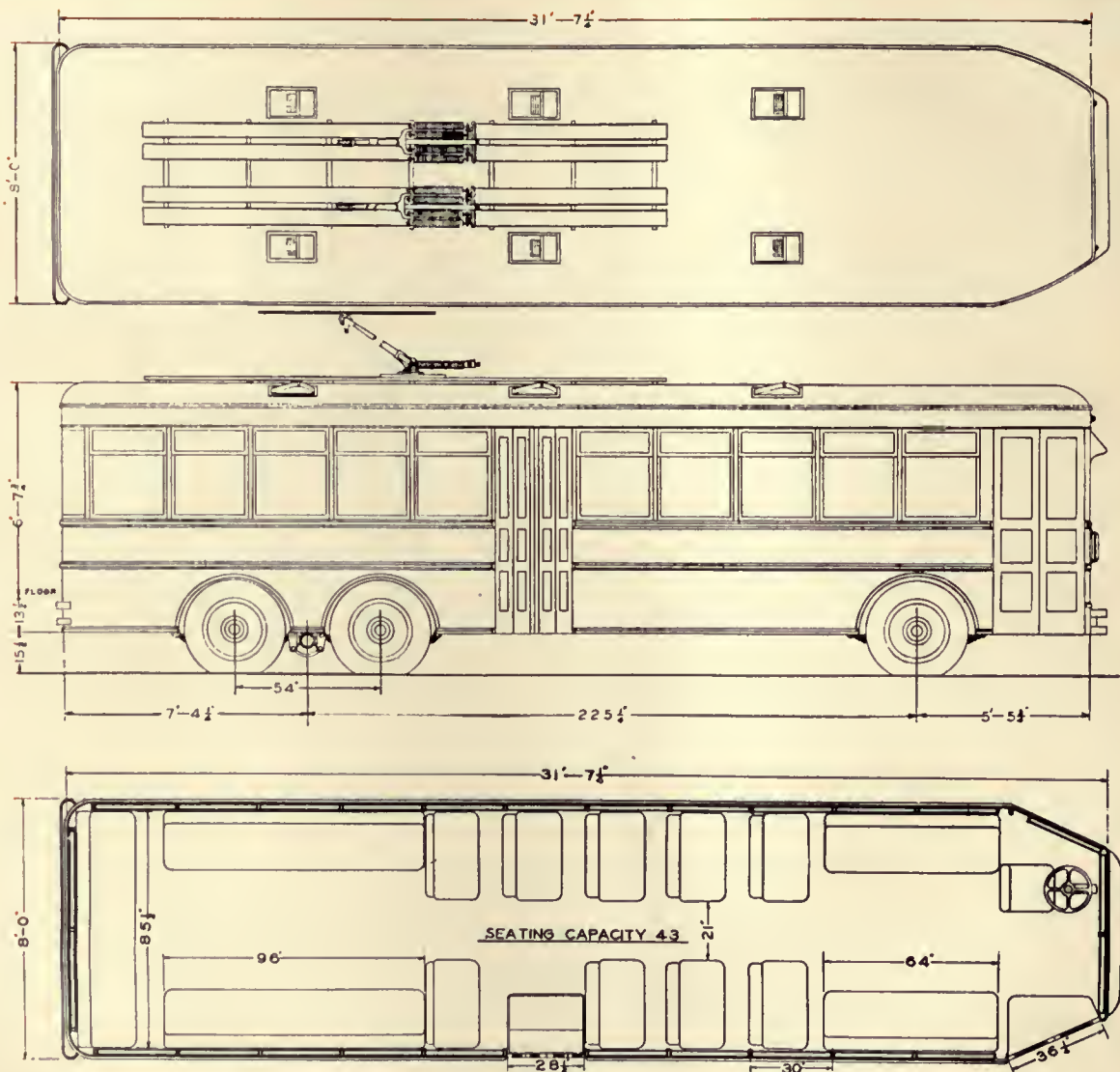
Trackless Trolleys

It is desired these coaches be in operation July 15th, which is entirely practical with this company, as unit construction permits of rapid production.

For those acquainted with Versare construction, it is easily recognizable that the standard 6-wheel Versare gasoline-electric coach is readily adaptable for use as a trackless trolley, with no essential changes of design or equipment.

Versare

Standard Design of Versare Trackless Trolleys



[Versare engineers welcome the opportunity to show electric railway executives the many advantages of Versare Trackless Trolleys]

Versare Corporation
Albany, N. Y.



Looking west on Washington Street at the intersection of Cincinnati Street. Note the excellent condition of the tangentials and the smooth surface of the track area. Carey Elastite Track Insulation was used throughout.

“...a test installation in 1924...
 now standard in all
 track construction”

“IN 1924, we made a test of asphaltic rail filler, installing it on each side of the rails,” said R. E. Standish, Superintendent Maintenance, Peoples Railway, Dayton, Ohio.

“In this way, we became thoroughly sold on this type of track insulation, and it is now included as standard in all our track construction work.

“We use Dayton-Mechanical ties, 100-lb. ARA-A rails, thermit-welded joints, Carey Elastite System of

Track Insulation, brick paving and asphalt filler.”

The Carey Elastite System of Track Insulation, referred to by Mr. Standish, is a preformed asphaltic compound reinforced with asphalt-saturated fibres. It is impervious to moisture, and forms a lastingly shock-absorbing cushion between the rails and paving.

Write for full particulars. If you are planning any track construction work, our representative will be glad to call and tell you all about this efficient material. Write.



The Philip Carey Company
 Lockland, Cincinnati, Ohio

SYSTEM OF TRACK INSULATION



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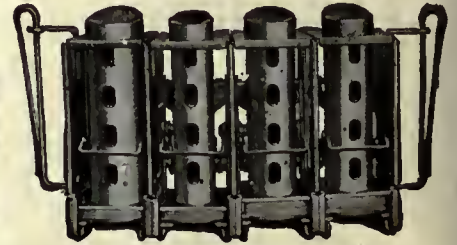
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519 Delta Bldg., Los Angeles, Cal.

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"SEARCHLIGHT"
 First!

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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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- Automatic Safety Switch Stands**
Ramapo Ajax Corp.
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Bethlehem Steel Co.
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Cincinnati Car Co.
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Studebaker Corp. of America
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- Batteries, Dry**
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Timken Roller Bearing Co.
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Graham Bros.
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Babcock & Wilcox Co.
- Bond Testers**
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- Bonding Apparatus**
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Ohio Brass Co.
Railway Trackwork Co.
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General Electric Co.
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Railway Trackwork Co.
Una Welding & Bonding Co.
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National Ry. Appliance Co.
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American Brake Shoe & Foundry Co.
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- Brake Testers**
National Ry. Appliance Co.
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Safety Car Devices Co.
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Twin Coach Corp.
Versare Corp.
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Irvington Varnish & Ins. Co.
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Differential Steel Car Co.
- Cars, Gas-Electric**
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Brill Co., The J. G.
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- Ceilings Plywood Panels**
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(Continued on page 50)

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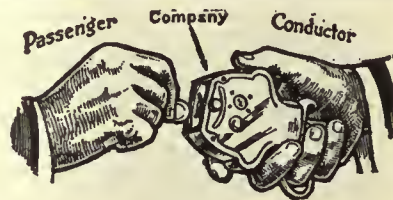
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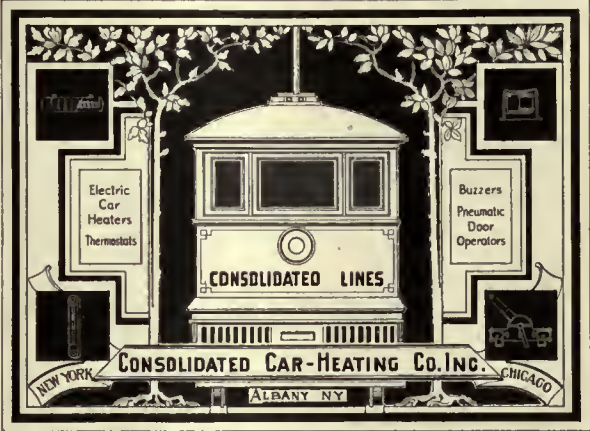
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Better Quality Seats
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Brill No. 201-B reversible seat is performing an important part in making the electric car more desirable to the traveling public. It attracts the eye and when a passenger becomes seated, he is convinced that the seat is fully as comfortable as it is attractive. He is induced to ride more often.

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Specify Brill Seats—it pays.

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The more experience you have with Timken Worm Drive Axles, the stronger will your conviction be that their silence is golden — a cash asset.



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ELECTRIC RAILWAY JOURNAL

Hill Publishing Company, Inc.

JUNE 2, 1928

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MOTOR WHEEL CORPORATION, LANSING, MICHIGAN

Be it resolved that:

Modernized Electric Railway Transportation contributes to the welfare and prosperity of city, state and nation.



Above—The Home of Republican National Convention.

Left—A One-Man Car in Kansas City with Westinghouse motors.



In Kansas City—

THE interest of the nation now centers upon Kansas City and Houston, acting as hosts to the National Conventions of Republicans and Democrats, respectively, in June.

Delegates to both Conventions will endorse the foregoing resolution so outstandingly exemplified in the excellent transportation service afforded by the Kansas City Public Service Company and the Houston Electric Company.

Up-to-date cars, rebuilt track, an efficient personnel, and Westinghouse motors and control make the superior electric railway service possible in these flourishing cities.



In Houston—

Below—The Home of Democratic National Convention, seating 25,000 people.

Right—One of the new 20 de luxe cars recently placed in service in Houston. They have Westinghouse Type 510 Motors and K Control.



Westinghouse

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June 2, 1928

Pages 885-926

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Levis Tramways Increases Revenue with Weekly Pass 901

By H. E. WEYMAN

Experiences with various fare schedules have convinced the management of this Canadian property that it is possible to popularize the fares for the regular riders without antagonizing the occasional patrons. A downward tendency in revenue was checked and there has been a gradual increase since the adoption of the new fare system.

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New days, new ideas

In 1900, the rides you sold were compared with steel tired rides on dirt and poor macadam.

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Only with smooth, silent track can you meet and beat this competition.

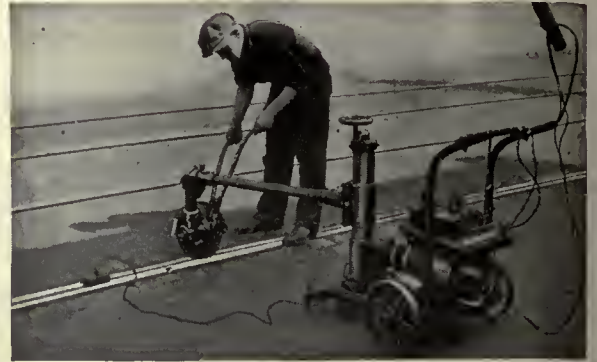
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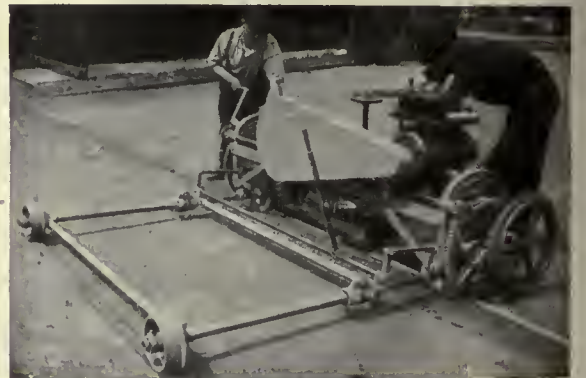
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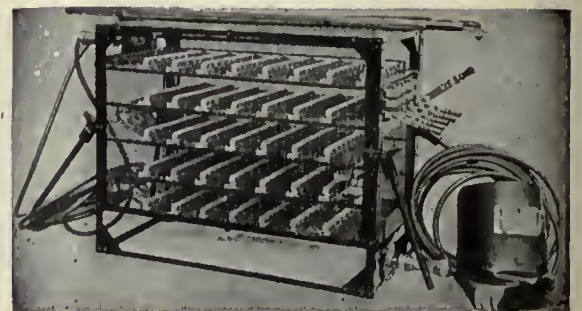
Enreka Radial Rail Grinder



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The Best Headlight Buy!

The ZP Special

A sturdy recess mounted incandescent headlight. Furnished with either Crystal or Gold Ray Prismatic glass 8 3/4-inch reflector. Adjustable lamp receptacle, for regular or focus type lamp, 23 to 94-watt lamp may be used. Case and door of heavy Armco sheet steel, finished in baked black enamel. Door hinged at top and fitted with Standard plunger door catch. Convex lens of heat resisting glass. See page 33, Catalog Supplement No. 1.

The cars in addition to being equipped with O-B Headlights also are fitted with O-B Trolley Catchers.

ON the new cars for a large property in an Eastern city, O-B Headlights have again demonstrated that they are the most suitable headlights for large as well as small properties.

Lowest first cost is an important consideration. Almost total elimination of maintenance for a long period of years is another. Both are combined in the ZP Special—the O-B Headlight expressly designed for city service.

The ZP Special is a recess mounted incandescent headlight of extremely shallow design, fitted with an 8 3/4-inch Prismatic glass reflector. Beam spreads on a horizontal plane, illuminating both sides of the track, yet giving ample pick-up.

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five years of
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in every

WEAR-PROOF MAT



plus
safety,
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economy.

Here are the reasons why Wear-Proof Mats are guaranteed for five years.

- 1 They are flexible, can be rolled up like a rug and will not warp nor turn up at edges.
- 2 They may be used on both sides.
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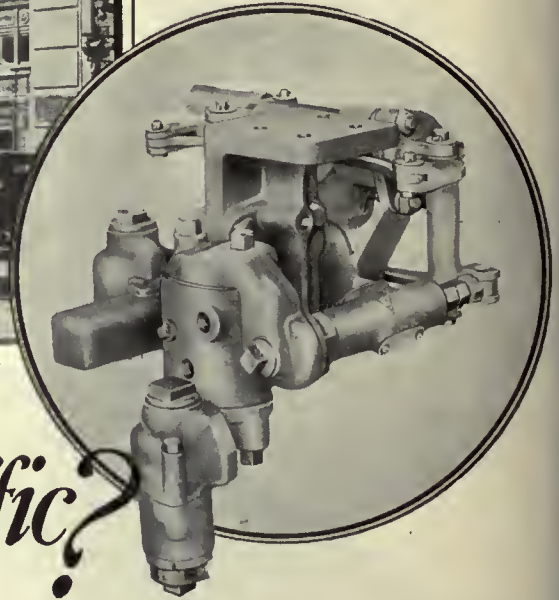
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WHEN thoroughfares are congested . . . when other vehicles are contending for the right of way . . . when traffic demands are greatest . . . are your cars as mobile as other conveyances that use the streets . . . can they lead the traffic rather than lag behind?

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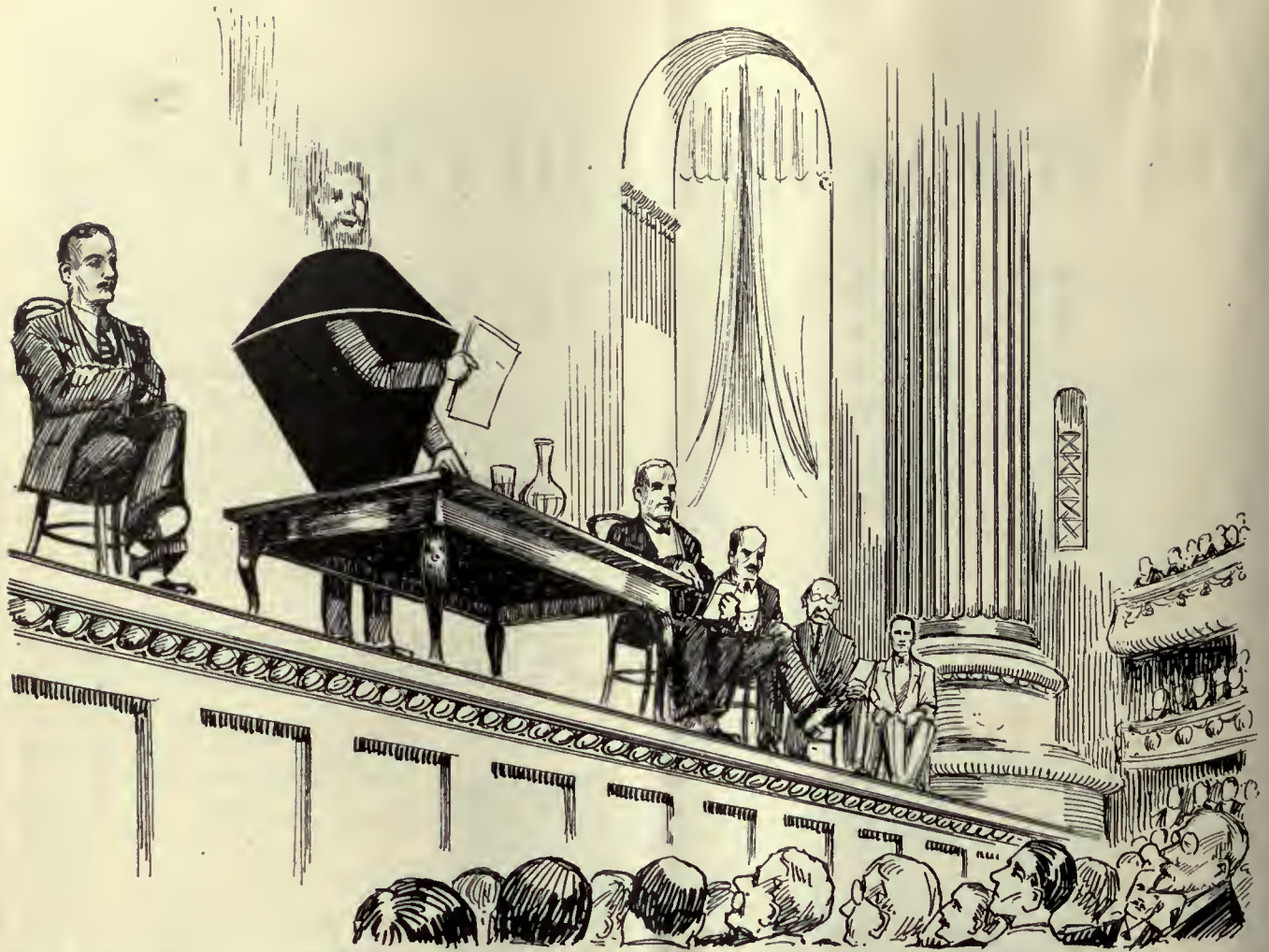
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THE BASE OF MODERNIZATION



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The railways have found that Thermit welding does eliminate joint maintenance. They have seen Thermit welds lasting without repair for twelve to fifteen years. They have had new track laid with Thermit welds, stay "new" for years and years. They have learned that "first cost is the last cost," and have seen that "first cost" brought down, by quantity production, to figures competitive with any other process.

That's why almost 65% of the new and reconstructed city track in recent months is "Thermit-welded."

Let your engineer act as judge of the "joint" debate. He's qualified by training and experience to best appreciate the arguments.



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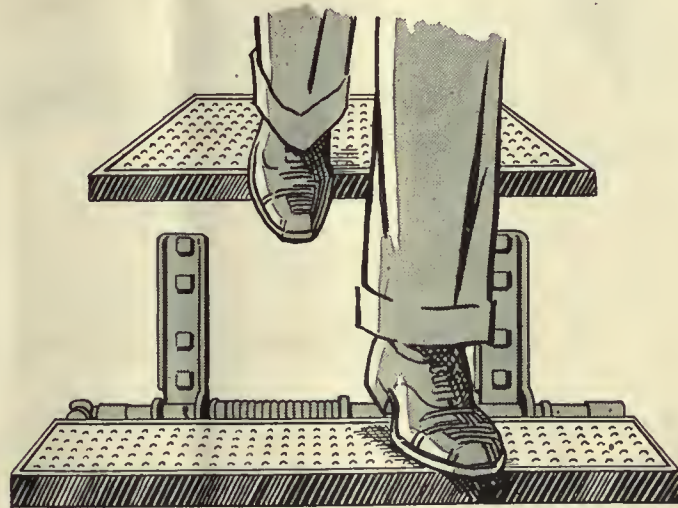
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and step control—
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load and—for popular
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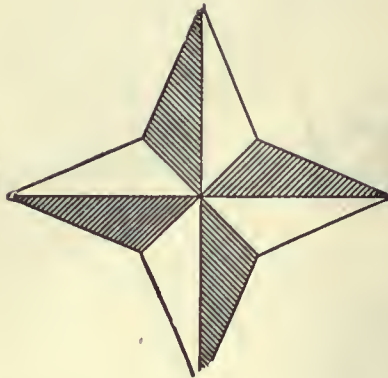
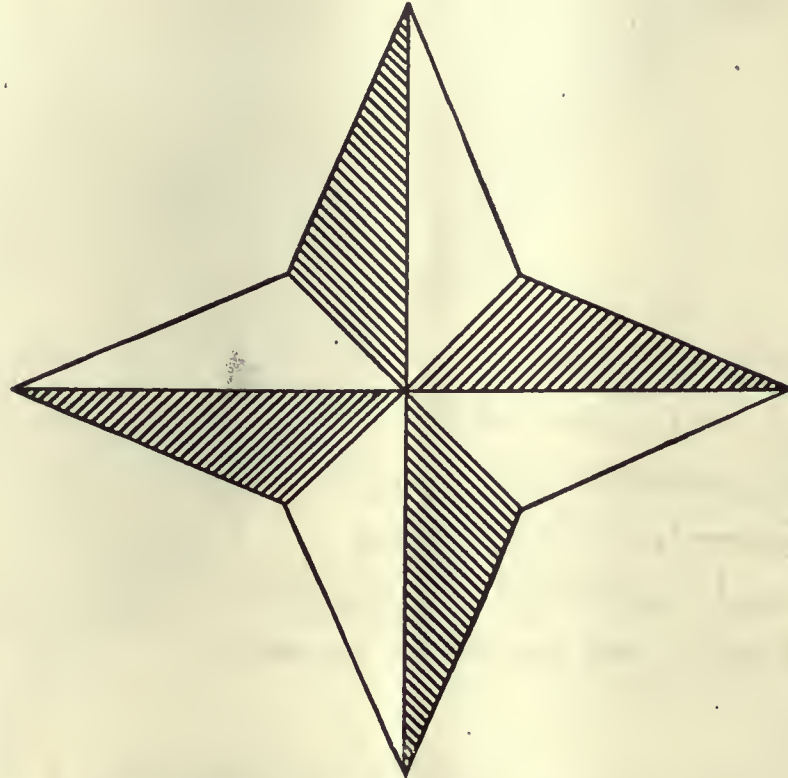
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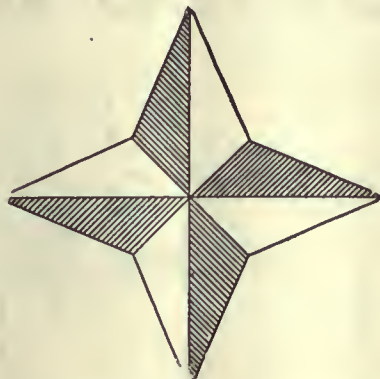
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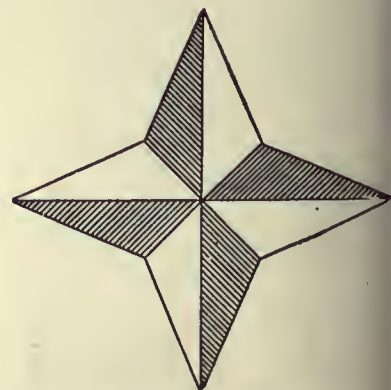
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“Lightweight with Strength”



“Capacity with Comfort”

means fast schedules and a decrease of 30% to 60% in stopping time

Cincinnati BALANCED LIGHT-WEIGHT cars are maintaining, consistently, fast schedules wherever they are in operation.

They are writing an enviable record in reports of "accidents prevented," due to their CINCINNATI DUPLEX AIR MAGNETIC BRAKING EQUIPMENT.

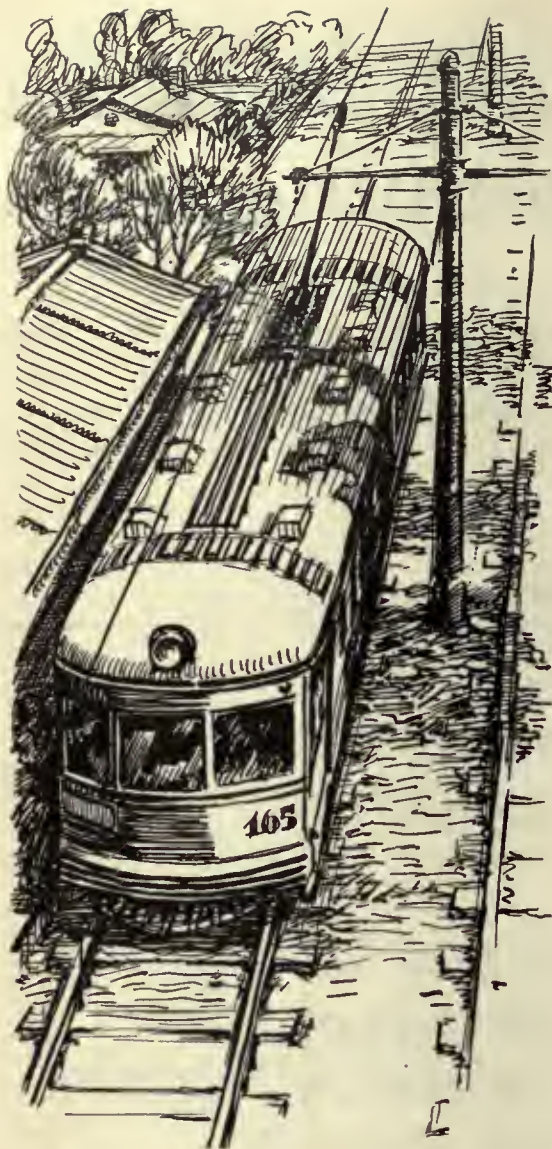
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We will be glad to show you actual reports.

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CINCINNATI, OHIO

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The Four Features of
Balanced Design are
the Cardinal Points of
today's demand.



IN FAST INTERURBAN SERVICE—

How about your wheels?

Standard Wheels carry hundreds of thousands of passengers to the cities and back again every day. The speeds and quick stops necessary to maintain competitive schedules put unusual tax on wheel stamina.

Standard Wheels hold up!

"FOR EVERY TYPE OF CAR



IN EVERY TYPE OF SERVICE"

**STANDARD STEEL
WORKS COMPANY**
PHILADELPHIA, PA.

CHICAGO
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UNIFORM

International

TREATED POLES
IN SERVICE 28 YEARS
ARE STILL IN
EXCELLENT CONDITION

INTERNATIONAL Creosoted Pine Poles installed 29, 25, 20, 18, etc., years ago are still in use. The remarkable thing is that the very old poles are still in splendid condition — there is nothing to indicate how long they will last, therefore, the ultimate life is not known.

These records prove that *International's* method of handling and treating poles must be correct to the last detail. The timber is sound to start with and the creosote is injected under pressure into the wood fibre far beyond the possible depth of abrasions and season checks. The full quantity of oil specified stays in the timber.

Illustration shows International Poles in service on the Union Pacific

International Creosoting & Construction Co.

General Offices: Galveston, Texas
Plants: Texarkana—Beaumont—Galveston



The International
Dating Nail

International Creosoted Yellow Pine Poles



ELECTRIC DRIVE
for
GAS-ELECTRIC BUSES
AND TRUCKS

GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

Preserving the Peace

In suburban districts of great cities there is peace.

That's why bread-winners go there to live and to bring up their children—to escape the noise and nervous strain of the roaring city.

They resent the intrusion of noisy buses, but they welcome those equipped with G-E gas-electric drive.

A suburban territory in the East recently granted a bus franchise with the condition that only gas-electrics should be used.

390-27

E L E C T R I C
SALES OFFICES IN PRINCIPAL CITIES

ELECTRICITY IMPROVES SERVICE AND INCREASES REVENUE



THE
GREAT NORTHERN
*electrified to improve
operating conditions*

When the Great Northern built a four-mile tunnel under the peak of the Cascades, the operation of steam locomotives was attended with difficulty, and electric locomotives were substituted. This was in 1907.

The results were so satisfactory that when a greater tunnel was undertaken in 1925, it was decided to equip this, too, for electric operation and also to electrify 66 miles of heavy grade at the ends of the tunnel. Locomotives of the motor-generator type, among the largest in the world, were selected.

These locomotives, which overcome mountain grades without loss of scheduled time, will keep the tunnel free of smoke and dirt and will make it possible to draw luxurious passenger trains and heavy freights with speed, frequency, and comfort—while materially decreasing the expense of operation.

Not only in mountainous divisions, but on the long, level stretches of main line, electric operation produces more revenue, simplifies operation, reduces maintenance, and gives better service.

Manifold advantages of electric operation have resulted from the use of electric locomotives and cars on main and branch lines, at terminals, and in suburban traffic; gas-electric cars for light-traffic lines; oil-electric locomotives in freight yards; and gas-electric buses for feeder service. Electric floodlights expedite freight sorting, and electric signal systems promote safe transportation.

**AMERICAN LOCOMOTIVE
GENERAL ELECTRIC**

Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
*Street Railway Journal and
Electric Railway Review*

CHARLES GORDON
Editor

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Number 22

Fares, Too, Can Be Made to Please the Patrons

EVIDENCE that it is possible to obtain more revenue from the riders on a street railway system and do it while pleasing the public rather than antagonizing it is given in the article by H. E. Weyman in this issue. When revenues were decreasing, some three years ago, he introduced a weekly pass on a portion of the system and at the same time increased the cash fare. Much care was used to inform the regular riders that they could obtain their transportation with no increase of rate by the purchase of passes. The plan proved so successful that later the pass was extended to cover all the zones. A glance at the charts shows that there was an increase in the cash fare at the same time that there was an increase in the regular riders who used either passes or reduced-rate tickets.

Previously tickets had been sold at four for 30 cents. Under the new plan they are sold at six for 45 cents, the idea being to discourage the use of the reduced rate and to encourage the use of the pass. As a rule it is a poor policy to adopt a rate that is awkward, or in any other way penalize the regular or semi-regular user of the service. It would be more in line with modern ideas to make the rate six for 50 cents, or if that could not be obtained, to sell seven for 50 cents. The loss of time and the inconvenience involved in making change at the odd rate would seem to make it undesirable, and the investment at the 50-cent rate would be so little more that few persons would be deterred by the difference.

The excellent results obtained in Levis indicate that much credit is due to care used by the management in introducing the new fare system and in keeping it popular after it was introduced. Items published in this paper from time to time indicate that many things have been done to make the fare system popular. Although, as Mr. Weyman states, the effect of introduction of the new fare schedule was feared, the whole-hearted manner used in putting it into effect has resulted in its being very much of a success.

A Modern Maintenance Plant

PROVISION of adequate maintenance facilities is an important part of the major rehabilitation program being carried out in the cities of Springfield and Worcester, Mass. The new Grove Street carhouse and garage, on which an article is published in last week's issue, are intended to provide facilities which will insure adequate and economical maintenance of the new cars and buses that have been purchased for the Worcester property.

Two general features of the Grove Street plant are of particular interest. Here, a modern carhouse and a 50-bus garage are located on a single plot of land so as to avoid duplication of air compressors, boilers for

steam and hot water, and other service equipment. This installation represents an ideal combination of a carhouse and garage. There is an opportunity here for co-ordination of maintenance work on cars and automotive vehicles and at the same time provide the facilities required for each type of vehicle.

Although there is nothing specially unusual in the general design of the garage, the depressed pit section is particularly interesting. The plan of piping grease and transmission oil under pressure directly to conveniently located outlets in the pits has a double advantage of reducing lost motion and at the same time making it possible to keep pits clean and sanitary. With respect to the facilities provided for efficient bus maintenance perhaps the greatest interest attaches not so much to the garage building as to the maintenance equipment which has been installed. When selecting the machinery for the Grove Street garage attention was given to the heavy duty which such equipment must withstand in bus maintenance work.

Pittsburgh Joins the Pioneers

IT WASN'T very long ago—less than three years, in fact—when railway men looked upon the exhibit of the Grand Rapids Railway at Atlantic City with feelings that ranged from wonder to amusement. Here was a railway actually trying to make its street cars attractive to patrons. Here was a railway trying to make car riding popular, by improving the appearance of the vehicle. Leather upholstered seats! Band brakes! Skirts on the sides! Bright colors! Shades of the horse car! No one but a circus man would try to do that to a street car. That might be all right for buses, but for cars—railway executives stopped and looked, but kept their opinions to themselves!

Since that time W. L. Harwood pioneered the Springfield car, J. R. Blackall the Joliet car—and many other cars that followed have attracted the industry's attention. Last year at Cleveland more radical departures from conventional practice were shown in a single exhibit than the industry had seen in a decade. Now comes the Pittsburgh car! Read the article elsewhere in this issue! Surely something has been happening in the industry since L. J. DeLamarter had the temerity to strike out for something better in the way of a street car.

The new Pittsburgh cars are frankly experimental. They include practically every innovation in car design tried up to this time, with the possible exception of the substitution of aluminum for steel in body framing. In addition, other features are being tried for the first time. The purpose is to make possible an exhaustive study in actual operation of factors likely to appeal to passengers. The Pittsburgh management also expects to determine from actual experience with the vehicle in service the practicability of many equipment features proposed for the improvement of car performance.

Undoubtedly some of these will not stand the test of

mass transportation service. That is what the Pittsburgh company is trying to find out. It proposes to utilize that experience in selecting Pittsburgh's future car equipment. Of one thing the management is convinced. The appearance and performance of electric railway cars *must* be improved if rail service is to meet and overcome the competition of the privately-owned automobile.

Perhaps the equipment on these cars is too complicated. Even if produced in large quantities they would undoubtedly be expensive in first cost and maintenance. Simplicity is an important characteristic of design, along with appearance, comfort and performance. A reaction has already set in from the glaring color combinations of some of the early attempts to beautify cars. A similar reversal toward simplification of equipment may be expected in the evolution of improved performance. Cost, reliability and ease of maintenance must be kept in mind in the effort to improve the street car.

Although the Pittsburgh cars are the most recent in the rapid series of car innovations, they are only the forerunners of many more to come. The metamorphosis of the street car is in full swing, and all signs point to its emergence from an ugly duckling to a thing of beauty and pride on our city streets—to use an imperfect metaphor. There are indications that the small, light, four-wheel car may be expected to play an important part in this evolution. Even the trolley bus in this country is showing signs of revived vitality.

All of these things give increased emphasis to the declarations of those who have said that after 40 years of local transportation we still have much to learn. Pittsburgh is doing its part. It is entitled to full credit in undertaking to put to the test of experience many of the recent innovations that have attracted interest.

Chicago's 5,441 Honor Men

GUIDING a street car successfully through the intricacies of traffic in a city such as Chicago day in and day out is a real achievement. And when 5,441 men do it for a whole year without a single accident the performance takes on an unusual aspect. Yet this is the record that men in the employ of the Chicago Surface Lines achieved last year.

On its part it would seem that the general public is disposed too much to accept meritorious service as its right. Trains whirl through the night at high speed, boats plough the seas beset by storm and fog and many other dangers, street cars speed through city streets encompassed at all times by a thousand hazards. It is true that on the common carrier rests the obligation to get the passenger through safely to his destination, but the hazards are great and the likelihood of human failure is always present. A child killed in the street, a passenger maimed or a pedestrian injured can mean only woe in some household somewhere.

Only at the occasional occurrences of man-failure is the public aroused, often negatively rather than positively. This is a tendency from which even the railways, the Chicago system among them, have not been free. In fact, the former plan of keeping accident records in use by that company tended to focus attention on the few men who were in trouble rather than on the many who were satisfactorily performing their daily duties. That point of view has now been reversed.

Heroic or spectacular achievement deserves its reward, but after all it is the day-by-day work accomplished, often with great celerity but with none of the aspects of

the spectacular, that counts. It is never pleasant to contemplate the theory of chances as applied to the matter of hazards to which everyone always is subject. The obligation to be careful is not lightly accepted by public service corporations, but it would be reassuring to know that all drivers of vehicles had been subjected to tests comparable in their severity to the ones to which all motormen and conductors must first submit before they are accepted as being qualified for their tasks.

The preponderance of men on the Chicago Surface Lines who have won the right to wear the insignia of merit which stamps them as being most careful should be reassuring to all users of the company's service who do not take life with a spirit that is carefree. Certainly the Chicago Surface Lines has every reason to be proud of its record. And the citizens of Chicago have every reason to be proud of the organization which established that record. It is an unusual accomplishment. The results attained were achieved only by constant vigilance sustained by a properly aroused sense of individual responsibility.

Safety Campaigns Need Concentrated Responsibility

DURING the recent "Safety—Save a Life" campaign, held in Philadelphia, an article on which appears elsewhere in this issue, the accident rate kept right on increasing. The number of accidents, both in the city and in the state of Pennsylvania, was greater than during a similar period in 1927. From this it might appear that safety campaigns are merely "open seasons" for the running down of pedestrians and the mutual destruction of autoists.

Yet if the campaign of this year is compared with the "Will Livelong" safety campaign conducted by the Philadelphia Rapid Transit Company in Philadelphia in April, 1927, some interesting observations may be made. Last year's campaign, for which the local transit organization was almost wholly responsible and which it financed entirely, produced a reduction in street fatalities during April of 26 per cent as compared with the similar month in 1926. Within the company organization an excellent record was established for reduction in car collisions and all types of accidents during the campaign. This year, while it seems that the divided responsibility for the drive produced no tangible results in increased street safety for the city, the transit organization was able to effect a further reduction in its own accident record.

This comparison seems to show that any city-wide movement, whether it be for safety or for some other purpose, needs a definite co-ordinating influence. Where the responsibility is left to individual organizations to pick up various phases of the work and carry them on independently, there is lacking an all-important unity of effort. The inertia in a large city and particularly in a state the size of Pennsylvania is great and cannot be overcome in a short period or by scattered effort.

The passing of kindly old Will Livelong, the safety sage, from the picture in Philadelphia was to be regretted. The personal type of campaign built around a central figure was able to reach the heart chords of the average citizen and to arouse him from an apathy which no amount of pure logic and reasoning could touch. Perhaps the old man might be brought back on the job again. It seems that he or some character like him was sorely missed this April.

The policy of Mitten Management in providing for

continuous safety work on its properties and for their active participation in civic movements to promote street safety in their respective communities is to be commended. The recent campaign in Philadelphia was effective from the standpoint of the local transportation company, at least, and possibly its influence upon the city as a whole will not be lost.

The safety patrols established years ago by the P.R.T. in the schools of Philadelphia, and now carried on directly as part of the regular school work, may be an object lesson to educators in other sections of the country. Safety patrols such as these are, of course, the nucleus around which any safety instruction in the schools is built in Philadelphia. Proper training of the children today will make for a more common-sense attitude toward the traffic and street safety question on the part of the adults of tomorrow.

Certainly no one can question the necessity for placing frequent emphasis on personal safety, pedestrian control and driving care on the streets and highways. But an occasional safety drive will have little effect unless the work just begun is carried on by the schools and similar organizations of the city which are charged with the normal education of its citizens.

Non-Political Control Suggested for Municipal Railway

SUPERINTENDENT Boeken of the Municipal Railway at San Francisco ought to know what he is talking about when he discusses the operation of that system. He says there need be no alarm for the future financial welfare of the system if recommendations he has made are carried out. Then he proceeds to say that the ability of the system to pioneer and develop new districts on a 5-cent fare has been over-rated; that it would have been wiser had reserves for depreciation been kept at a healthy level; that it does not appear feasible to reduce service as a measure of economy; that bus lines have been unprofitable, and that transfers between cars and buses should be abolished. Most important, the superintendent says that it must be plain to anyone that in order to preserve the railway as far as possible from political control and influence, it is imperative that a non-political public utility commission be created and be entrusted with the future destinies of all of San Francisco's public utilities.

Thus did Mr. Boeken stick his head into the noose. He has told the truth as he sees it and has shamed the devil. As the *San Francisco Chronicle* sees it, Mr. Boeken might as well have saved his breath. According to that authority, the only hope for taking the railway out of politics lies in the passage of the charter amendment on Aug. 28 under which there would go to the Legislature for ratification a plan for commission control similar to the one to which the superintendent of the railway has referred. That may or may not be the answer. Off hand, a commission of this kind, presumably dominated locally, would appear to be merely another subterfuge under which, by remote control, the politicians will eventually exercise their influence.

The future of the municipal railway certainly is a matter of speculation. The present shows one set of politicians proclaiming the municipal railway to be a mint, and another set proclaiming it to be bankrupt. As the *Chronicle* says, poor Mr. Boeken is rolled between the two of them because he had the temerity to make the

situation clear and to suggest that politics be bumped off the track. Certainly the superintendent brought out many illuminating things about the municipal railway. On the basis of its contents the report might be converted into a preachment against municipal ownership, but that is not necessary, since the report is its own best commentary on the result of the attempt at paternalism entered upon by the city of San Francisco when it went in for running its railway.

Electric Railway Practice on Both Sides of the Atlantic

EUROPEAN electric railway practice in many respects does not differ greatly from that in America. This is indicated in the abstracts of the six papers presented at the Rome Convention of the International Street and Interurban Railway & Bus Association and published in this issue and that for last week. The topics that are treated do not differ from those which might have been discussed at almost any electric railway convention in this country. There are two papers on one-man car operation, two papers on truck design, one paper on track construction in city reservations, and one paper on improvements in rails and ties.

Europe has been behind this country in the proportion of cars operated by one man. Wages there are not so high, so that the need has not appeared so great. The zone-fare system in use in many cities has been thought an operating obstacle. But with the increase in one-man cars in Europe, which is now apparent, many features in car design, such as power-operated doors, which up to this time have been considered distinctly American, will probably come into more extensive use. It is significant that the four cars for one-man service, recommended by Mr. Bacqueyrisse, are equipped with power-equipped doors and treadle exit doors. Paris now seems committed to one-man operation of at least some cars and buses.

Two other papers relate to radial axle cars. The greater interest in this subject in Europe than here lies largely in the more extensive use abroad of single-truck cars because of the narrow streets, and the effort to prevent nosing and teetering on these cars when mounted on short wheelbase trucks. The papers indicate that most of the efforts toward radial axles so far tried in Europe have not proved very satisfactory, though one writer attributes at least part of the poor results to failure to use the right design.

Another paper relates to track construction in city reservations. American city planners have failed lamentably in most places in providing space in boulevards which can be used exclusively, except at street intersections, for railway track. If all the cities had been designed like New Orleans, Mobile, and a few others which might be named with reservations of this kind, street transportation problems would be much simpler than they are at present. Fortunately European designers in modern times have had this need in mind, and Mr. Lenartowicz points out their great advantages in the way of increasing car speeds and so postponing the need for elevated or underground rapid transit lines. Daniel L. Turner has advocated the same plan for city extensions in Detroit, Long Island and elsewhere. It is hoped that street widths sufficient to permit such central reservations will be the rule and not the exception for arterial highways in the future.

Pittsburgh Seeks More Popular Street Car

Two experimental cars recently received from the builder incorporate many innovations intended to improve service and make street cars more attractive to the public. Railway company considers car improvement of vital importance in meeting automobile competition

By Charles Gordon



DETERMINED effort to seek out those improvements in electric railway equipment that may be expected to appeal to riders through better performance and greater attractiveness, is represented in two experimental street cars recently delivered to the Pittsburgh Railways and exhibited to the patrons of its system. Graceful lines and proportions, high acceleration and braking rates, smooth and quiet operation, comfortable seats, ample aisle room for rush-hour travel, low step heights, and economical operation, were some of the major objectives sought in the design of these two new cars. Ideas from the automotive vehicle were frankly incorporated wherever they were considered worthy of a trial in car construction. Several features represent so wide a departure from previous electric railway practice, that they were included with the full understanding that they may prove impracticable under the severe conditions of low price, mass transportation service.

Because of this recognition by the Pittsburgh company of the need for car improvement, and the daring innovations incorporated in this experimental equipment to de-

An unusual seat arrangement is one of the features being tried in the Pittsburgh cars

The wide aisle gives large rush-hour capacity, while the stanchions are intended to provide comfortable standing facilities at high acceleration and braking rates.

termine the possibilities of developing a more merchandisable street railway service, particular interest attaches to some of the features of these two cars. They were built by the Osgood-Bradley Car Company under the direction of the railway

company's engineers, and in co-operation with the Westinghouse Electric & Manufacturing Company and the Westinghouse Air Brake Company. Recognizing the need for stimulating car builders and manufacturers to the exertion of their initiative and ingenuity in meeting the present-day demand for car improvements, the Pittsburgh company limited itself to outlining generally the objectives sought in these cars, and permitted the manufacturers to work out the details of design and equipment. Throughout the design, many of the ideas previously developed by W. L. Harwood in the Springfield experimental car, published in the March 26, 1927, issue of *ELECTRIC RAILWAY JOURNAL*, and by J. R. Blackhall in the Joliet car, published in the April 2, 1927, and Dec. 17, 1927, issues, were followed.

Both cars are similar except that they are mounted on

different types of trucks equipped with two sizes of motors. Many of the motor, control, truck and brake features incorporated recently in various experimental cars are included in these two Pittsburgh units, and in addition, there are a number of new ideas being tried for the first time. The electrical equipment includes semi-pneumatic, magnetic, remote motor control of Westinghouse manufacture, having manual acceleration and automatic, regenerative braking. The control resistance is used for car heating during acceleration and electric braking. Electrically controlled air brakes are also included, the brake handle being used merely to establish electrical contacts for the operation of remote brake valves assembled in a special equipment box under the car. One car is mounted on Timken worm-drive trucks with internal expanding, automotive type brakes, equipped with 35-hp. motors and 26-in. diameter wheels. The other has special Osgood-

Considerable success has been achieved in carrying horizontal body lines across the vestibules without breaking the lines at the doors. This results in a stream line effect, intended to give the car a graceful appearance indicative of speed and comfort. The bottom line of the lower step is carried around the dash to the blind side of the vestibule at each end of the car, and then tapers up from the body corner post until it meets the bottom line of the side sheets. Thus the vestibules are symmetrical on both sides, and the unbalanced appearance so often characteristic of cars with inside steps, is eliminated. Since no skirt is used below the sides of the body, the general treatment of the vestibules gives them a very low-hung appearance, as is shown in accompanying illustrations. The roof is painted steel gray. Above the belt rail the body is a neutral shade of green. A broad orange stripe extends completely around the body and vestibules



One of the two experimental cars recently put in service by the Pittsburgh Railways in the effort to develop a more popular type of street car. High acceleration and braking, attractive appearance and individual seating are features of the design

Bradley trucks, 50-hp. motors. W-N drive, 24-in. wheels and a new arrangement of brake rigging using Westinghouse automotive type diaphragms to actuate conventional cast-iron brake shoes on the wheels. The units are designed for high acceleration and braking rates and for free running speeds considerably above those usually attained by city cars. They are of the low floor, arch roof type with two inside steps front and rear, and are arranged for one-man, front entrance, rear exit, single-end operation. They incorporate the sloping type of front window adapted from automotive vehicle practice on several recent experimental cars, and in addition are equipped with sashless plate glass side windows similar in design to those used on automobile and bus bodies. Inside folding doors are set flush with the body corner and vestibule posts, to give a smooth exterior appearance. The vestibules at each end of the car taper in from the body on both sides. The front dash is comparatively flat below the belt rail, and the use of double headlights indicates the further influence of automotive practice. Since the cars are for single-end operation only, the two vestibules are not alike, the rear end being rounded and equipped with vertical windows arranged to open similarly to the body side windows.

at the belt rail. The lower half of the car is blue. These colors are carried across the doors at both ends so as to emphasize the stream line effect.

Simplicity characterizes the interior appearance, which presents an unusual effect because of the radical departure from conventional practice in the seating plan, and the large number of stanchions along the aisles. A single row of stationary, individual, special bucket type seats made by the Hale and Kilburn Company are arranged along each side of the car so that the passengers face toward the center line at an angle of 45 deg. to the direction of motion. The chair backs are covered on the front surface with canvass-lined rattan, and on the rear with painted sheet steel. A round leather cushion in each seat is mounted on a formed steel pan, which in turn is fastened to the pedestal brackets at three points spaced on a triangle, so that when the cushion is worn on its front edge it may be mounted in two other positions to prolong its life by distributing the wear. Clearance of about $\frac{3}{4}$ in. is allowed between the cushion and the surrounding back frame for easy cleaning. The cushion and back are pitched to give a comfortable seating angle, the front edge of the cushion being about 17 $\frac{1}{2}$ in. above the floor. The circular shape of the seats permits them to be stag-



All apparatus in the front vestibule is inclosed in cabinets. Liberal door space permits easy access for inspection and repair. The control switch groups are in the cabinets at the left

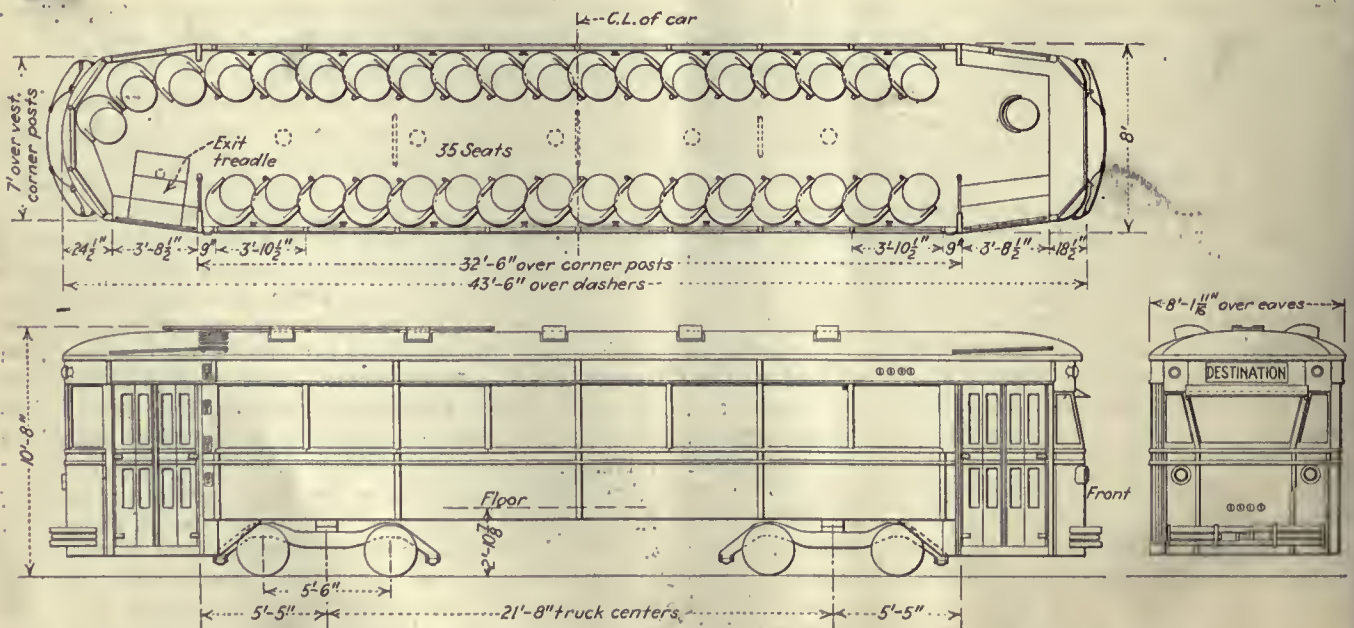
gered behind each other on a 23½-in. spacing, thus giving a seating capacity of 35.

No hand straps are used. Adjacent to each seat, however, along each side of the aisle, are two rows of stanchions extending from the floor to the roof. This arrangement is intended to give a wide aisle with comfortable supports for standees and to prevent falling in the cars even at the high accelerating and braking rates for which they are designed. In one car the stanchions are finished in white enamel and in the other they are nickel-plated. Although the plan of using a single row of seats on each side gives a total seating capacity of only 35, it was felt that this might not prove objectionable to passengers if ample room and supports for comfortable standing in the rush hours were provided. It was assumed to be impossible with any seating arrangement, to provide seats for all passengers in the peak periods of the day. Likewise, it was argued that a seating capacity of 35 per car is more than ample to provide seats for all passengers in the non-rush hours. A further considera-

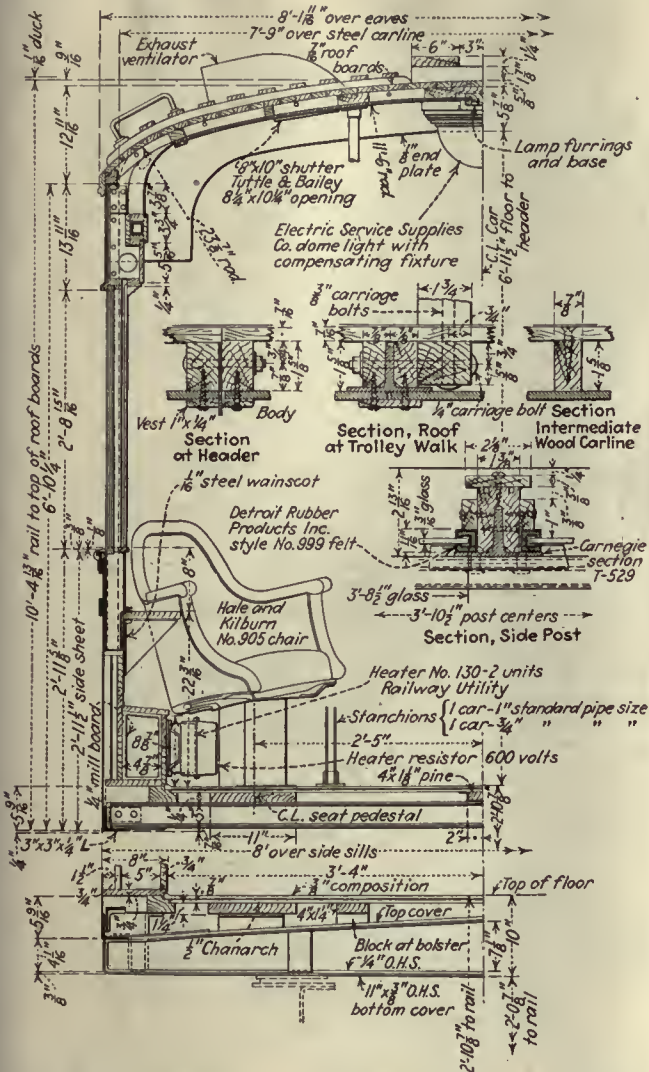
tion is that the apparent reduction in the number of seats per hour that would be provided on a line in which this type of car were substituted for cars with conventional seating arrangement, would be partly offset by the practice in Pittsburgh of increasing service approximately 30 per cent when changing from two-man operation to one-man on a given line. This experimental seat arrangement is being tried, therefore, on the theory that it may prove desirable to provide more comfortable standing room during the rush hours at the expense of some reduction in the number of seats, to make possible the use of a more comfortable and desirable type of seat. These are available for those passengers who do obtain seats during the rush hours, and, if they prove popular, are expected to stimulate the use of the car service during the off-peak traffic periods. Although this in general constitutes the reasoning which led to the adoption of this novel seating plan, the Pittsburgh management considers the whole idea entirely experimental and subject to the test of experience.

No attempt was made in the design of these cars to achieve extremely light weight. They are 43 ft. 6 in. long over dashers, 32 ft. 6 in. over the body corner posts, 8 ft. 1¼ in. wide over the eaves, and 10 ft. 8 in. high from rail over trolley boards. An unusually wide side post spacing of 3 ft. 10½ in. is used to provide a maximum glass opening and to help in giving the cars a long, rakish appearance. The trucks are spaced on 21-ft. 8-in. centers. The front and rear door openings are the same, being 3 ft. 8½ in. The framing is of steel, built up of standard sections. The entire floor, including the vestibules, is level, without ramps, and consists of Flexolith composition laid on Chanarch steel supported on suitable furring members fastened to the underframe. Double inside steps are used front and rear to keep the step height low. On 26-in. wheels, the body floor is approximately 2 ft. 10⅞ in. above the rail and the step heights are 14⅞ in., 10 in. and 10 in. respectively. On one car, which is mounted on 24-in. wheels, the first step is correspondingly reduced. The car with 35-hp. motors weighs approximately 35,000 lb. and the one with 50-hp. motors, 36,500 lb.

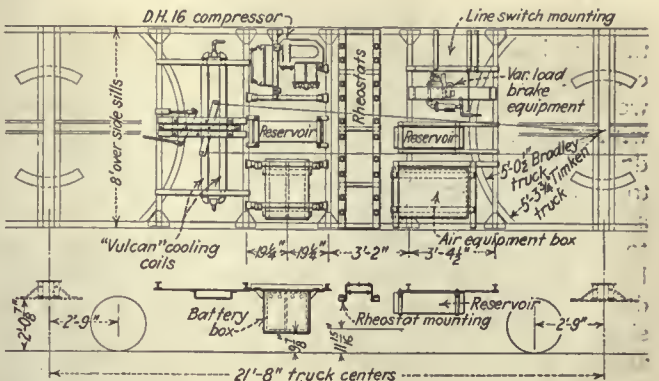
The main body side posts and carlines are rolled steel



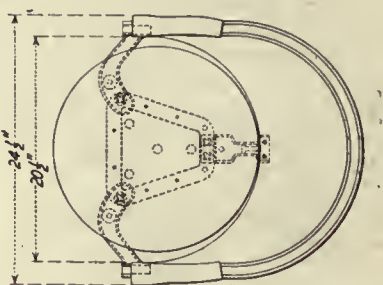
Seating capacity of 35 is obtained in the experimental Pittsburgh cars by staggering the two single rows of seats as shown. The cars are 43 ft. 6 in. long, 8 ft. 1¼ in. wide over the eaves and weigh 35,000 lb. and 36,500 lb., respectively



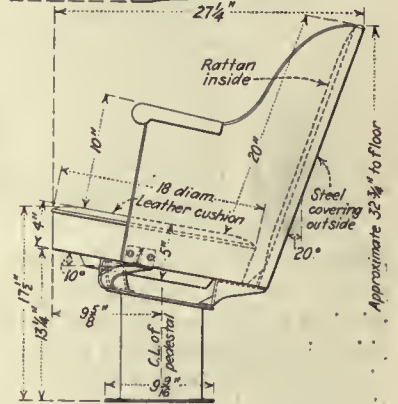
Cross-section showing principal features of Pittsburgh experimental car body construction. The sashless plate glass windows slide in felt grooves into pockets in the body side which permit them to be lowered 10 in.



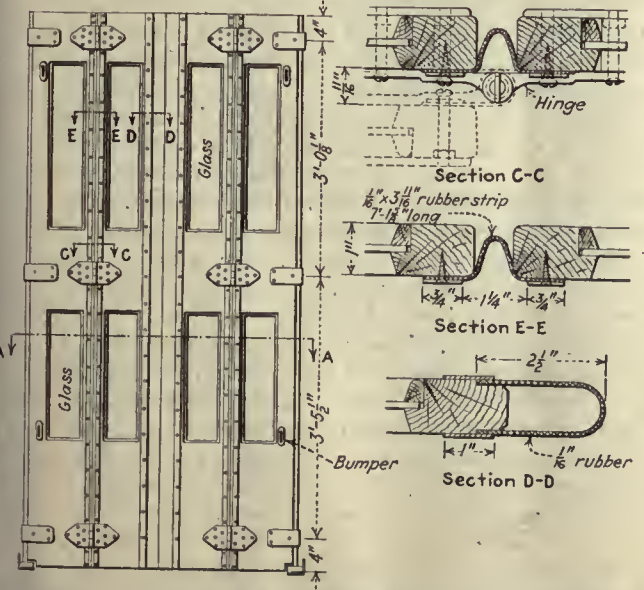
Elimination of the conventional foundation brake rigging permits a compact arrangement of equipment under the car. Air valves and miscellaneous parts are assembled in the air equipment box and may be readily removed from the car for inspection



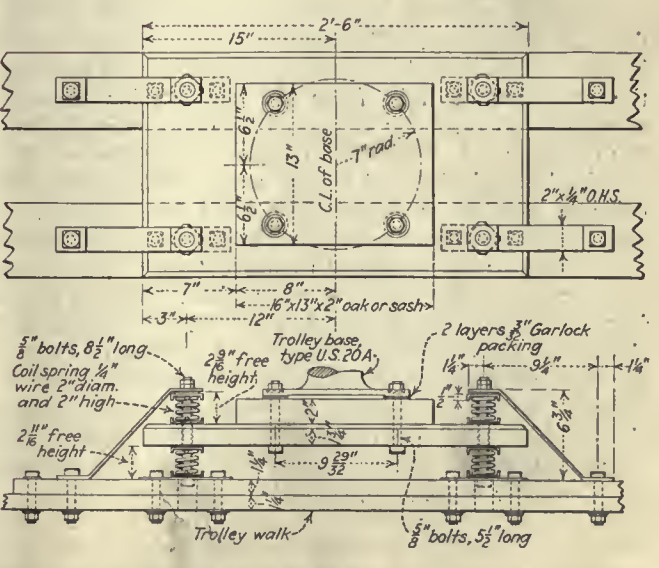
These bucket type seats developed for Pittsburgh are almost circular on the outside, to conserve space. The cushion is leather, while the back is faced with rattan



Section A-A



Precautions are taken to prevent folding doors from pinching passengers. Note particularly the arrangement at the hinged joints

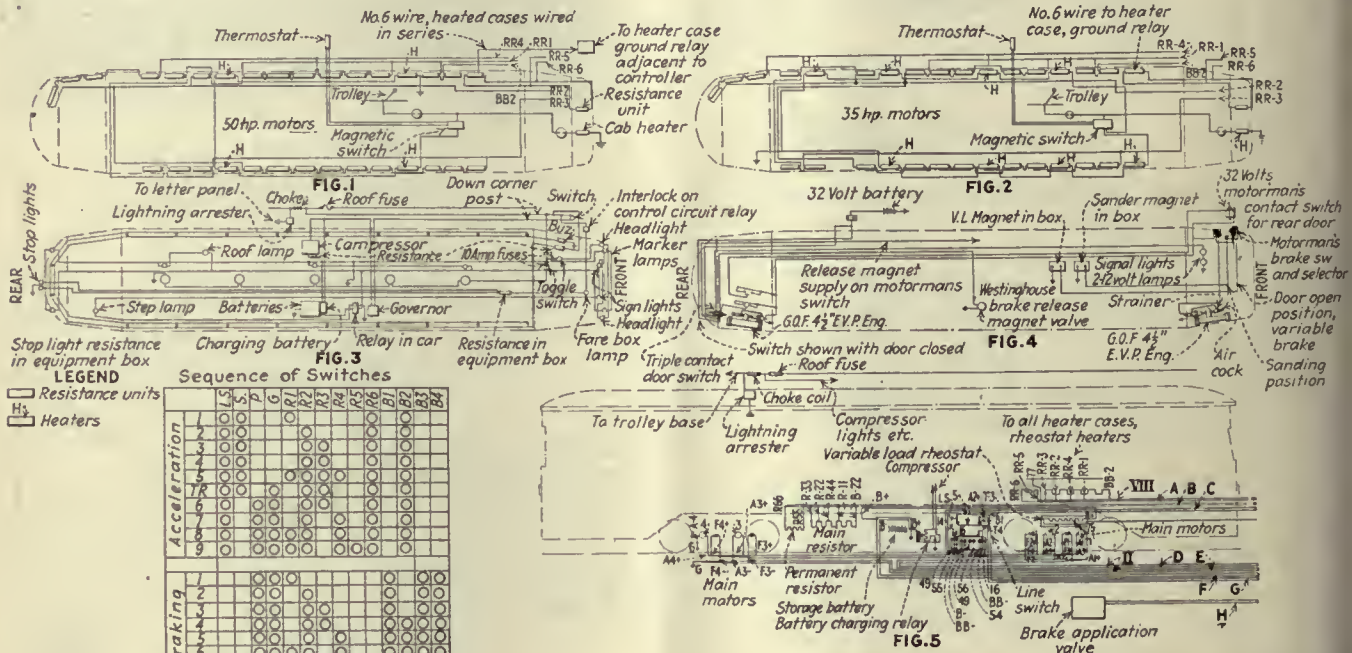


A special spring-mounted trolley base support reduces transmission of trolley noise to the body

tees, intermediate wood carlines being placed between them as indicated on accompanying drawings. The roof consists of tongue-and-groove poplar secured to the wood carlines and to the furrings on the steel carlines with cement-coated nails, and covered with No. 8 cotton duck. The eight wide windows on each side of the body, together with the windows in the rear vestibule, are of sashless, automobile type, of $\frac{3}{16}$ -in. plate glass, arranged to drop 10 in. from the top into suitable pockets in the body side. These windows are operated by special heavy-duty, Ternstedt regulators designed to handle glass of this size. Because of the weight of the glass a counter-balancing spring is arranged so that the windows may be

for ventilation. A simple operating mechanism on each side sash holds it securely in closed and open positions. A special weatherstrip arrangement is designed to preclude the entrance of wind or water at the sides or bottoms of these side sashes when they are closed.

Both the front entrance and the rear exit doors are double, inward folding, and are operated by National Pneumatic door equipment. They are controlled by a selector valve which permits either the front or rear doors to be opened or closed separately or simultaneously. In addition, the rear doors are controlled by an automatic exit treadle arranged in the conventional manner so that after the operator has thrown the selector handle to the



Control wiring and auxiliary circuits of the Pittsburgh experimental acceleration and automatic, regenerative, electric

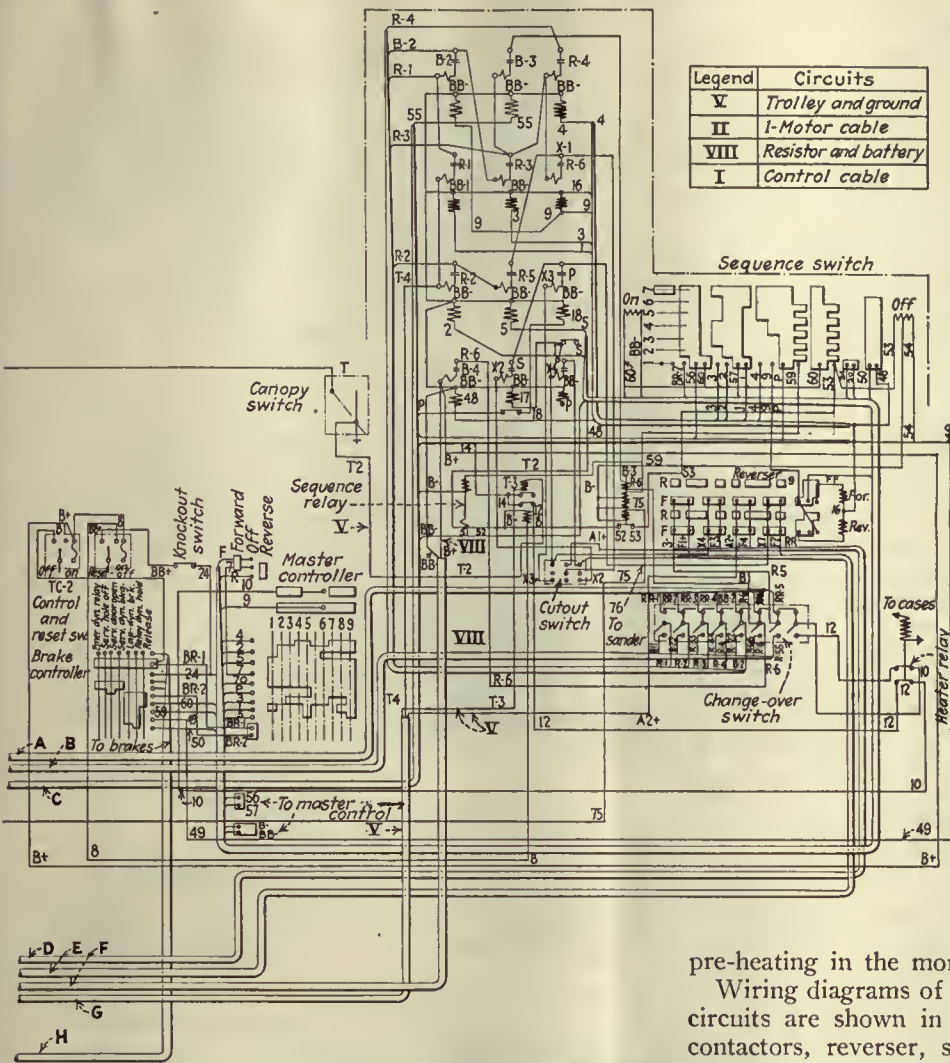
opened or closed with surprising ease by conventional automobile type operating handles. By this arrangement, window guards on the sides of the car, which were considered unsightly, costly to maintain and a nuisance in cleaning, are eliminated. Special drains are arranged in the pockets into which the side window glass drops, to carry off any water which might enter between the glass and the window sill. There are no side window curtains.

The front vestibule side window, opposite the entrance doors, is stationary. The front vestibule center window is also stationary and is set at an angle intended to deflect the reflection of light from the car interior so as to eliminate the need for the conventional curtain back of the operator. A Folberth air-operated window wiper is provided with inside and outside wipers to keep the glass clear of rain, snow or moisture from condensation. A sun visor is also provided over this window. An unusual arrangement was developed to prevent the formation of sleet or ice on the front center window. This is shown in an accompanying illustration. It consists of a slot in the top of the equipment cabinet and a deflector close to the dash, arranged so that heat from the vestibule heaters, mounted within the cabinet, is conducted upward against the sloping glass to prevent the formation of ice. The front vestibule side windows are framed in Curtain Supply Company brass sash, shaped to fit the space between the vestibule corner posts and the sloping front window. They are hinged at the vestibule corner posts by continuous piano hinges and are arranged to swing outwardly

proper position the rear doors will open only if a passenger is standing on the top treadle, or steps upon it, and cannot be closed until the passenger alights from the bottom treadle. The rear step treadles and the front steps are covered with Kass safety treads.

The sides of the body below the belt rail are insulated with three-ply Salamander felt, secured in place by means of nails electrically welded to the side sheets. This insulation performs the double function of preventing loss of heat in the winter and deadening the transmission of sound in the body. All the wood trim on the interior, as well as the vestibule doors, is selected mahogany, stained walnut color and finished with rubbed varnish. The headlining in the car body and vestibules is Agasote finished in cream-color Vitralite enamel. There are ten Osgood-Bradley Car Company exhaust ventilators in the roof, covered on the inside by grilles with adjustable lever-operated shutters. The car body is illuminated by five 101-watt lamps mounted in Electric Service Supplies Company special dome fixtures. These have integral automatic compensators which cut equivalent resistance into the circuit if one or more of the lamps burn out, so that the remaining lamps continue to burn at proper voltage. Double headlights furnished by the Electric Service Supplies Company are mounted on the front dash. At the rear end there is a Nichols-Lintern stop light.

A lamp is mounted over the entrance and exit steps,



mental cars. The control is semi-pneumatic, magnetic, with brakes in combination with electrically-controlled air brakes

and the front end destination sign is illuminated by two lamps located inside the sign box. An emergency system of lighting from a storage battery, which is part of the electric control equipment, is wired through a suitable relay to function in the event of a trolley dewirement or a power failure. These emergency lights are located in three of the body dome light fixtures and in the letterboards at each end of the car, where they are equipped with red semaphore lenses. One light on the roof is located near the main fuse, as an aid in replacing a fuse after dark. Passenger signal buzzers are Faraday type.

In the vestibule letterboard, above the center sash, there is an Electric Service Supplies Company illuminated destination sign with 10x41-in. sign openings. Extending out from the dash at each end there is mounted a heavy C. & G. Spring & Bumper Company automobile type spring bumper. This is designed so that it will spring back toward the dash in the event of a car collision and will permit the drawhead to project through and act as an anti-climber.

One of the cars, mounted on Timken trucks, is equipped with four Westinghouse No. 1425 motors of 35 hp., geared 10:1 in the worm drive. These trucks have 26-in. diameter wheels. The motors are wound for 300 volts, and are permanently connected in series in groups of two. On level tangent track with a trolley voltage of 600, this car without load will balance at a free running speed of

approximately 33 m.p.h. The motor weight is 545 lb. and the maximum safe motor speed is 5,000 r.p.m. at 38.7 m.p.h. car speed.

The control apparatus consists of a master controller, magnetic contactors, pneumatic line switch, pneumatic reverser, sequence switch and edge wound resistors mounted inside the car to utilize for car heating the resistance losses during acceleration and dynamic braking. A second set of control resistances is mounted under the car for use in summer, and a change-over switch is provided so that the control circuit may be shifted from the inside to the outside resistances when seasonal changes make this necessary. Supplementary Railway Utility truss plank car heaters are connected to a thermostat on the interior of the car, so that they are cut in automatically whenever, in severe weather, the heat supplied by the control resistances is not sufficient to keep the car at a predetermined temperature.

They are also available for pre-heating in the morning before cars go into service.

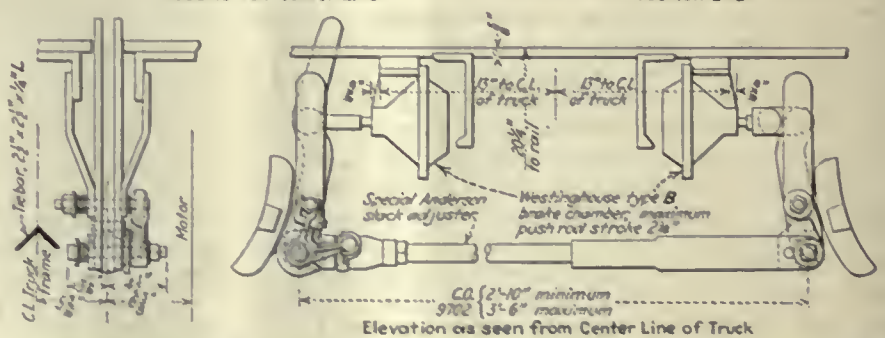
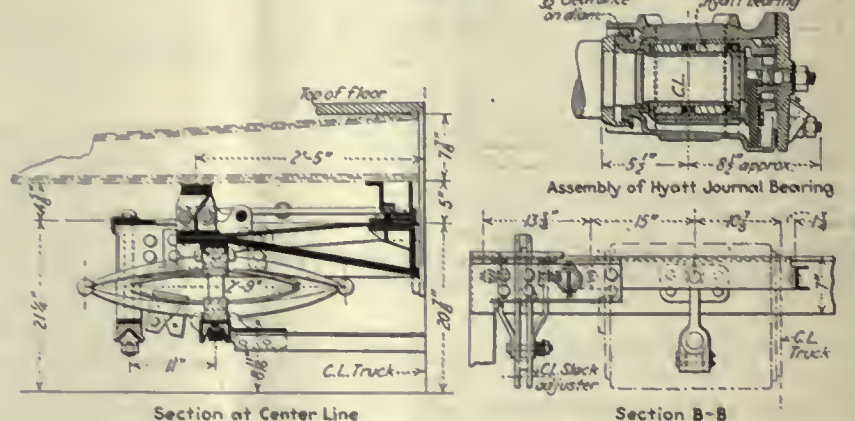
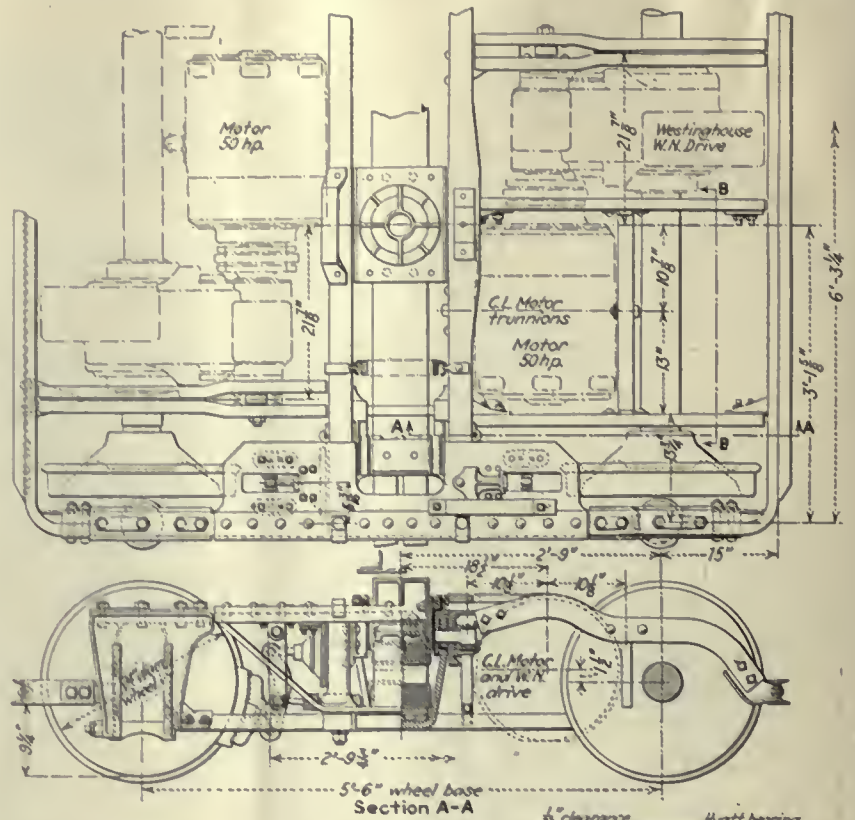
Wiring diagrams of the control and auxiliary electrical circuits are shown in accompanying illustrations. The contactors, reverser, sequence switch, and other apparatus of the control equipment, are mounted in suitable cabinets on the left side of the front vestibule. These cabinets are made shallow in depth so as not to interfere with the view from the car interior toward the front. The cabinets are of wood, heavily insulated with asbestos lining, and are provided with large doors so that the equipment is readily accessible for inspection. The line switch is mounted underneath the car. All switches and other vestibule equipment are enclosed in cabinets in the front vestibule, as shown in the accompanying illustrations. The only exposed items are the wheel of the Peacock staffless hand brake, the dynamic brake handle and the top portion of the controller. An Economy meter is mounted inside the control cabinet near the entrance door in such a way that the dial is exposed for convenient reading, either from the platform or from outside the car.

The application of power to the car is by straight hand notching. The dynamic brake is applied automatically under the operator's control at the air brake handle. The dynamic braking positions on the segment of this control handle, correspond to the usual air brake positions on the conventional motorman's brake valve. Dynamic brake application is made by manipulation of the control handle very similar to a conventional straight air brake equipment. By moving the handle of this dual brake control to the right, beyond what would normally correspond to brake lap position, the air brake becomes operative. In fact, the dynamic and air brake arcs lap into each other so that there is a gradual transition from the electric to the air brake.

Arrangement of equipment under the car is shown in an accompanying drawing. An unusual feature of arrangement is that the compressor governor, brake application valves, relay valves and other air brake equipment are grouped in a special box with a removable bottom and a heating unit to prevent freezing. By disconnecting the pipe lines leading into the box, at the unions, and the wiring at special connectors provided, all of the valves may be removed in a group for inspection, cleaning or repair. Air brake piping, with the exception of a small amount of standard iron piping at special locations, consists of aluminum tubing in various sizes, fitted at valves and other junctions to apparatus with special, long taper, automotive type, couplings. The use of the aluminum tubing not only reduces weight but simplifies installation, since it is flexible enough to be bent into position without the use of elbows or other pipe fittings. Further advantages expected from the use of this material are the elimination of pockets, freer flow of air through the long bends, and the elimination of trouble from scale and rust.

The Timken trucks are similar to the type developed for the experimental cars in Springfield, Mass., and Joliet, Ill., and subsequently applied in experimental installations in a number of cities during the past year. The second car is mounted on special Osgood-Bradley trucks, type 45-66-KDA-50, equipped with 50-hp., Westinghouse No. 1426 motors, geared 7.06:1 and driving 24-in. diameter wheels through W-N (double reduction) gear units. These trucks are of the Osgood-Bradley conventional truss frame, spring pedestal type, equipped with Hyatt journal bearings. Aside from modifications to permit mounting of the high-speed motors and the W-N drive, the principal feature of interest in the truck design is the brake arrangement. The brake itself is applied through conventional cast-iron shoes on the wheels. Instead of the customary brake cylinder and foundation rigging, however, Westinghouse diaphragm automotive-type brake chambers are mounted on the truck, one at each wheel. The push rod of each chamber actuates the corresponding brake lever directly through a specially designed Anderson automatic slack adjuster. General arrangement of the truck and brake rigging is shown in an accompanying drawing.

Except for the fact that the Westinghouse 1426 motors on this car are of 50-hp. capacity instead of 35, they are quite similar in design to the No. 1425 motors on the car equipped with Timken trucks. They are wound for



By using Westinghouse automotive brake diaphragms mounted at each wheel, a unique brake arrangement was developed for the Osgood-Bradley trucks used under one of the cars. The motor drive on this truck is through W-N, double-reduction type gearing. The other car is mounted on Timken trucks with worm drive

300 volts and are connected permanently in series in pairs. With four of these motors per car, unusually high accelerating rates are possible. Under the same conditions as given above for the 1425 equipment, the balancing speed is 38 m.p.h. The weight of each motor is 800 lb. and the maximum safe speed of 4,000 r.p.m. corresponds to a car speed of 44 m.p.h.



The Timken worm drive trucks used under one of the Pittsburgh cars are equipped with 35-hp. motors and automotive type spring mounting

The W-N drive unit is carried on the truck frame in special yokes designed to avoid twisting on the short drive shaft between the motor and the gear unit. The high speed and intermediate shafts are carried on Timken tapered bearings at each end, and the low-speed gear is carried on a sleeve mounted on Timken bearings. The car axle is pressed into the sleeve in the same manner as it is ordinarily pressed into the gear of a conventional single-reduction drive. The gears and pinions are cut with high-angle helical teeth designed to reduce noise to a minimum. The gears are also silenced to prevent ringing at high speed.

A variable load brake device is part of the equipment of each car. Another interesting feature, shown in an accompanying illustration, is the special spring-mounted trolley base support which is intended to reduce drumming inside the car from the action of the trolley wheel on the wire and overhead special work. This trolley support was designed by the Pittsburgh Railways and is used on a number of other cars in regular service on the line of the company.

Large Electric Locomotives for France

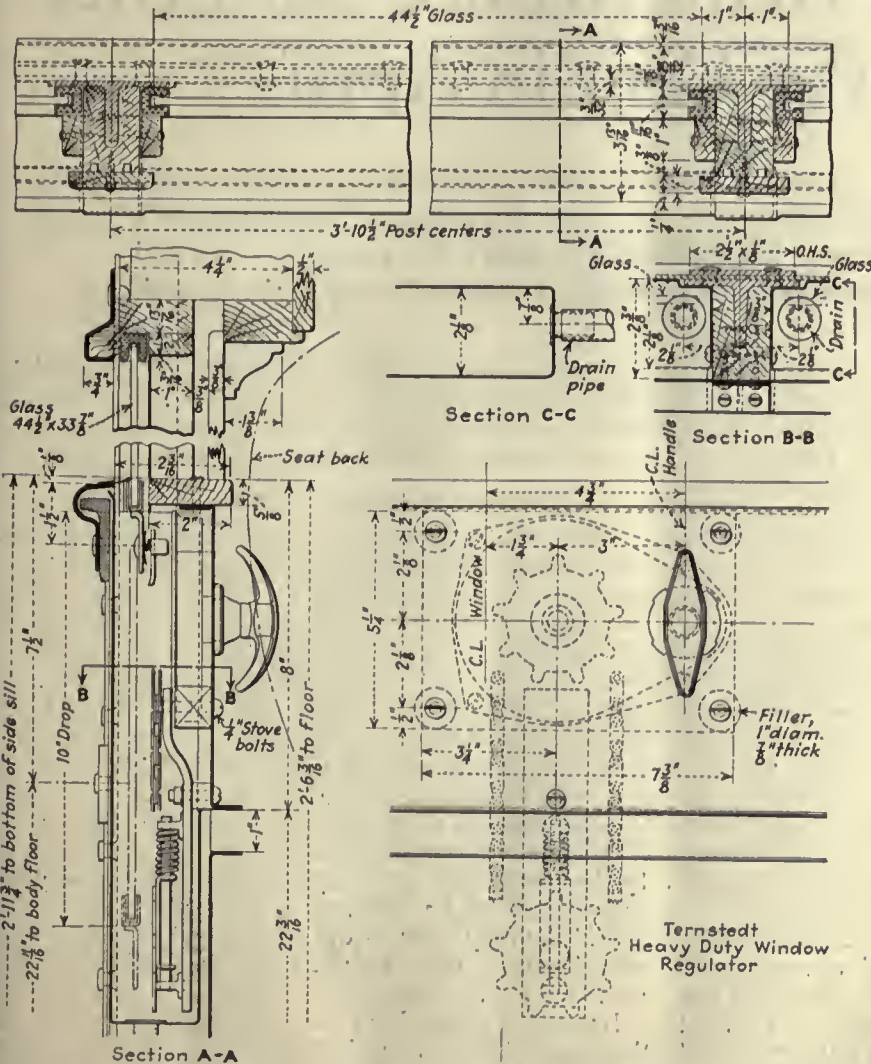
FOUR large d.c. express locomotives have been ordered by the Paris, Lyons & Mediterranean Railway. These rank among the most powerful single locomotives ever built. On the one-hour rating they develop 5,400 hp. The contract for their electrical equipment was placed with the Société Oerlikon, Paris, while the mechanical part is being supplied by the Société de Construction des Batignolles.

It may be recalled that, in 1925, the P.L.M. Railway began a trial service on a relatively short section of the line approaching the Mount Cenis Tunnel, to collect data with regard to the most suitable type of electric express locomotive, before proceeding with the electrification of its system on a large scale. Four locomotives were ordered, two being of the 2BB2 type, with individual drive. While the results obtained with this drive were good, the investigations showed that it was advisable to have a considerably higher output than in the case of the trial locomotive. In view of this, the number of driving axles had to be increased, and the output per driving axle raised.

FRAMES ARE ARTICULATED

The locomotives now in the course of construction are of the 2CC2 type, with close-coupled trucks and a long locomotive body. They are provided with the Oerlikon individual drive, each of the six driving axles being driven by a twin motor. With a voltage of 1,350 on overhead line, these motors develop 800 hp. each at 45 m.p.h., while with the full voltage of 1,500 volts, the one-hour rating is 900 hp. per motor or 5,400 hp. for the locomotive. The output in each case is measured at wheel periphery. This is claimed by the manufacturers to be in excess of any locomotive output up to the present time. The permissible weight per axle is 18 tons and the maximum speed is 80 m.p.h.

The total weight of locomotive is 153 tons, so that the weight per hp. in the case of the one-hour rating is 63.5 lb. This figure is said by the manufacturers to be a low record as regards weight per horsepower. The length of the locomotive over buffers is 78 ft.



This enlarged section through the body side shows the plate glass automotive window construction and the heavy-duty Ternstedt operating mechanism



Representatives of the safety patrols of the public and parochial schools were greeted by Mayor Mackey and Ralph T. Senter, president of P.R.T., and were presented with flags as a reward for their work during Child Safety Week

Safety Drive Helps Reduce Accidents 26.9 Per Cent in April

Philadelphia Rapid Transit System takes active part in state-wide "Safety—Save a Life" campaign as part of Mitten Management's aggressive safety measures. More than 250 safety talks given. No fatal accidents on P.R.T. street car and high speed system during entire month

DURING the past April a state-wide safety drive in Pennsylvania was launched in response to a proclamation issued by Governor Fisher. Since Philadelphia is the largest community in Pennsylvania, it naturally became the scene of the most widespread activity in the accident prevention campaign. Because of the vital importance of the subject of street safety to a transportation company, and because of the emphasis which Mitten Management places on this phase of operation, the Philadelphia Rapid Transit Company was one of the most active participants in the local activities of the state-wide Safety—Save a Life campaign. In the Will Livelong campaign in April of the year previous P.R.T. had been the guiding spirit; had practically financed the carrying on of the month-long safety work, but had invited all other interested organizations and bodies in the city to co-operate and had shared with these other bodies the credit for speeding and executing the safety activities and in bringing about the very material reduction in street casualties which was effected during the month.

This year, while being merely one of the many organizations and groups participating in the Governor's campaign, the company nevertheless threw its resources into the undertaking without reserve. It appropriated several thousand dollars to carry on its share of the work and many of its officials and employees contributed their

services as safety speakers in the schools and before clubs, civic organizations, etc. The publicity and advertising department devoted many hours to the preparation of safety literature, stories, speeches, debates and plays.

COMPANY ACTIVITIES ALONG TWO LINES

The activities of the transit organization were concentrated along two specific lines. In the first place, intensive efforts were made to put over the safety idea within the organization itself. It was desired to show a material reduction in street car, bus and taxicab accidents under the very good record established in April, 1927. In addition, the company devoted considerable money to the preparation and display of dash, bulkhead and ceiling-rack signs calculated to catch the public eye and to center attention upon the accident hazards of the street.

Excepting the work carried on inside the organization itself, however, the most outstanding contribution made by the company to the safety campaign was probably the organization of an emergency speakers' bureau which provided safety talks in the schools and before various organizations. More than 250 such speeches were delivered by P.R.T. representatives during the two final weeks.

Immediate results from the April campaign throughout the state and in the city of Philadelphia were not as great as might have been anticipated. Judging from the effect

THE GUEST OF HONOR



Are you sitting at this banquet?

14,305 Highway Accidents in Philadelphia in 1927

Most of these were needless—

Failure to think caused them

JOIN THE UPRISING AGAINST CARELESSNESS

Safety, Save-a-life

PRT Co-operating

ONLY ONE RIGHT WAY TO CROSS THE STREET
Safety-Save-a-life PRT Co-operating

The Traffic Officer is Your Safety Specialist
 Obey him, and he can prevent accidents
Safety - Save a life - PRT Co-operating

I AM CAREFUL
Safety-Save a Life PRT Co-operating

Watch for Children
Safety-Save-a-life
PRT Co-operating

THE CHILDRENS' SAFETY PLEDGE
 applies to grown-ups too
Safety-Save-a-life PRT Co-operating

Join Our Uprising Against Carelessness
Safety-Save a life-PRT Co-operating

Follow the White Line
Cross at Crossings
Safety-Save a life
PRT Co-operating

SAFETY
Save a life

Yellow Cab Co-operating

Safety
Save a life
PRT Co-operating

P. R. T.
Co-operator



Vol. 8, No. 8

April 28

The cartoon entitled "The Guest of Honor" was enlarged for a window poster and more than 2,000 distributed to stores, schools and clubs.

get well started until about a week later. Thus the actual working period was only about three weeks. During the Will Livelong campaign, which lasted for the entire month of April of last year, it was noted that the mounting toll of these accidents was not checked until well into the third week of the campaign. After that the curve showed a distinct falling off. It is quite possible that the Safety—Save a Life campaign would

have shown a similar effect had it continued a week or two longer. It is significant that Philadelphia was the only large American city to show a decrease in its accident death rate during the year 1927. This is an indication that the safety educational work which is being carried on in that city has a cumulative effect and the emphasis given to it by occasional campaigns, such as this latest one, undoubtedly has a salutary effect.

Considering more particularly the individual work of the Philadelphia Rapid Transit Company during this campaign it is worthy of note that a distinct checking of its own accident toll resulted from the work carried on inside of the transit organization. A new safety record was established during the month of April, no fatal accidents occurring on the P.R.T. street car and high speed system throughout that period. The results obtained in April, 1927, during the Will Livelong cam-

Posters and cartoons with safety messages were widely distributed during the campaign.

of the Will Livelong campaign in 1927, when a decrease of 20 per cent in street fatalities was accomplished in Philadelphia, it had been hoped by those who conceived and directed the present state-wide drive that a similarly encouraging result might be obtained this year. Actually street accidents in both city and state during the period of the recent campaign, as compared with a similar period in 1927, showed an increase. The same was true of deaths resulting from highway accidents.

The explanation of the rather anomalous situation perhaps lies in the fact that a state-wide movement of any kind is of necessity cumbersome. It proved a very real problem to co-ordinate the work in various sections of the state and, to a lesser degree, in Philadelphia proper. No single organization was responsible for carrying on the unified campaign.

The Will Livelong campaign in April, 1927, had more immediate and more far reaching results, probably because it was a purely local effort; because it was financed and directed largely by a single organization and because it had a very personal and direct appeal to the individual citizen through the existence of the central character of Will Livelong, the Safety Sage.

While the Safety—Save a Life campaign officially opened on April 1, the activities in Philadelphia did not

Children's Week Drive Is Opened

Safety Campaign to Be Carried Into the Schools.

President Ralph T. Senter, of the Philadelphia Rapid Transit Company, yesterday opened the Children's Week safety drive by presenting the first button badges of the newly formed "I Cross at Crossings Club" to representatives of the...

CHILDREN'S SAFETY DRIVE IS STARTED

P. R. T. to Organize 'I Cross at Crossings Club' in City Schools

CHILDREN CO-OPERATE IN SAFETY CAMPAIGN

Promise to Cross Streets Carefully in Pledges Being Made in Schools

CHILDREN'S WEEK DRIVE IS NOW ON

Safety Campaign to Be Carried Into the Schools

DISTRIBUTE BUTTONS

Children's Week Safety Drive Opened By P. R. T.

President Ralph T. Senter Presents First Buttons to Representatives of Public and Parochial Schools

INSTRUCTIVE PLANS PREPARED

Officially opening the Children's Week Safety drive...

30 PRIZES OFFERED TO PUPILS OF CITY

P. R. T. to Give Awards for Posters on Safety Week Opening Here Tomorrow

AUTODISTS TALK IN SCHOOLS

Plans for participation by school children of this city in "Children's Safety Week" which opens tomorrow, were outlined yesterday in a circular sent out by Dr. Edwin C. Broome, superintendent of schools.

Speakers from the Automobile Club of Philadelphia, the Key...

P. R. T. EMPLOYEES AID SAFETY DRIVE

The Safety Patrols among the school children of Philadelphia now number 181, and are composed of 2720 boys, it was stated at a meeting of P. R. T. men and management, held last Thursday at the car house at 19th and Locust streets to complete plans for the Safety-Save-A-Life campaign. These patrols work under the supervision of Phillip G. Lewis.

Last year's safety campaign, featuring the genial Will Livington, was so effective that accidents involving any of the transportation lines of the company were reduced 15 per cent. This year the active participation of the transit company in Governor Fisher's campaign began Monday, April 9th, and will continue...

'SAVE-A-LIFE' DRIVE IS EMPHASIZED NOW

97 Children and 245 Older Persons Killed in Phila. in 1927 Stirs Officials

Keystone Auto Club Head Says Adults Take Chances That Youngsters Don't

The "Save a Life" campaign will be featured this week by a program...

Safety—Save a Life!

Officially opening the children's week safety drive, during which it is hoped to bring membership in the newly formed "I Cross at Crossings Club" to 300,000, Ralph T. Senter, president of the P. R. T. Company, presented this morning the first of the new button badges to representatives of the safety patrols of the public and parochial schools. George W. Elliott, Jr., son of the former director of public safety, represented the safety patrols of the public schools, while Thomas Murphy, of St. Anna's...

P. R. T. TO HELP SAVE "LIFE-A-DAY" HERE

In co-operation with Gov. Fisher's campaign of "Safety—Save a Life," the Philadelphia Rapid Transit Co. will undertake an extensive educational program among its 18,000 employes and will distribute messages to riders.

Through a similar campaign last year, P. R. T. reduced accidents 15 per cent, and a further reduc...

Oficjalne Otwarcie "Drajwu Bezpieczenstwa"

Otwierzajac oficjalnie Tydzien Drajwu Bezpieczenstwa Dzieci oczekiwaniem jest powiekszenia liczby czlonkow w nowo utworzonym Klubie "I Cross at Crossings Club"

EXPLAIN SAFETY DRIVE

P. R. T. Officials Tell Clerk of Work Among School Children

How the P. R. T. is co-operating with the state and city in an effort to reduce the number of accidents at street crossings was explained to the members of the Business Science Club by Edwin J. Thayer, of the public relations department of the P. R. T., at a luncheon in the Hotel Adelphi yesterday. R. Henderson Farley, secretary, presided.

Philadelphia newspapers devoted much space to the safety campaign. The activity of the Philadelphia Rapid Transit Company in the campaign is well noted in these typical clippings

paign, were noticeable and they constituted a real mark at which to shoot. The period from April 8 to 28, inclusive, showed a reduction in all types of accidents over a similar period in 1927 of 26.9 per cent. This figure includes street car, bus, cab and elevated divisions. This record compares favorably with the per cent reduction accomplished during April, 1927, since it is naturally more difficult to better a record that is already good.

The various organizations in the city which co-operated in the Safety—Save a Life campaign included the Citizens' Safety Committee of the Chamber of Commerce, the Automobile Club of Philadelphia, the Keystone Automobile Club, the public and parochial schools, the department of public safety, the transit organization, and other civic bodies. Each assumed responsibility for a certain field of activities.

WHAT P.R.T. DID WITHIN ITS OWN ORGANIZATION

The activities of P.R.T. during the campaign might be roughly classified as (1) those carried on within its own organization and (2) those which dealt with giving publicity to the matter of street safety on its cars and buses and through its speakers' bureau. The company accepted a commission from the Governor as official inspection station No. 1 for the inspecting of all types of vehicles used in street operation. A large number of these stations were established throughout the state, particularly in the various public garages. The one conducted by P.R.T. limited its activities to the inspection and certifying of company vehicles only. Every street car, elevated car, bus, cab, and truck operated as a part of the P.R.T. system carried the official seal of the State Department of Highways during the month of April. This indicated that its brakes and general equipment were in a satisfactory condition.

Accident clock dials were placed in each location of the

company, showing its daily standing and the standing of the campaign to date as compared with similar periods during 1927. One-of-the-hands was painted red and the other hand black and conscientious efforts were made by the employees to keep the hand representing the 1928 standing behind that one representing the standing for 1927. A special issue of the PRT Co-operator, containing a large and varied array of safety propaganda, was distributed to the 15,000 employees about the middle of the campaign.

Safety posters were widely utilized on the company bulletin boards, a special safety message from President R. T. Senter was enclosed in the pay envelope of every employee early in the campaign, the employee committeemen representing the transportation locations were assembled in a preliminary meeting and urged to spread the gospel of safety among their constituents; in short, every possible step was taken to get the idea of safety firmly implanted in the minds of all employees charged with the operation of vehicles.

Large cloth banners were placed in the various carhouses, garages, and other locations, bearing the slogan "Safety—Save a Life, PRT Co-operating." Similar banners were displayed on water tanks, building fronts, and other prominent vantage points over the system. These attracted considerable attention, both inside of the organization and out.

The spirit of friendly rivalry between various individual carhouses, bus garages, cab garages, etc., led to many "zero" days for various locations—days in which no accidents of any sort were charged against employees from those locations. One heavy downtown route, for example, has operated recently for a period of 332 days without a car collision. These local records are jealously guarded by representatives of the particular location involved.

The week of April 8 to 14 was used as an introductory period in which dash signs bearing the legend "Safety—Save a Life—PRT Co-operating" appeared on the 3,500 cars and buses operating on the streets of Philadelphia. Various safety bulkhead and ceiling-rack signs and cab cards were used inside the vehicles. Considerable newspaper publicity was given to the proposed activities of the transit organization during the balance of the safety month.

From the standpoint of the community welfare as a whole, it is probable that the single activity of P.R.T. which accomplished the greatest good was the operation of its speakers' bureau. There are somewhat more than 300 public and parochial schools in the city of Philadelphia. The company sent representatives into about 175 of these schools, giving more than 250 talks. The Automobile Club of Philadelphia and the Keystone Automobile Club also did good work in sending speakers into the schools, although neither of these organizations went into this activity to a degree equaling that of the transit system. A large majority of the school children in the city, of proper age to assimilate safety instruction readily, were reached by these speakers. The week of April 15 to 21 was designated officially as Children's Safety Week and during it a majority of the safety talks in the schools were delivered. The P.R.T. speakers, in particular, stressed the importance of forming proper safety habits while children, since habits are obeyed instinctively, and the habits of safe procedure while on the street are therefore most important.

It had originally been intended to handle the speaking work in the schools with the membership of the public speaking class conducted for P.R.T. employees. However, the requests for safety speakers were so great and such a majority of the requests were for speakers to appear before 9 o'clock assemblies, that it was utterly impossible to fill all engagements with the limited membership of the public speaking class. Therefore, additional employees and company officials were called upon, so that eventually a corps of more than 40 speakers was assembled.

The speakers had at their disposal safety charts and pictures illustrating various types of child accidents, as well as a supply of safety rules for children, pedestrians and autoists, these being distributed in all schools where P.R.T. speakers entered.

Safety stories, plays, recitations, debates and similar material were prepared and sent broadcast to the principals of all the public and parochial schools for whatever use they might desire to make of them. More than 350,000 membership buttons in the "I Cross at Crossings Club" were made and distributed to all school children in the city. President Senter of P.R.T. presented the first of these membership buttons to representatives of the public and parochial schools at the beginning of Children's Safety Week and most of the city newspapers had photographers on hand to record this event.

At the close of Children's Safety Week safety patrol flags were presented to representatives of the public school and parochial school safety



Large cloth banners bearing the slogan, "Safety—Save a Life—P.R.T. Co-operating," were prominently displayed at many points on the system

patrols by the Philadelphia Rapid Transit Company and silk American flags of the same size were presented to these representatives by the Automobile Club of Philadelphia. This presentation was held in the Mayor's office at City Hall, the flags being first presented to Mayor Harry A. Mackey, who in turn gave them to the boys. This pleasant ceremony was preceded by drills of crack safety patrols in the downtown section of the city. The P.R.T. Kiltie Band provided suitable music.

This work with the children has proved doubly satisfactory. In the first place, it is apt to be more effective and more permanent in nature with the young people than with adults. In the second place, the good-will established between the company and the children, as well as the parents of the children, is of no small value. The transit corporation is revealed as a very human and friendly organization, instead of a cold-blooded thing of business.

An additional safety activity fostered in the schools by the company during the campaign was the holding of



P.R.T.'s booth at the Philadelphia Auto Show. Safety literature was distributed here and the part played by the transit organization emphasized with posters



One of the billboard posters, acquainting the public with the safety drive

a safety poster drawing contest among the children in the art classes. This contest was inaugurated during Childrens' Week and was to continue for a period of one month. P.R.T. offered, as prizes for the best safety posters submitted, memberships in the Circulating Picture Club of the Philadelphia Art Alliance. These memberships went to the schools from which the winning posters came, rather than to the individual pupils. In this way a school from which a winning poster was chosen is entitled to receive twelve fine paintings during the course of the ensuing year, each painting to remain in the school for a period of one month. This arrangement was to comply with the regulation of the Philadelphia Public Schools, which states that no individual prizes may be given to school children for any contest held in the schools.

The safety cartoon entitled "The Guest of Honor," which first appeared in the special safety issue of *PRT Co-operator*, attracted so much attention that it was later reproduced on a large scale as the central theme of a window poster. P.R.T. car and bus supervisors distributed more than 2,000 of these posters to the stores and community shops. A large number were also sent to various schools and clubs.

Letters were sent to every club in the city, asking that



A safety poster drawing contest was fostered among children in art classes. Here are four of the stencil posters submitted

the safety campaign be supported by resolutions, by the posting of safety pictures on the club bulletin boards, and by the provision of speaking opportunities for a safety speaker either from the club's membership or from the P.R.T. speakers' bureau. Many of the clubs responded to this appeal in one or more of the ways suggested.

This was practically the only other outside safety campaign activity carried on by the transit organization besides those already mentioned. The work was concentrated upon a few specific functions rather than being spread out over every field of safety activity.

In this way it was possible to handle the transit system's part in the campaign this year with a smaller budget than was required for the Will Livelong campaign. Yet the result obtained within the organization and among the school children would seem to indicate that fully as much benefit was derived from the safety work during this past April as from that during last year's campaign.

As a windup to the activities carried on among the children, the annual Boys' Week Parade was staged on May 5, being postponed from April 28 because of bad weather. Representatives of the safety patrols marched in the parade, carrying safety banners and wearing caps provided by P.R.T. for the occasion. The 110-piece prize-winning band of the transit organization took part.

So far as the transportation system was concerned the April campaign was but a passing phase in the year-round schedule of safety work. "Bigger and better zero days" are what the entire organization is shooting for now.



Daily standings for each transportation location were shown by accident clock dials

Cross-Seats for 200 Detroit Trailers



Longitudinal seats have been replaced by leather upholstered cross-seats in this Detroit trail car

LEATHER upholstered cross-seats have been installed in place of the old cane upholstered longitudinal seats in one of the trail cars of the Department of Street Railways, Detroit, Mich. The change was made at low cost by reclaiming a number of seats from dismantled cars and re-upholstering them in leather. Work has been started on a similar conversion of about 200 more trailers.

Levis Tramways Increases Revenue with Weekly Pass

Careful adjustment of the fare schedule is necessary to insure success. Cash fare and the ticket rate must bear certain relation with the cost of the pass

By H. E. Weyman

Manager Levis Tramways Company, Levis, Quebec, Canada



At left—Dating the weekly passes with a reciprocating stamper. At right—Stitching the passes together in pads

DECREASES of traffic and revenue during the first four months of 1925 caused the Levis Tramways, Levis, Quebec, Canada, to install the weekly pass. The company had studied the pass system carefully and was ready to adopt it when circumstances proved that something should be done to stimulate traffic and to counteract the effect of the private automobile. The railway system is a suburban one with terminal loading and unloading at the Quebec Ferry, and therefore not a particularly favorable one on which to use a weekly pass. The management, however, decided that with careful adjustment of rates of fare it could be made to pay, and consequently adopted it.

At first a \$1 pass was used with the cash fare of 10 cents and the ticket fare of four for 30 cents on the two single-zone routes within Levis. The sales of the first four weeks were about 15 per cent of the total revenue. In the week of July 12, 1925, the same pass was made effective in the first or Levis zone of the third route, the one extending to the Quebec Bridge. The sales

immediately increased 24 per cent. It was gratifying to learn that satisfied patrons were telling others of the new system and to such an extent that riders in the second zone were soon asking for a pass.

EFFECT OF TICKET COMBINATIONS ON WEEKLY PASS

The request from the second-zone or St. Romuald riders for a pass offered the opportunity to make a bargain. The public wanted a weekly pass and the company wanted to sell strips of tickets that would not be too easy for a casual rider to obtain. The company arranged with the municipal authorities for the sale of six tickets for 45 cents instead of four for 30 cents, the public agreeing to this alteration in exchange for a \$1.75 pass to go into effect in November, 1925. The first week's sale of the new pass was only 42, but in a short time the number more than doubled. Also the number of cash fares of 10 cents per zone increased 30 per cent during the first week, a most gratifying increase. This experience proved convincingly that the most profitable use of a weekly pass

TABLE I—DISTRIBUTION OF PASSENGERS ACCORDING TO FARE USED, IN PER CENT

	1924	1925 (Pass Used Seven Mos.)	1926	1927	1928 (Three Months)
Cash.....	13.3	11.5	13.3	13.0	11.2
Tickets.....	86.7	68.4	48.4	44.6	42.0
Passes.....	.....	20.1	38.3	42.4	46.8

occurs when the ticket is not made too accessible for those who are really casual riders on the one hand or who might be regular riders with the pass on the other hand.

It may not seem that 45 per cent is a large enough investment to deter fairly good riders from using tickets, especially when the tickets are sold on the cars. Yet it is a fact that tickets in strips of six or eight tend to make the regular rider a better and more profitable one by using the convenient pass, while casual riders accept the dime cash fare to avoid bother.

The results in Levis demonstrate how much care must be exercised in arranging cash and ticket rates to work with the pass. The cash fare and the ticket rate must bear certain relations with the pass or the best results will not be obtained. Quite often one sees a property putting a weekly pass into effect with no consideration for the remaining fare scale. As a result the pass is usually a failure.

RATIO OF PASS REVENUE TO TOTAL RISES

The opening sale of the first or \$1 pass was 250. This same pass, with no change in privileges, attained a sale of 718 in the week of March 18, 1928. In like manner the two-zone or \$1.75 pass has advanced from 42 to a winter sale averaging 90 and a summer sale as high as 130. The outstanding fact is that revenue from prepaid users of the pass has risen from 15 to 26 per cent of the total revenue.

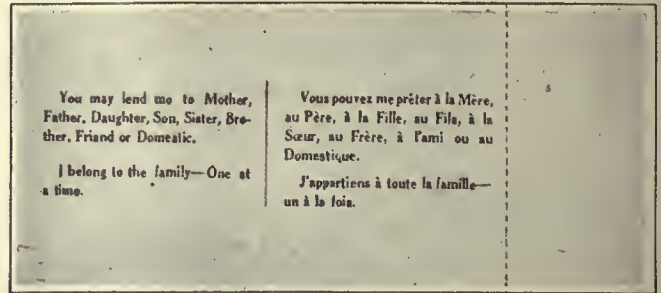
The accompanying graphs show the revenue received from cash fares, tickets and passes. It will be noted that cash fares showed an immediate increase as soon as the sale of tickets in strips of six replaced the sale of tickets in strips of four. The increase has continually been in evidence since the change. The revenue from tickets sold shows a decline due to the pass. This decline indicates that the ticket rider has been converted to a pass owner, paying more than he did for the tickets but enjoying more convenience. The revenue from passes varies from month to month, as some months are credited with five weeks and others only four. However, the gradual increase in the sale is well demonstrated.

Transferability of the pass has caused no loss of cash fares that might have been paid otherwise by members of the pass holder's family. Cash fares increased from 295,851 in 1926 to 324,781 in 1927 at the very time that the tickets decreased from 1,078,301 to 1,065,182. The pass and cash sales tend to advance at the same time because pass holders prefer to pay the dime fare to purchasing six tickets for 45 cents.

When the weekly pass was first mentioned the com-

TABLE II—DISTRIBUTION OF TOTAL REVENUE WITH RESPECT TO TYPE OF FARE, IN PER CENT

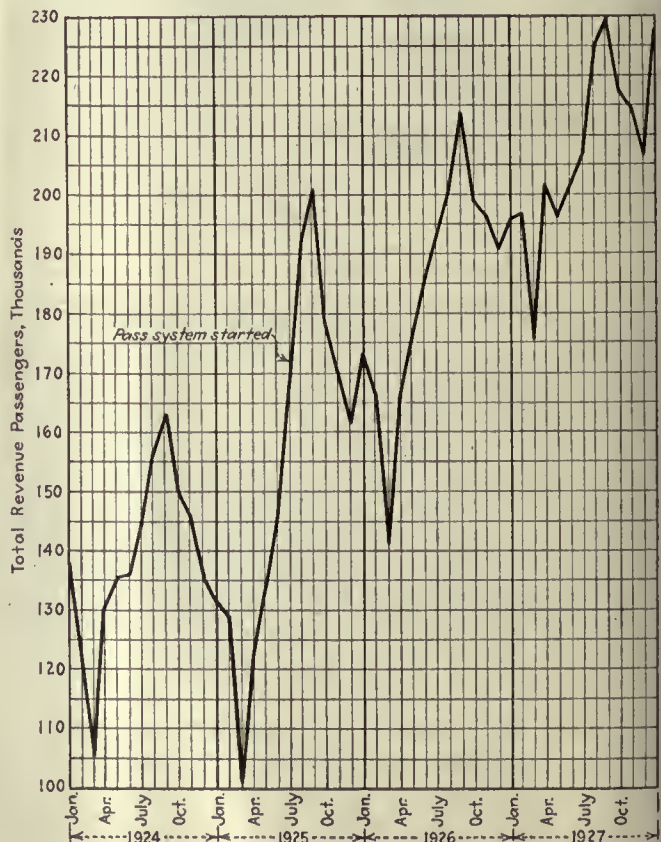
	1924	1925 (Pass Used Seven Mos.)	1926	1927	1928 (Three Months)
Cash.....	17.8	17.4	22.3	22.8	20.3
Tickets.....	82.2	73.0	56.9	51.5	51.8
Passes.....	.....	9.6	20.8	25.7	27.9



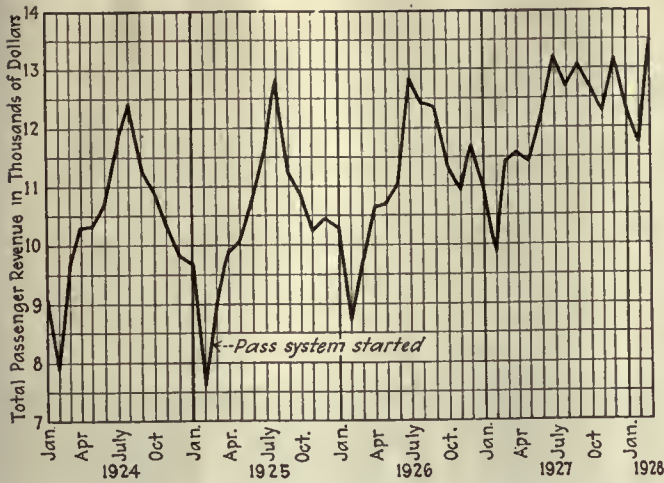
At top—Face of one of the printed weekly passes used by the Levis Tramways. At bottom—Reverse side of the same pass showing one of the slogans used

pany actually feared it. The many possibilities of misuse and the thought that increased car service would be required to take care of the pass riders caused an unfavorable reaction toward its adoption. However, it was felt that the pass would be worth while in making fare collections more convenient for both operators and patrons, and that it would serve as a good will measure.

Experience with the pass showed that there was a very definite limit to the number of rides that pass holders



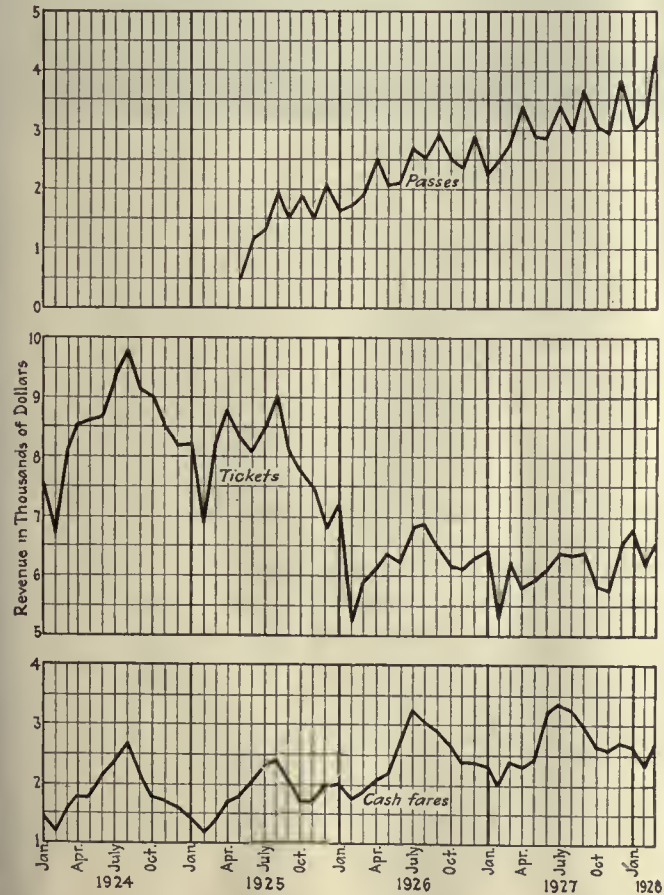
Total passengers by months for the years 1924 to 1927, inclusive. The total has climbed steadily since the introduction of the weekly pass



Total revenue by months for the period from January, 1924, to February, 1928, inclusive. It is significant that the pass has caused a large increase in revenue as well as in number of passengers carried

averaged despite the theoretical unlimited service. An average of about 2½ through rides a day has been maintained practically since the start. To avoid possible abuse of the pass the following was printed on the front of each one:

Pass must be shown to car operators and inspectors upon entering car and is good for only one passenger on any given trip and must remain in possession of passenger during trip. Any attempt to misuse pass renders it void. Company reserves the right to cancel the pass system at any time.



Revenue by months for the period from January, 1924, to February, 1928, inclusive, from passes, tickets and cash fares. While revenue from tickets has declined the revenue from both passes and cash fares has increased

On the back of the passes the following information was printed:

The issue of this pass constitutes an attempt by this company to provide a method whereby the general public can obtain cheap fares. In other words, it is an attempt to sell "transportation at wholesale rates." Any person attempting to illegally use this pass in any way will be arrested for fraud.

Prosecution of the few persons who did misuse the pass soon put an end to the practice. The public approved of this policy for it appreciated that the pass was instituted for its benefit.

CHEAPER PAPER NOW USED FOR PASSES

Bearing on the question of fraud with the pass, a simpler and cheaper pass is now used. The original card showed all the months of the year and had date spaces, so that it could be punched to show the week of use. The simple printed pass, shown in one of the accompanying illustrations, is now used. The tickets are printed in large quantities with blank spaces for the date. They are of different colors and have serial numbers. Previous to any week's sale the passes are dated with a reciprocating stamper. The passes are then put up in pads of five, ten or fifteen, with a stub carrying the printed serial number and the stamped date. The machines for dating and binding the passes are also illustrated. The backs of the passes are used for company publicity and bear advertising slogans.

The success of the pass plan, perhaps, may be credited to the whole-hearted manner in which the system was put into effect. Every channel of salesmanship and publicity that was suggested or could be thought of was used, and as a result every prospective buyer of the pass was informed of the plan. The management feels that if Levis had half a dozen theaters instead of one, with night schools, ballrooms, lecture halls and the like in addition, the publicity program would have been still more successful.

Railway Wages Increased 3 Per Cent Between 1926 and 1927

WAGES for motormen and conductors in 44 of the larger cities of the country are tabulated for two years in the "Bulletin of Labor Statistics" for March, 1928. The dates selected are May 15, 1927, and May 15, 1926. The average increase between these two dates was 3 per cent. Twelve industries were considered and the electric railways were one of the six whose hourly wage rate increased during the year. The others were the bakers, building trades, chauffeurs and teamsters, book and job printing and publishing, and newspaper printing and publishing. On the other hand, four trades showed decreases in hourly wages during this period, namely, granite and stone cutters, laundry workers, linemen and longshoremen. The two industries covered in the report but not listed as increasing or decreasing were barbers and bus drivers. The barbers' wages could not be compared on an hourly basis. A table is published of wages of bus drivers from 27 cities as of May 15, 1927, in general, the bus lines listed are those affiliated with the electric railways in the cities covered. Corresponding data were not collected in 1926.

The number of men included in the electric railway group were: motormen and conductors, 57,289, and in the bus group were bus drivers, 2,730.

Cleveland Light Metal Car Uses Less Energy

Energy saving from reduced weight, as compared with the same car when built of steel, amounts to more than 17 per cent

Tests made with the aluminum car of the Cleveland Railway, No. 1376, have shown a considerable reduction in energy consumption owing to its lower weight. The car is of the company's standard "pay-pass" design, with one large entrance door in front and two exit doors at the center, known in Cleveland as the "1300 type." It was built some two years ago and was a conspicuous feature of the 1926 Convention exhibit in Cleveland.

The car is 51 ft. 2 in. long over bumpers and weighs, with equipment, 30,300 lb. The weight of a steel car of the same design and equipment would be 43,200 lb., so that the use of aluminum alloys effects a saving of about 12,900 lb. Full particulars of the structural features of the car were published in *ELECTRIC RAILWAY JOURNAL* for April 9, 1927, page 655.

The car was put in service Dec. 2, 1926, and a daily record has been kept of the car-miles made by it and the kilowatt-hours used. During part of this time the car has been used as a single unit and during another part of the time it has hauled a trailer. It began in train service, and from Dec. 2, 1926, to January 11, 1927, an additional 60 per cent in mileage was credited to it to allow for the extra energy taken in pulling a trailer. On this basis the following results were obtained:

Kilowatt-hours consumed	11,084
Car-miles run	4,864
Kilowatt-hours per car-mile	2.27

On Jan. 11, 1927, those in charge of the test began to keep separate readings, one set to be while the car was being run as a single unit and one set while it was being operated as a leading car of a two-car train. At the same time, the company decided to keep daily mileage and energy consumption records of three other cars of similar design but built of steel, operating over the same route under the same conditions. The results of this test up to the end of March, 1928, appear in the accompanying table.

It will be noticed that figures for per cent saving during January and February, 1928, are quite low compared with other figures in the same column. This is due to the failure of the trainmen to separate the records for

the aluminum car in single unit and train operation. This has now been corrected, and the figure for per cent saving is moving back to normal.

Window Wipers Speed Operation

REGULAR passenger cars of the Connecticut Company, New Haven, Conn., have been equipped recently with window wipers. The management believes that this will have two advantages: it will reduce the accident hazard by giving the motorman clearer vision in stormy weather, and it will also permit closer



Window wipers on cars of the Connecticut Company clear a large area of the glass in front of the motorman

adherence to schedules at such times, by relieving the motorman of the necessity of stopping the car every few minutes to clean off the glass of the front window. The wipers are of the swinging arm type and clear a large area of the glass. They are manually operated, as it is thought that such mechanism is more rugged and reliable.

Orders were first placed by the company for a few wipers for trial. These proved so satisfactory that orders were entered for enough to equip the remaining cars. A total of 947 cars have been equipped, making this the largest installation of the kind yet made.

COMPARISON OF ENERGY CONSUMPTION ON CLEVELAND RAILWAY ALUMINUM CAR 1376 WITH STEEL CARS 1370, 1371, 1372

Month	Aluminum Car 1376						Steel Cars 1370, 1371, 1372			
	As Motor		Kilowatt-Hours per Car-Mile	As Train		Kilowatt-Hours per Car-Mile	Kilowatt-Hours	Car-Miles	Kilowatt-Hours per Car-Mile	Per Cent Saving
1927	Kilowatt-Hours	Car-Miles		Kilowatt-Hours	Car-Miles						1928
January.....	3,210	1,450	2.21	3,108	846	3.67	38,270	13,711	2.79	20.4
February.....	4,695	2,348	2.00	2,623	746	3.52	38,085	14,166	2.69	25.7
March.....	4,682	2,414	1.94	2,535	674	3.76	42,550	15,938	2.67	27.3
April.....	6,448	3,266	1.97	4,022	1,059	3.80	42,914	16,419	2.61	24.5
May.....	4,897	2,474	1.98	2,386	627	3.81	43,108	17,068	2.53	21.8
June.....	5,706	2,850	2.00	3,290	809	4.06	21,289	8,237	2.58	21.3
July.....	6,036	2,990	2.02	2,639	676	3.91	31,020	11,940	2.60	22.3
August.....	3,941	1,760	2.24	2,152	554	3.88	39,534	14,505	2.73	17.9
September.....	.....	.....	.....	.....	.....	.....	40,760	15,544	2.62	.....
October.....	3,904	1,432	2.16	1,640	389	4.11	39,693	15,194	2.61	17.2
November.....	4,342	1,832	2.37	2,531	600	4.22	39,399	14,758	2.67	11.2
December.....	5,487	2,222	2.47	2,686	613	4.38	46,414	16,475	2.82	12.4
1928										
January.....	7,416	2,872	2.59	3,309	709	4.95	48,736	17,512	2.78	6.8
February.....	3,430	1,298	2.64	1,111	244	4.55	42,886	15,634	2.74	3.7
March.....	5,829	2,472	2.35	2,133	457	4.66	42,250	15,971	2.65	11.3
Total.....	70,023	31,680	2.21	36,165	9,003	4.02	598,908	223,072	2.68	17.6

The Readers' Forum

Further Analysis of Car Heating Costs

CHICAGO SURFACE LINES,
CHICAGO, ILL., April 30, 1928.

To the Editor:

I have read the article by A. W. Baumgarten in the April 21, 1928, issue on the subject of cutting heating costs by recovery of energy from dynamic braking. This article has been of particular interest inasmuch as we have been studying the same problem for some time past and have been unable to estimate a saving of such magnitude as indicated by Mr. Baumgarten.

Mr. Baumgarten's figure for average miles per car per day, 180, is rather high for city service. We only average about 103 miles per car per day, or less than ten hours at 11 m.p.h. schedule.

The total heat required per month will, of course, vary from day to day, and the average car cannot be expected to be in service every day in the month as indicated by Mr. Baumgarten's figures. For purposes of comparison, full day months will be used, however.

The kilowatt-hours required to heat a car per day will necessarily vary with conditions, such as loading, outside temperature, use of storm sash, elimination of heat waste through windows, doors, etc.: thermostat setting and ventilation. A lengthy article in the Sept. 30, 1922, issue of the JOURNAL covered this subject thoroughly. It has been found that electric heating can maintain our cars in service at a temperature of 52 deg. F., which is our thermostat setting, with an expenditure of energy as shown in the accompanying table.

Outside Temperature, Deg. F.	Kilowatt-Hours per Hour of Operation	Kilowatt-Hours per Car-Mile ^a Based on 11 M.P.H. Schedule
50	0.3	0.027
45	1.0	0.091
40	1.4	0.127
35	2.2	0.20
30	2.6	0.236
25	5.3	0.48
20	6.9	0.627
15	8.3	0.755
10	9.6	0.873
8	10.7	0.974

These figures are for a closed wood-body, double-truck car, 49 ft. 2 in. over bumpers, equipped with bulkheads, storm sash for winter use, having adequate ventilation and with seating accommodations for 40 passengers. Electric heaters rated at 8.8 kw. at 500 volts are installed, and have sufficient capacity to maintain a temperature rise of 40 deg. F. in service, as required by city ordinance. This contrasts somewhat with Mr. Baumgarten's statement of 13 kw. required to secure 35 deg. rise.

For the cost of hauling additional weight we prefer a figure of 0.05 to 0.06 kw.-hr. per mile per 1,000 lb. for energy alone used in transportation, as this is more readily applicable to any property than any arbitrary figure of cents per year. It takes into consideration average miles traveled as well as local cost of power. Based on 37,593 car-miles per year and 1.25 cents per kilowatt-hour as applied to our local situation this amounts to 2.58 cents per pound per year.

In order to make a direct comparison, I obtained the

government temperature record for Chicago for the months given in Mr. Baumgarten's paper and find that 6,478 kw.-hr. would maintain the temperature of one of our cars at 52 deg. F. for ten hours service each day, for a period of 168 days. This is shown in detail in the following table:

Month, 1924	Number of Days During the Month at Which the Average Temperature in Deg. F. Was:										Kw.-Hr. per Car*
	8	10	15	20	25	30	35	40	45	50	
January.....	8	1	6	3	3	2	4	3	1	0	2,028
February.....	0	0	0	5	6	8	8	2	0	0	1,155
March.....	0	0	0	1	1	10	10	5	3	1	805
April.....	0	0	0	0	0	1	1	2	8	7	247
November.....	0	0	1	0	2	3	5	8	3	5	564
December.....	6	2	2	1	6	6	3	4	1	0	1,736
Season.....	14	3	9	10	18	30	31	24	16	13	6,478

*Total kilowatt-hours per car for the month required to maintain a temperature inside of 52 deg. F. for ten hours of service each day.

It would appear that the car mentioned in the table was heated during the same season outlined in Mr. Baumgarten's article at a cost to our company of \$81, or \$375 less than the cost for heating Mr. Baumgarten's car. The cost of energy for heating is, therefore, the most important factor in a determination of whether an installation of this type would be economical or not, as the above difference in cost is greater than the estimated \$301 saving.

On Mr. Baumgarten's temperature curves the temperature rise continually grows smaller from 3 p.m. to midnight. For the five hours 7-12 p.m., a rise of approximately 28 deg. is maintained. In his article the average return of power is seen to be 8 kw. or 3.5 deg. rise per kilowatt of heater input. On our cars, mentioned above, we obtain approximately 4.55 deg. rise per kilowatt input and Mr. Baumgarten's older cars indicated 35 deg. rise with 13 kw. input, or only 2.7 deg. rise per kilowatt. Mr. Baumgarten's temperature curves would indicate that whenever the temperature falls below 22 deg. F. outside, auxiliary heat would be required in addition to that obtained from dynamic braking in order to maintain a temperature of 50 deg. F. in the car. In the season under consideration there were 36 days for which the outside temperature was below 20 deg. F. out of the total of 168, or 15.5 per cent. Some additional heat supply would be necessary for this. Mr. Baumgarten's article states: "The car was put in regular service at 5:30 a.m. with an inside temperature of 40 deg. F. obtained with the auxiliary heaters, and an outside temperature of about 12 deg. F." From his curves we read a rise of 28 deg. at 2:30 a.m. and a rise of 30 deg. at 5:30 a.m. or 2 deg. increase as a result of 5 kw. for three hours.

In our study of resistor heating of cars we have considered three distinct types or classes of utilization:

1. Inclose present grid resistors with ventilated box leading into duct in car.
2. Additional resistor heaters within car body for use as accelerating resistors.
3. Additional resistor heaters, control and motor capacity for rheostatic use in acceleration and braking.

The first plan is by far the simplest and while we consider it only 60 per cent efficient, the first cost is only

\$125, the additional weight 200 lb., and it is worth 5-10 kw. of heat, depending on installation and service, with an estimated saving of \$28.75 per car per year obtained at a cost of \$18.60, or net saving of \$10.15.

The second plan, while 100 per cent efficient, involves \$550 and 612 lb. additional cost and weight for 40 per cent of the heat required. A maximum saving of \$46 is obtainable at a cost of \$69 for fixed charges and \$14.40 for energy for hauling extra weight.

The third plan would furnish all the heat required, at a saving of \$115, but would require the following additions:

	Cost	Weight, Lb.
Heaters.....	\$840	680
Control.....	440	470
Motors.....	160	80
Total.....	\$1,440	1,230

Fixed charges of \$180 and energy cost for transportation of about \$30 would indicate this to be an uneconomical installation.

In conclusion it might be said that performance as outlined in Mr. Baumgarten's tabulation might be obtained for a single car, even to the excessive cost for energy consumed for heating, and if his cars require this much energy and an average of 180 car-miles per day for each day in the month is obtained, then it is entirely probable that it would be profitable to equip cars for the utilization of this waste energy. But we cannot expect that every property can show such savings and the individual economic factors must be determined for the installation under consideration.

W. C. WHEELER,
Engineer of Equipment.

NOTE—According to the custom of this paper, the above letter was submitted to the author of the article for such comments as he desired to make. Mr. Baumgarten has made a thorough analysis of the points raised by Mr. Wheeler, to which he has replied to in detail. His letter is printed below.—EDITOR.

CHICAGO & JOLIET ELECTRIC RAILWAY
JOLIET, ILL., May 19, 1928.

To the Editor:

With further reference to the article by the writer as published in the April 21, 1928, issue on the subject of energy savings from dynamic braking and heating, there appears to be some misunderstanding with regard to the data given in this article and particularly with respect to the costs and possible savings on other properties. With this in view, it seems necessary to explain further in detail how these figures were arrived at and point out particularly that the analysis given pertains only to the property of the Chicago & Joliet Electric Railway and that, in order to arrive at savings that might be effected on other properties, certain factors and conditions must be changed. This is true of the analysis of Mr. Wheeler's comments regarding the article appearing in the April 21 issue.

In the comparisons made by Mr. Wheeler, he has endeavored to reconcile the figures given with those of the Chicago Surface Lines, which cannot be done, inasmuch as practically no small properties enjoy the low power rates and low average mileage per car as those obtained in Chicago. It will be noted that Table III of the April 21 issue was based on 180 miles per car per day, 150-day heating season and thermostat control set at 60 deg. This was based on the full number of miles per day of cars in

service and not on the average miles per day of all city cars. If, as Mr. Wheeler mentions, the Chicago cars are in service less than ten hours per day, then the total equipment in use is a little over 50 per cent. On most smaller properties the average hours in service would be considerably more than this. On the Chicago & Joliet Electric Railway, the average service of all city cars is fourteen hours per day. However, the figures given in Table III are based on actual operation and metered energy over the period as shown and must be taken on the basis of 180 miles per car per day, 60 deg. thermostat setting and 150-day heating season. The heating season, however, is usually longer than this and, for the period shown, was actually about 168 days.

Referring to the table showing the variation of kilowatt-hours per hour of operation, with outside temperature as shown in the first of Mr. Wheeler's tables, it will be noted that the variation between different temperatures is neither uniform nor consistent. Plotting these figures, we find that there is a straight line variation from 35 deg. outside temperature to 8 deg. outside temperature, or the kilowatt-hours per hour of operation per degree change in temperature is 0.315 between the temperatures of 35 deg. and 8 deg. It appears that the figures given above 35 deg. were entirely off of the curve when plotted. This curve should be a straight line variation starting at 52 deg., or the thermostat setting noted. On this basis, the energy per car per hour should be as follows:

Outside Temperature, Deg. F.	Kilowatt-Hours per Hour of Operation 52 Deg. Thermostat
50	0.65
45	2.20
40	3.78
35	5.35
30	6.92
25	8.50
20	10.20
15	11.70
10	13.20
8	13.90

Taking the average of 190 kw.-hr. per car per day and correcting this figure for a 168-day heating season with an average heating season temperature of 31 deg., we obtain a figure of 0.326 kw.-hr. per hour of operation per degree change of temperature. This compares very favorably with the figure of 0.315 kw.-hr. per hour of operation per degree change of temperature obtained from the plotted curve of the figures between 35 deg. and 8 deg. outside temperature given by Mr. Wheeler.

If this is true, then to maintain a temperature rise of 40 deg. F. in service, as required by city ordinance referred to by Mr. Wheeler, would require a capacity of 12.6 kw. The old cars on our property, with a capacity of 13 kw., would not maintain 60 deg. temperature when atmospheric temperatures were below 25 deg.

The cost of hauling weight per year of 4 cents per pound would probably not hold true on other properties and, expressed in other terms, comes to about 0.0625 kw.-hr. per car-mile per 1,000 lb.

The average temperature for the heating season, based on the temperatures given in the second table in Mr. Wheeler's comments, shows an average of 31 deg. for the season of 168 days. This would require an average temperature rise of 21 deg. with a thermostat setting of 52 deg. On the basis of 0.315 kw.-hr. per degree change of temperature and ten hours per day operation and a 168-day heating season, we would obtain 11,100 kw.-hr. per car per year for electric heat which, at a cost of 1.25

cents per kilowatt-hour, would amount to \$139 for energy only.

With reference to the chart in the article in the April 21 issue, page 650, showing the car temperatures obtained in the car on March 5, 1928, we wish to emphasize that this is only a typical temperature curve taken with the recording meter in the car on that particular day. Therefore, the difference between outside temperature and car temperature does not indicate the maximum temperature obtainable from dynamic braking and resistor loss heating, but does show that it is possible to expect an average rise of 30 deg. to 35 deg. within the car. It will be noted also that the average return of power from dynamic braking only may be as high as 8 kw. To this must be added the heat of starting resistor loss, which is about 20 per cent of the power input to the car, making a total of approximately 13 kw. power return to the car. It is not possible to know accurately the average actual kilowatts return of power to the car with this dynamic braking and resistance loss heating. However, on the basis of season heating tests on the older cars, we obtained a temperature rise of 3.05 deg. per kilowatt input. And, since we have obtained an average temperature rise in the new car of about 30 deg. to 35 deg., it is reasonable to suppose that the average power return in heat is between 9.8 kw. and 11.4 kw. The amount of this energy return is entirely dependent on the scheduled speed, stops per mile and grades on which the car operates.

We have found that in general the auxiliary heat is not used when atmospheric temperature is above 15 deg. F. Therefore, the total number of days during which auxiliary heat would be operating would not be more than 10 per cent or 12 per cent and the heat of 3,000 kw.-hr. per car per year, as given in Table IV of the April 21 article, is sufficient to take care of this 10 per cent and additional two hours auxiliary heating required in the morning before the car is put in service. One point not explained in the article and which may be noted in the temperature curve obtained on March 5, is that the resistor heaters retain their heat for some considerable time. It will be noted on the typical chart of March 5 that the car temperature dropped only 10 deg. from 12 o'clock midnight to 2:30 a.m., at which time the chart was changed and auxiliary heat was turned on. The car was out of service at 12 o'clock midnight.

In analyzing the three types of heating enumerated in Mr. Wheeler's comments, it is stated that the resistor accelerating heat "is worth 5-10 kw. of heat depending on installation and service, with an estimated saving of \$28.75 per car per year." If a minimum of 5 kw. of heat can be obtained from starting resistors on a basis of ten hours per day, 168-day heating season and 1.25 cents per kilowatt-hour, the total energy saving would be about \$104 and, with 60 per cent efficiency, would be an estimated saving of \$62.40 instead of \$28.75.

In the second plan, with the additional resistors within the car body, this would give a minimum saving of \$104 or a maximum saving of \$208.

By the use of dynamic braking and starting resistor loss heat, it would be possible to obtain all of the energy required for heating and, as mentioned previously, with a thermostat setting of 52 deg. and an average seasonal temperature of 31 deg., this saving would be \$139, based on an energy cost of 1.25 cents per kilowatt-hour. During the heating season and with electric heat it is invariably true that the peak demand occurs on the days of lowest temperature and, therefore, the demand charge for the electric heat would be about 12 kw. The

cost of this demand charge, in the case of this company, would be about \$152 per car per heating season, and the energy cost, based on fourteen hours average car operation, would be about \$156, making a total energy cost per car per year of \$308. Mr. Wheeler has not explained in his comments as to whether the 1.25 cents per kilowatt-hour takes care of this additional demand charge. Some years ago this company abandoned the use of electric heaters and the maximum demand for the year was reduced about 400 kw. at a total saving of \$7,200.

In making comparisons of savings, Mr. Wheeler has not taken into consideration the additional substation equipment capacity required where electric heaters are used. It is reasonable to suppose that, with 12 to 15 kw. heater capacity per car and with maximum demand practically always occurring on the coldest days, it would be necessary to provide at least 15 kw. capacity in substation equipment per car in service during peak load hours. Therefore, with electric heat there will be an investment in the substation which is comparable to the total investment per car with dynamic braking and resistor heating. The substation capacity of this company since the abandonment of electric heat a number of years ago has been reduced 250 kw. and, with the installation of new substations, has effected an investment saving of \$500 per car in city service.

In conclusion, analyzing the costs of electric heating based on *average* cars in service, it is estimated that the savings per car per year would be not less than \$250. And, based on *actual* cars in regular schedule service, the figures as outlined in my article are conservative, inasmuch as savings in substation investment and maximum demand charge are not taken into consideration.

Referring to Mr. Wheeler's analysis of electric heating versus dynamic braking and starting heating, he has not considered the fixed charge of electric heating but has based his net savings on energy saving only. This does not give a true comparison. Also, if storm sash and other means of insulation are used on the car for the conservation of energy with electric heating, this additional investment must be charged against electric heating cost. Furthermore, in my article we have considered only the savings to be effected in heating cost and have not given credit to the dynamic savings of brakeshoe wear and maintenance cost, which would be an appreciable item, and other indirect benefits to be derived from the braking. In actual service, it has been found that dynamic braking is sufficient for about 90 per cent of the total braking in making service stops, so that if this method of braking is only used during the heating period, we might expect about 40 per cent saving in brakeshoe maintenance and wear. If this method were extended to both summer and winter use, the saving would be considerably greater. Where the dynamic braking and heating are only used during winter periods, we believe it is safe to assume that additional motor capacity is not required inasmuch as the cooling of the motors would be much more rapid during the cold weather.

Taking all of these things into consideration, it is true that the saving effected on this property would not be the same on other properties and each case must be analyzed from the basis of service, number of cars and energy costs on the property in question. However, we believe that the possible savings shown on this property are conservative and that, if all items are taken into consideration, they eventually might even be greater.

A. W. BAUMGARTEN,
Division Engineer.

Maintenance Methods *and* Devices

Screw Press for Straightening Bars and Rods

ANY PRESS is a very handy tool to have in a shop, especially when it can be used for straightening bars, rods, etc. The press shown in the accompanying illustration is used by the New York & Harlem Railroad, New York City, and was designed and constructed in its shop. Although it is used for straightening plow bars primarily, it can be and has been used for straightening many other kinds and shapes of metal.

A steel bar 38 in. long, 3 in. wide and 7 in. thick is used as a base and is embedded in the concrete floor so that 4 in. of it projects above the surface. Two 2x3-in. fulcrum blocks 4 in. high are welded to the base, each about 1 in. from either end. The top surface of these blocks is concaved to correspond to a radius of 1½ in. Two 1x2-in. V-shaped uprights are welded and bolted to a threaded casting of 4 in. diameter, 5 in. long and the lower ends welded to the base. One end of a ½x2-in. brace is bolted to one of these uprights on either side and the other embedded in the concrete floor. These braces provide additional rigidity. A screw of 3 in. diameter and 18 in. long is installed in the threaded casting. One end of this screw is designed with a head of 3¼ in. diameter, 4 in. high and is provided with two 1½-in. diameter holes drilled diametrically opposite on 1½-in. centers for reception of a leverage bar. The other end is provided with a pressure head 3-in. diameter, 3 in. long and concaved at 1¼ in. radius.



Portion of incinerator with automatic water-feed control

The screw is designed with five threads per inch.

This machine has been found very serviceable and has not failed to produce the results for which it was designed.

Incinerator Provides Steam for Shop Use*

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

CONSIDERABLE rubbish and scrap lumber must be disposed of around electric railway repair shops, creating more or less of a problem on most properties. As a convenient means of getting rid of this, the San Diego Electric Railway has built an incinerator in such a manner as to

supply heat to a 15-cu.ft. capacity steam boiler. The steam is used for various cleaning purposes around the shop. It also furnishes heat to the paint shop.

The fire-box door is on the outside wall of the building. This is not shown in the accompanying illustration. The boiler has an automatic water-feed control so that no attendant is required.

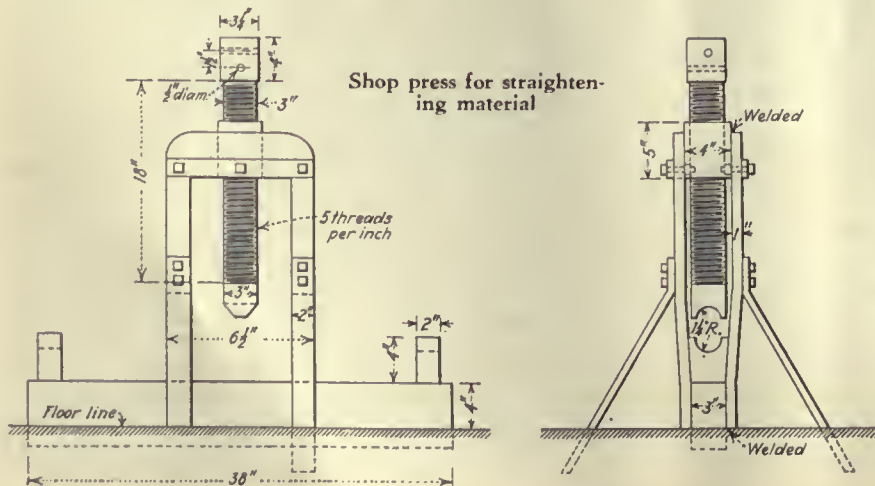
Motor Leads on Axle Side Reduce Trouble*

BY R. T. CHILES
Master Mechanic, Cumberland County Power & Light Company, Portland, Me.

TO REDUCE failures of motor leads from rubbing and short circuiting, the Cumberland County Power & Light Company brings the leads out on the axle side. Inside-hung motors are used on the company's standard type safety cars. With this arrangement during the year 1926 there was but one lead failure for every 104,551 motor-miles operated and 55 per cent of these failures occurred during January, February and March, when there was a large amount of snow and rain.

With inside-hung motors the company found it impossible to keep leads from chafing on brake levers

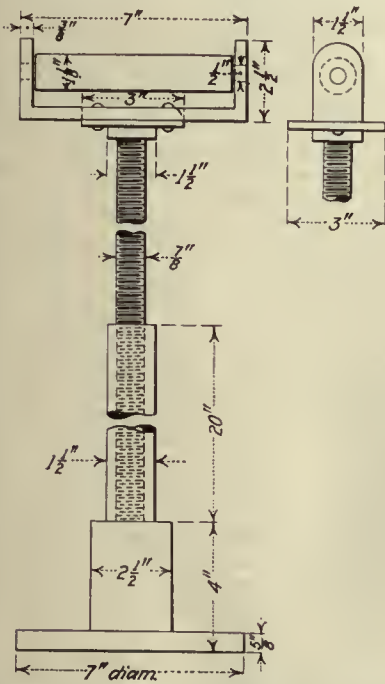
*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



and motor cases where the leads were brought out on the suspension side. On the axle side the leads hang clear and do not come in contact with the brake rigging or motor cases. The small clearance between the car floor and motors on standard Birney type safety cars makes it necessary for the leads to lay on top of the motor where they are brought out on the suspension side.

Portable Stand for Drill Press

MACHINE work in the wood mill and machine shop can be done more readily if suitable equipment is provided to support the material undergoing the process. In the shop of the Manhattan & Queens Traction Corporation, Long Island City, N. Y., a portable adjustable stand for use in the machine shop and mill was constructed. This stand is shown in the accompanying illustration. The base is a forging with a flange and a hub of 2½-in. diameter to which a piece of



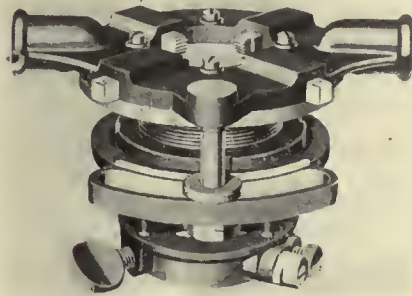
Adjustable stand for holding long material while being machined

steel of 1½-in. diameter and 20 in. long is welded. It is drilled and tapped for a screw 20 in. long fitted with a flange, to which is riveted a bracket 7 in. long. A roller made of tubing 1½ in. inside diameter and 1½ in. outside diameter is mounted on a ½-in. shaft and installed in the bracket. Turning the adjusting screw to the right or left in the upright raises or lowers the roller to any height desired for supporting the work.

New Equipment Available

Self-Contained Die Stocks

TWO new self-contained adjustable die stocks are announced by the Borden Company, Warren, Ohio. The No. 11 Beaver supersedes the



Adjustable die stocks

old No. 25 plain tool and the No. 11A Beaver supersedes the old No. 26 ratchet.

With the new tools one set of dies is set quickly to thread 1-in., 1¼-in., 1½-in. or 2-in. Mislaying of the dies is impossible. Adjustments are made to thread under or over standard without affecting the length of the thread. The threading dies in the new tool are made of high-grade alloy steel, specially treated, hardened and tempered to give long life.

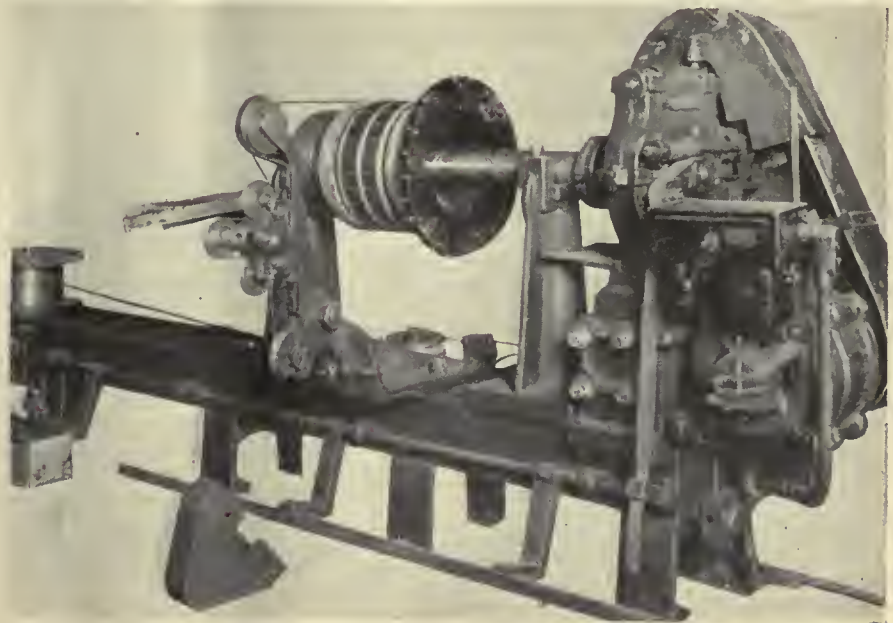
In the new tools the die heads and threaded barrel are two separate parts so that when repairs are required but one part need be replaced. The work holder, or pipe-gripping device, is of

new design and centers the pipe more accurately than previous types. Two knurled screws are set quickly and hold the pipe firmly, leaving only the thumb screw to be tightened after the die stock is placed on the pipe. Loose bushings are eliminated.

Banding-Wire Tension Indicator

EXACT tension in pounds on steel banding wire as it is wound on railway armatures by the banding machine or lathe is indicated by a device developed by the General Electric Company, Schenectady, N. Y. It provides a simple means of keeping track of this tension throughout the entire progress of banding the armature. The wire will not be stressed beyond the elastic limit or tensile strength of the steel, and will be kept under uniform tension during the winding.

An essential characteristic of the indicator is that it can be attached to practically any type of armature-banding machine. It is equipped with a rotary dial which can be turned to any position by loosening a nut and setting the pointer at zero, so that the scale may be read at any angle. The indicator dial is calibrated and graduated from zero to 500 lb., allowing the use of any size banding wire within the range of the machine. The center pulley wheel over which the wire runs is actuated by a heavy coil spring so that when the banding machine or lathe is started and stopped a constant tension is maintained.



Tension indicator with cover removed, attached to armature banding lathe

Association Activities

Journal Becomes Correspondent of International Association

THROUGH appointment by the Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles, this paper has just become the official correspondent of that association in the United States. In consequence, it will publish notices of forthcoming meetings of the association. It will also be pleased to answer any inquiries from railway men in the United States in

regard to the organization and its proceedings and of European electric railway practice in general, where it has the information.

The International Association completed on May 12 a six-day convention in Rome, Italy, at which subjects of very live interest to electric railway companies were discussed. Several of the reports presented at this meeting have been published in this issue and in that of May 26. Others, with a report of the convention, will appear in future issues.

Ashton, where a single-truck one-man car, provided with a smoking compartment, was put in service in December, 1923. Entrance and exit were at the front with manually operated doors. The headway was reduced from twenty minutes to fifteen minutes. A conductor is used on this car during 1½ hours morning and evening. No financial results have been published, but it is reported that the service has been expanded to six cars.

The city of Malmö, Sweden, began one-man service in 1921 with a number of old cars and very little change except to close the doors on the rear platform. In 1924 the service was expanded by the addition of cars equipped with separate entrance and exit on the front platform, the exit door being unlocked by the operator at each stop, opened by the passenger and closed by a spring. Fare boxes were used. Later, one city and three suburban lines were changed over to one-man operation. The most important of these lines, 4½ miles in length and with average distance between stops of 1,150 ft., carries 10,000 passengers daily. The headway was reduced and although the operators receive 10 per cent more wages than are paid to motormen on two-man cars, the saving in platform expense and materials has been very satisfactory.

As already explained, the only changes made on most lines in Germany and Austria, when one-man service was begun, were to close the rear platform doors, and post notices urging boarding passengers to have the exact change. It is not surprising, then, that these lines should show a reduced schedule speed owing to lengthened stops. On most of the systems, where one-man operation has been adopted, about fifteen altogether, this kind of service has been limited to lines of light traffic where the fare system was simple and where there was little passenger interchange. Generally, fares were collected in a fare box similar to the Cleveland or Johnson types.

Halberstadt has been using such a system for some time, with fare collection supplemented at heavy traffic points by street collectors.

Dresden has been running some cars on lines of light traffic, but later the service was extended to lines of heavy traffic. In 1922 there were 47 one-man cars, all single truck. During rush hours a conductor is sometimes used. The management believes that 40 passengers is the maximum which can probably be cared for on any of its one-man cars.

Brandenburg has installed several one-man lines, and to simplify the fare collection problem sells tokens at a reduction from the regular fare.

Berlin made a short trial, but when the traffic on the line increased, returned to two-man cars.

One-Man Cars and Buses in Europe¹

One-man operation is becoming more popular in Europe as the difficulties with fare collection are being overcome. Full automatic equipment is urged for both cars and buses. Details are given of Paris practice

BY LOUIS BACQUEYRISSE

General Manager of Transportation, Société des Transports en Commun de la Région Parisienne (Paris Surface Railway and Bus Lines), Paris

STUDIES of ways to reduce electric railway operating expenses come down in practice, always, to questions of equipment. This is true even of those disbursements made primarily for labor. If we are seeking to reduce the expenses attributable to poor quality of employees, we turn to equipment for the scientific selection of applicants for employment. If we aim to reduce the percentage cost of platform labor in our operating expenses we must investigate types of car equipment which increase the output of our platform men in car-miles.

A great deal has been published about the use of one-man cars in America.² Some progress along these lines has been made in Europe, though the number of one-man cars at present in operation there now will hardly exceed 400. Briefly the situation is that in England, Switzerland and France a few trials have been made. In Holland and Sweden one-man cars are quite generally employed. In Germany, Austria and Denmark a few trials have been made, but in most cases they have been with old cars without any of the distinctive one-man safety features. Simply the rear door has been closed.

The experience in Holland is made the subject of another report to be presented at this convention, so that the

writer will review only the conditions in the other countries mentioned.

In England a single one-man car was put in service by the London United Tramways in 1922. It was a single-deck single-truck car with capacity for 30 seated passengers. Entrance and exit were in front and the door and folding step were interlocked and operated by hand. An automatic ticket-issuing machine issued five different types of tickets, and there was a travel indicator in the car to show to passengers its position on the road.

The result of the trial was so satisfactory that in 1924 the London United Tramways purchased four double-truck single-deck one-man cars. They were fitted with air brakes and pneumatic door engines with front entrance and rear treadle exit and a standard "dead man's handle." Fares were collected in a Johnson fare box, and the operator was assisted in fare collection by an automatic change-making machine.

The fare was that standard in London of 1 penny for one zone and 2 pence for two zones. The schedule speed was 10 m.p.h., with average stops of three seconds each. The operators received an increase of 10 per cent over the wages paid motormen on two-man cars.

The financial result with these cars is not available, but they did not prove popular with the London public, the reasons given being (1) absence of an upper deck which the English like because it gives them a place where they can smoke their pipes and (2) too complicated a system of fare collection on a line having many fare zones.

Another English installation was at

¹Abstract of paper presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles, held in Rome, Italy, May 6-12, 1923.

²The extended survey of American one-man car practice by Mr. Bacqueyrissse occupies 72 pages in his report. It is not reproduced.

Augsburg, a city of 160,000 inhabitants, has been trying one-man cars on quite a general scale since 1923, though "floating" conductors are used in the congested sections during rush hours. The platform expense was reduced 35 per cent.

Odense, Denmark, runs all of its seventeen motor cars with one man, except that at times they pull trailers. The doors are manually controlled and a locked fare box is used. As the cost for labor, even under one-man operation, amounts to 54 per cent of the total expenses, it is obvious that one-man cars are a necessity. No accidents have been reported since 1911, except collisions with other vehicles on the street, which cannot be attributable to one-man car operation.

The systems in Arnhem and Amsterdam, Holland, are mentioned in another paper on this subject by Mr. Nieuwenhuis. All of the 63 cars in Arnhem are one-man, although there are several different types, varying in length from 27 ft. 10 in. to 33 ft. 6 in. over all. The doors are manually operated, but no special safety equipment is used except a dead-man control. The schedule speed is 12½ m.p.h., and a notable saving in platform expenses has been obtained, though the one-man operators are paid a bonus.

In 1924 the Swiss Federal Railway Department issued a list of minimum requirements as to safety for one-man cars, although the one-man system as in the other countries mentioned has as good a safety record as with two-man cars. These regulations relate principally to means by which passengers may stop the car and open the doors in emergency.

In Montreux, three cars have been in operation with satisfactory results, although on one line the grade is as high as 8.5 per cent.

One of the interurban lines out of Berne uses one-man cars 43 ft. 5 in. long. Basle had one car, but withdrew it because of increase of traffic on the line in question.

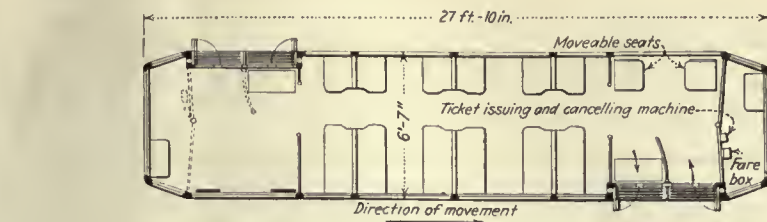
The Paris surface lines have done considerable in the way of one-man operation, as explained in a recent paper by Mr. de Ribes.³ The latest one-man car has a capacity of 30 seated and 20 standing passengers. The two front doors are operated pneumatically, the entrance by the motorman and the exit on the rear platform by the Chicago treadle device. The two rear doors are kept closed except when a conductor is used. Folding steps interlock with the doors.

Since the development by the company of a special ticket-issuing and cancelling machine, mentioned in another report to the convention, the time taken to collect zone fares by one man presents no further problem.

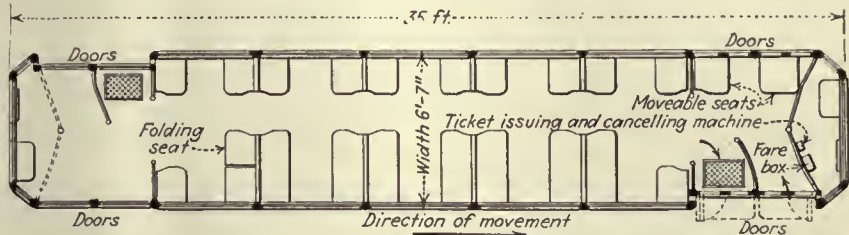
ONE-MAN BUS OPERATION

One-man operation for buses is fortunately farther developed in Europe than one-man operation for tramways, though the absence of statistics prevents an ex-

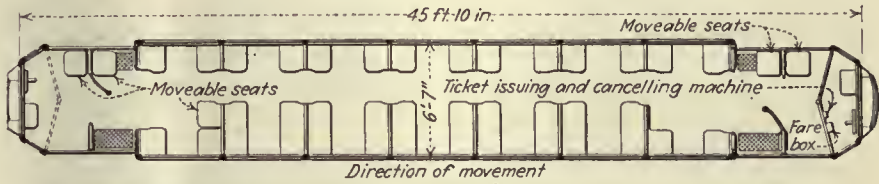
³See paper by Mr. de Ribes in ELECTRIC RAILWAY JOURNAL for April 28, 1928, page 704.



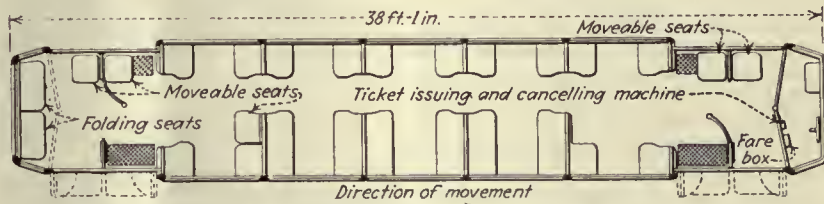
Recommended single-truck one-man car for lines with light traffic under European conditions



Recommended type of one-man car for large European systems



Recommended type of one-man car for European interurban service



Paris end-entrance double-truck trail car intended for one conductor but so designed that two may be used

act statement. The use of one man has not been extended as yet to double-deck buses, which are the standard in London and Berlin.

In England a notable instance of one-man operation of buses is at Leeds. In Holland, Amsterdam has 92 one-man buses, each with accommodations for 21 seated passengers. The single entrance and exit door is 24 in. wide and is manually controlled. The schedule speed of these buses is 9.6 m.p.h., with an average distance between stops of 1,226 ft. and an average length of stop of 8 seconds. A flat fare is used. The average number of passengers per car-mile is 4.6. The Hague has 28 one-man buses. They are from 24-passenger to 32-passenger seating capacity. Loosduinen in Holland has 18 one-man 20-passenger buses.

Vienna has 34 one-man buses. The fare collection problem is simplified in this city by the installation of automatic ticket-issuing machines at the most busy loading points and by street collectors at certain places during the rush hours. Under present economic conditions in Vienna, two-man service would be impracticable. The accident record is very low. Luxembourg has five one-man buses. They make a schedule speed of from 9½ to 11 m.p.h., with average distance between stops of 1,000 ft.

The Paris Surface Railway & Bus Company (S.T.C.R.P.) is operating a number of suburban routes, with one man, to good satisfaction.⁴ Bordeaux has ten one-man buses and 40 two-man buses and favors the former.

CONCLUSIONS ON ONE-MAN CAR OPERATION

While much can be learned from America about one-man operation, it does not follow that American methods can be transferred bodily to Europe to advantage. The principal differences in conditions between America and Europe are: (1) excessive complication of European fares; (2) greater readiness of the American passenger to accept regulations intended for his safety.

Europeans have also to contend with limitations on the dimensions of the equipment which they must use, particularly the width of car body. The usual European width of 2 m. (6 ft., 7 in.), prevents the employment of cars with a capacity of 150 passengers each, common in America, and limits one-man car capacity for city service to about 50 passengers. For interurban service we can approach more nearly American standards.

⁴For further information see paper by Mr. de Ribes in ELECTRIC RAILWAY JOURNAL for April 28, 1928, page 704.

With the limitations in dimensions and capacities mentioned, the writer feels he can recommend specific types of one-man cars for three different kinds of service, namely, light city traffic, large city systems and interurban routes. Diagrams are presented of the cars suggested, with one of a double-ended one-man trail car used by the Paris surface lines.

The first car shown, that for light and medium traffic, has accommodations for 20 seated and 20 standing passengers, and a wheelbase of 9 ft. 10 in. to allow it to go around a 50-ft. radius curve. The car is designed for Cardan drive with high-speed ventilated motors. The body is partly wood and partly light metal. There are separate entrance and exit doors at the front, pneumatically operated, and interlocked with the controller. The exit door is controlled by a treadle and the door on the rear platform is kept locked. When the direction of movement is reversed the fare box, ticket machine, barriers and two movable seats on the front platform are changed to the other end of the car.

The second type of car, designed for large city systems, has a capacity for 30 seated and 20 standing passengers, and a wheelbase of 12 ft. 6 in. The recommended type of motor suspension and nature of safety equipment are the same as for the small car. There are four doors on each side of the car but those on the rear platform are intended for use only when the car is being operated by two men or at important loading points where there is a street collector.

The third, or interurban car, has a capacity of 40 seated and 20 standing passengers and is mounted on double trucks. Each truck has two motors with Cardan drive. All-metal body construction can be used here, as there is less chance of damage to the vestibules from street collisions. The eight doors (four on each side) are arranged as in the large urban car, except that each of the exit doors is controlled by a treadle. This car has five movable seats. The two on each platform are transferred to the opposite side of the car when the direction is reversed and one seat is moved from one end of the car to the other to give more room at the front end.

On systems where at certain hours there has to be a very large increase in passenger accommodations, the answer can often be found in the use of trailers of a large capacity. The Paris system has two types, one a double-truck center-entrance 57-passenger car and the other the double-truck end-entrance, shown in the fourth illustration. This car has a capacity for 34 seated and 21 standing passengers, with four doors on each side, of which two are for exit and treadle operated, all pneumatically. The car is designed for one conductor on the front platform, but if desired, a second conductor can be stationed behind the railing on the rear platform with a second set of fare boxes and ticket issuing machines and with the end folding seats raised.

In general, a capacity of 20 passengers is sufficient for buses on small systems,

especially where some light baggage has to be carried, and for express service in large cities; a desirable type of bus for systems of average size is for 30 passengers, and that for large cities is 40 or even 50 passengers. Where streets are very congested and street area is at a premium, there is a field for the double-deck bus.

For interurban runs, the six-wheel 29-passenger bus has a field, and for interurban runs of more than 35 miles, the 20-passenger bus will probably fit into more places than any other.

In city service the work required of the driver will be much simplified if the doors are operated by air.

While the one-man bus may not make quite as rapid time as the two-man bus of the same capacity, what the passenger loses in speed he makes up in frequency of service. Powerful equipment should be used to obtain rapid acceleration and retardation. Speed is also a function of the number and length of stops, and the latter in turn are largely affected by the arrangement of platforms, steps and doors, and by the method of fare collection. This latter can be speeded up by

the use of fare boxes, ticket-issuing and cancelling machines, and change-making machines. At certain periods of the day a conductor or street collector can be used to advantage.

While the flat fare is the simplest to collect, the automatic ticket-issuing machine greatly reduces the complication of the zone-fare collection and, of course, pay-enter, pay-leave can be used on two-section lines, if the fare is uniform for each section.

Finally, two essentials to the success of one-man service should not be overlooked. One is to secure the hearty co-operation of the employees by convincing them that their interest, like that of the company, is improved by economical operation and that no equipment will be omitted to simplify their work. The other essential is to secure the co-operation of the public. This can be done by instructing it, in advance of the actual introduction of the one-man car, of its advantages in the way of comfort, safety, increased service, and less need for higher fares. This can be done through the press, by moving pictures, and by notices posted in the cars.

Improvements in Rail and Ties*

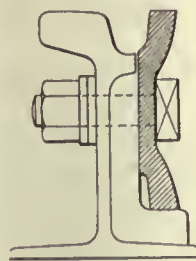
Rail standardization is gaining more converts. Thermit is widely used for joints. Trials of ties being made

BY ED. VAN NOORBEECK

General Supervisor,

Société Nationale des Chemins de Fer Vicinaux of Brussels, Belgium

IT WILL be recalled that the International Commission on the standardization of street railway rails has recommended four rails for straight track and four corresponding rails for curves, as shown in the accompanying



Hard metal guard used on curves by some European street railways

table. A number of companies, especially in France and Switzerland, have accepted these standards.

For track over private right-of-way the almost general practice is to use a T rail, varying in weight from 36 to 72 lb. per yard. Some companies are using rails weighing from 90 to 100 lb. per yard.

Rail lengths are rarely less than 29½ ft. and for grooved rail are usually 39½ ft. or 59½ ft. One company (that in Brussels) has used rails as long as 65½ ft. but such rails are awkward to han-

dle in city streets. Comparatively few companies are using transition curves, though such use is advisable where car speeds are considerable. Opinion is divided as to the desirability of inclining the rail and also between coned and horizontal tread wheels. Rail inclination is usually secured through an inclined base plate. Some companies use shallow grooves on the outside rails of curves so that the wheels will run on their flanges. Many companies use hard composition rails (manganese, nickel chrome, etc.) on curves. Some use on curves a rail without a lip but bolted to it is a guard rail of wear-resisting steel, as shown in the accompanying section. Only a few companies use a resilient material, wood, cloth or felt, under the base of the rail. However, such a plan undoubtedly reduces rail vibration and is especially desirable with a concrete substructure.

Rail joints are made with angle plates, thermit or arc welding.

Thermit is used in three different ways. Under one method used in new track and known as the pressure process, the rail heads are ground square and butted together with a small space ground out between the webs and bases. After the thermit has been cast around the joint, the heads are pressed against each other by powerful clamps. The joint is then machined. Where the rail is not free, this process has to be changed slightly.

*Abstract of paper presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intèret Local et de Transports Publics Automobiles, held in Rome, Italy, May 6-12, 1928.

TABLE OF GROOVED RAILS RECOMMENDED AS STANDARD BY THE INTERNATIONAL COMMISSION

Straight rail	Weight		Height		Base	
	Kg. per Meter	Lb. per Yard	Mm.	Inches	Mm.	Inches
1	59.430	118.86	180	7.1	180	7.1
2	53.020	106.04	180	7.1	160	6.3
3	46.920	93.84	175	6.9	155	6.1
4	47.235	94.47	160	6.3	160	6.3
Curved rail						
1	61.560	123.12	180	7.1	180	7.1
2	52.150	104.30	180	7.1	160	6.3
3	50.750	101.50	175	6.9	155	6.1
4	51.220	102.44	160	6.3	160	6.3

The joint is opened by an expansion press and after the thermit is poured, the press is removed and the released elasticity of the rails supplies the pressure instead of clamps. In the third process, which is used principally with old track, a space of from $\frac{1}{8}$ to $\frac{1}{4}$ in. is sawed between the rail ends. After a mould has been set about the joint, it is preheated and the thermit is poured, some metal remaining over the rail head. After the joint has cooled it is machined. This third method is used principally for rail in place, where the other methods cannot be adopted. (See Editor's note.)

Better results than formerly are being secured with electrically welded joints and their use is increasing. This is partly because the technique of welding is understood better and partly from improvements in design. These latter lie principally in the addition of a base plate welded to the rail bases, just as the angle plates are welded to the sides of the rail. In fact, one company (Société Nationale des Chemins de Fer Vicinaux of Belgium) has laid 5,000 joints with welded base plates but no angle plates. Where this has been done, the rail ends are prepared for welding by having their edges beveled off with the electric arc all the way around except at the base. After the base plate is welded in place, the notch formed between the beveled edges is filled up with metal by the arc. Then the rail heads are ground smooth. Marseilles has also used this method of notching or chamfering the ends of two abutting rails and filling up the space with metal deposited by an arc. In that city, while the notch in the heads of the rails is being filled with metal the rails are kept aligned by temporary angle plates. After the work on the head is finished, these plates are removed and the sides of the rail are treated in the same way.

Of the 76 companies replying to the questionnaire, 60 used some kind of joint welding. Of these, 26 employed thermit only, the other 34 using both thermit and arc welding. Of this latter number, eleven used arc welding only for auxiliary track work or at compromise joints. The other thirteen used thermit for new track and arc welding for old track. A recent article in a French engineering paper points out that the effect of the heat necessary in welding joints tends to soften the steel by reducing the carbon and manganese contents. It suggests, if possible, some method of welding by

which air would be excluded from the rail surfaces. No practicable plan has been developed to accomplish this result, but it is worth the attention of welding experts.

As for ties, of the 76 companies replying to the questionnaire, 63 used ties of some kind. Of this number 40 used wooden ties only, four metal ties only, and the remainder ties of more than one kind. Of the latter number, six have reinforced-concrete ties in experimental use. Where wood ties are employed, oak is most generally used, then pine, then beechwood. The ties are usually treated with creosote, sulphate of copper or carbolineum.

The four companies using metal ties

exclusively are Constantinople in Turkey, Hamburg and Mannheim in Germany, and one road in the Belgian Congo. Paris is one of the roads testing metal ties.

Where reinforced-concrete ties are being employed, steel plates or wooden blocks are set in the concrete so that the rail may be held to it by screw spikes or clips. Concrete ties may be considered to be still in the experimental stage. They are expensive and awkward to handle but have manifest advantages in moist soil.

Editor's Note: All the thermit methods differ from that generally used in this country. The pressure method is very difficult here because American rails are much higher in carbon than the European rails. As the carbon content increases, the difficulty of pressure welding increases very rapidly. Also, it is usually thought necessary in America to weld from twenty to thirty joints per day with one equipment. Since the European method requires a loose rail ahead all the time, the amount of track which can be laid in a day is limited and the production is cut to perhaps six to eight joints per day. The clamps used in European welding weigh about 800 lb. On the higher carbon American rails, a much more powerful clamp would be required to get satisfactory results. It has even been considered necessary to use hydraulic clamps for this type of welding wherever American rails are used. The use of clamps of this type would, of course, increase the cost of the welding in America to a point where it would be almost prohibitive. With the "insert" method as used in America, clamps of this type are not necessary. In fact on wood tie track, no clamps at all are required, and on steel tie track, light clamps are used only to hold the rail in line while the welding is being done, provided the welding is done ahead of the laying of concrete. If the welding is done after the concreting, no clamps are required on this type of track.

The second type of welding described in Mr. Van Noorbeeck's article, that by pressing the rails apart, is not practiced in America. The "insert" method obviates its necessity. The third method described also differs from that used here, as in this country a shim of rail steel is inserted between the rail ends before the rail is cast. This prevents any danger of cupping.

Incidentally the Metal & Thermit Corporation of New York, from which the data in this note were obtained, is closely allied with the Thermit companies of Europe. The closest co-operation is maintained among the four companies and each avails itself of the methods and processes of the others, as well as of their engineering advice and experimental work. The different processes developed show how methods have to be changed because of dissimilar conditions.

Wood Preservation Meeting

COMMITTEES of the American Wood Preservers' Association and the American Railway Engineering Association on Wood Preservation will hold a summer meeting in Chattanooga, Tenn., June 12-13. All those attending will have the opportunity of visiting the treating plant of the Western Union Telegraph Company, where zinc meta-arsenite is being used, and the car shops where lumber treated with this preservative is being utilized.

COMING MEETINGS OF

Electric Railway and Allied Associations

June 4-6—Midwest Electric Railway Association, Hotel Baltimore, Kansas City, Mo.

June 4-8—National Electric Light Association, Atlantic City, N. J.

June 6-8—Canadian Electric Railway Association, annual convention and exhibit, Toronto, Canada.

June 12-13—American Wood Preservers' Association, Chattanooga, Tenn.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 13—A.E.R.A. Executive Committee on yacht "Florida," New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

News of the Industry

By Air and Interurban in Ohio

The Cleveland & Southwestern Railway & Light Company established a regular schedule of rail and air service connections in conjunction with the Stout Air Service, Inc., which operates a daily passenger air line between Cleveland, Ohio, and Detroit, Mich. Ten northern Ohio cities—Medina, Elyria, Oberlin, Wooster, Ashland, Mansfield, Crestline, Galion, Bucyrus and Wellington—are affected by the plan, under which through rates and service have been put into effect over the interurban lines to the Cleveland airport and thence by plane to Detroit.

The plan was made operative on May 28 when tickets for the combined rail-plane service became available at all ticket stations of the Southwestern. No additional track construction was necessary, since the interurban line runs past the airport a short distance outside of Cleveland. E. L. Hukill, traffic manager of the Cleveland & Southwestern, made the arrangements with officials of the Cleveland-Detroit air line after he had flown to Detroit and back and had become an air enthusiast. Prospective users of the new service may arrange to board an interurban, which will make connections with the planes at the airport, by consulting ticket agents in their respective towns. Two round trip flights are made a day, one in the morning and one in the evening, so it will be possible for anyone on the Southwestern lines to make a trip to Detroit in the morning, have five hours there and return home the same day.

Three-motored Ford planes each accommodating fourteen passengers are in service on the Cleveland-Detroit air line. Every possible convenience is provided. The air trip takes from an hour to an hour and a half, compared with more than four hours by rail. The Ford planes also make daily sightseeing trips of 50 miles over Cleveland. The arrangement with the Southwestern also provides for excursion rates to the airport including the sightseeing ride.

Threat of Competition in Baltimore

Linwood L. Clark, an attorney who represented one of the bodies opposed to the increased fares for the United Railways & Electric Company, Baltimore, Md., has written the Maryland Public Service Commission that an undisclosed principal is prepared to make the necessary application for the right to operate a bus system in Baltimore in competition with the United. Mr. Clark said the present purpose is to ascertain if the franchise rights of the United "are of such pre-emptive charac-

ter as to exclude a competitive city-wide bus system furnishing superior service at less cost to the public, park tax or its equivalent included."

In reply the commission, through Chairman Harold E. West, has declined to give an expression of its stand on a city-wide and suburban passenger bus service until it receives the application in regular form. Mr. West said that the

commission can only pass on specific applications regularly before it for adjudication and then only in the light of the particular facts and circumstances presented. On the facts submitted, he said, the commission would hesitate to give a categorical answer and that it would not attempt to express an opinion about the legal or other rights of the United Company in the premises.

President Thomas N. McCarter Honored

More than 600 invited to dinner to him culminating the celebration of 25th anniversary of company's founding. Optimistic over prospects of transportation unit's co-ordinated service



Thomas N. McCarter

CELEBRATION of the 25th anniversary of the formation of the Public Service Corporation of New Jersey with Thomas N. McCarter at its head as president culminated in a dinner on the evening of June 1 to Mr. McCarter at the Robert Treat Hotel. About 600 guests attended, including industrial leaders of New Jersey, state and municipal officials, prominent utility men from the Eastern part of the United States and officers of the corporation. The roster of names at the speakers' table included:

Thomas S. Gates, Col. A. R. Kuser, Samuel T. Bodine, directors of the Public Service Corporation; Percy S. Young, director and vice-president of the Public Service Corporation; E. I. Edwards, U. S. Senator from New Jersey; John B. Miller, California Edison Company; Arthur W. Thompson, president of the United Gas Improvement Company; A. Harry Moore, Governor of New Jersey; Thomas N. Mc-

Carter; Owen D. Young, General Electric Company; Edward T. Stotesbury, Drexel & Company, Philadelphia; Uzal H. McCarter, director of the Public Service Corporation; Edmund W. Wakelee, director and vice-president of the Public Service Corporation; Joseph F. Autenrieth, chairman New Jersey Public Utilities Commission; Gen. W. C. Heppenheimer, director of the Public Service Corporation; John L. Waterbury, former director of the corporation; Frank Bergen, general counsel of the corporation.

Credit is frankly given by his associates to Mr. McCarter for the work he has done in welding together the present state-wide system of electric railway, electric light and power and gas systems and directing them to their present magnificent standards, and in turn credit is just as frankly given by Mr. McCarter to the men and women in the companies of which he is the head for the part they have played in the 25-year program of progress, to which reference will be made more in detail later. Here the concern is first with the beginnings; then with the accomplishments.

Prior to the organization of the company, Mr. McCarter had attained distinction not only as a leading member of the bar, but as State Senator and Attorney General of New Jersey. He was familiar with the public utility situation existing at that time. Service was being rendered by scattered and comparatively small units. Additional money was needed for improvements and extensions. The time had come when a thorough reorganization and rehabilitation of the gas, electric and railway properties were necessary. Then the opportunity and the man met. It was Mr. McCarter who conceived the plan for bringing under one management the then scattered properties and, in collaboration with Randal Morgan and John I. Waterbury as a committee, he proceeded to develop the details of the plan which was finally put into

effect. One of the stipulations made by the men interested in the project was that Mr. McCarter accept the presidency of the new company. This he finally consented to do although it made it necessary for him to give up further practice of his chosen profession. As Edmund W. Wakelee, vice-president of the company, has expressed it, during these twenty-five years there have been many problems to be solved, many adverse conditions to be overcome, but through good times and bad times, in prosperity and in adversity, President McCarter has supplied the energy, courage and directing force necessary to carry out his plans and make his vision a reality. And all this time Mr. McCarter has played a most important part in shaping the national destiny of the industries included in the New Jersey corporation's activities, particularly in the electric railway industry, in the councils of which he has been a factor since first he entered the utility field.

Mr. McCarter's message to his associates follows:

In this, the 25th anniversary of Public Service, I extend my personal and official greetings to each member of the Public Service staff.

During its existence of a quarter century, Public Service has constantly expanded electric, gas and transit facilities and is today justifiably proud of the three great utility systems which are so adequately serving the people of New Jersey.

It is no less proud of the splendid organization of men and women which operates, maintains, expands as increased demand requires, and gives life to these physical properties. To the intelligent, faithful and efficient efforts of this Public Service family, the success of the enterprise and the complete and dependable service that it provides are in large measure due.

I am profoundly grateful for the loyal support that the organization has given me as its chief and it is with feelings of personal gratitude that I extend to its every member the thanks of the officers of Public Service and express their appreciation of services rendered. Please accept my best wishes for your health and prosperity.

CELEBRATION A COMPANY EVENT

While the dinner to Mr. McCarter overshadowed other events in connection with the celebration of the twenty-fifth anniversary, still it was just one of a number of events in connection with the present occasion. On May 22, in the directors' room in the Newark Terminal, an oil portrait of Mr. McCarter was unveiled. The portrait was done by John Christen Johansen of New York, who was commissioned to do the work following an announcement of the proposed presentation, Oct. 20 last, at a dinner to Mr. McCarter, by the Public Service organization on the anniversary of his sixtieth birthday.

Since the organization of the company, 1903, more than \$163,000,000 has gone into additions to and extension of electric facilities.

Since 1903, more than \$59,000,000 has gone into additions to and extension of gas facilities.

Since 1903, some \$71,000,000 has

gone into additions to and extension of transportation facilities. Public Service Corporation has not hesitated to add to an already extensive and complete railway system, a complementary motor bus service which is already one of the most extensive in existence. The 378 miles of railway track which Public Service took over in 1903 have been increased to 878 miles, while there have been added to the equipment available to serve the public 1,800 street cars and 1,400 motor buses.

Mr. McCarter said recently:

Confidence in the state's future development, growth and progress led in the first place to the organization of Public Service and is still a guiding principle of those who have its affairs in their charge. We are planning and building now so that Public Service will be in a position to meet all demands for service as they will be made in the coming years. Within the last twelve months we have entered into an agreement with neighboring electric companies for the formation of the world's largest power pool which assures to New Jersey an ample supply of electric power, capable of expansion to meet future requirements.

As Mr. McCarter sees it, there is no problem more vital as affecting the interests of New Jersey than that of adequate and convenient local transportation and the solution of no similar problem is fraught with more difficulties. But his remarks left no doubt about the character of the accomplishments of the company in this particular sphere of its activities. There appeared to be no mistaking the fact that Mr. McCarter feels that a solution of the problem is possible and best of all that it is near.

"No Parking" Decreases Number of Accidents in Chicago

A study of accident reports recently completed by traffic engineers of the Chicago Surface Lines indicates that since Jan. 10, when the no-parking ordinance became effective in the downtown district of Chicago, Ill., there has been a decrease in accidents involving street cars of approximately 30 per cent. This decrease is credited to the greater facility with which cars now enter the Loop district and to the reduction in the number of collisions between automobiles and street cars which were due to the maneuvering of automobiles into and out of parking spaces.

An ordinance recently passed by the City Council which would have prohibited all mid-block or "U" turns on downtown streets, was vetoed recently by Mayor William Hale Thompson. The Mayor explained his action by saying that he had received many protests against the measure and that he had been informed that the ordinance was illegal. It is understood that the ordinance will be referred back to the traffic committee of the City Council and submitted to the corporation counsel for an opinion with regard to its legality.

Decision Reserved on Philadelphia 5-Cent Fare Suit

A special Federal Court of Equity, composed of Circuit Court Judge Davis and District Judges Dickinson and Kirkpatrick, reserved decision on a motion by two taxpayers to restrain the Philadelphia Rapid Transit Company, Philadelphia, Pa., from collecting more than a five-cent fare pending a final decision by that court in the case. The suit is for recovery of \$79,800,000 in excess fares over the five-cent base fixed in the 1907 Philadelphia Rapid Transit-city agreement. Complainants contend that the Public Service Commission and fare rulings of that body are unconstitutional.

A somewhat similar suit was dismissed by Federal Judge Dickinson in June, 1926.

Covington Company Seeks Fare Increase

A proposal to increase fares in the Northern Kentucky communities from 5 cents to 10 cents cash, with an 8½-cent ticket rate, was made by H. C. Blackwell, president of the Cincinnati, Covington & Newport Railway, at a joint meeting of Kentucky city officials on May 23. The franchises under which the company now operates are perpetual. Most of them stipulate a 5-cent fare.

Mr. Blackwell pointed out that the sale of merchandise of any kind at cost or below cost would result only in disaster to the business to the discomfort of all who depend on it. Among other things he said:

The citizens of Cincinnati, confronted with practically the same conditions as exist in the Kentucky communities, met and solved the problem in the course of a reasonable time. Not only are the city streets there something to be proud of, but so is the railway. Street railway equipment, both rolling stock and tracks, under a proper rate of fare, can be kept in the condition they should be; and when additional or better service is needed, it can be supplied.

Everyone knows that it is impossible to operate under a 5-cent fare and as support for this statement all we need do is to accept the word of the Cincinnati city officials who have found that the service-at-cost plan requires a 10-cent cash fare for single-trip passengers, or three tickets for 25 cents. Every expense encountered by the Cincinnati Street Railway has its parallel for the Kentucky company, and we have an additional expense in the toll charged for crossing the Ohio River.

Mr. Blackwell said he knew of few other communities where a 5-cent fare is in existence. He was not asking the city officials, upon their return to their various cities, to authorize an increase in fare, but to give the matter most serious consideration, together with the promise from him that with the adoption in the Kentucky communities of the fare now being charged in Cincinnati would come increased service, where necessary, and reduced rates for current in Kentucky, thereby benefiting the entire community.

New Franchise Ordinance in Toledo

Provides for bus monopoly by Community Traction Company.
Power rate reduced and fares to remain as at present.

\$560,000 rehabilitation program

A NEW ordinance in the form of a contract with the Community Traction Company, its ownership as represented by the Toledo Traction, Light & Power Company, and the city of Toledo, Ohio, supplementary to the present Milner franchise, has been introduced into the City Council by Mayor William T. Jackson and is now being studied. Along with the ordinance the Mayor filed a letter explaining the provisions of the plan worked out largely by Commissioner E. L. Graunlich and David H. Goodwillie, member of the street railway board of control, in conference with representatives of Henry L. Doherty & Company, and whipped into legal form by city and company attorneys. He also transmitted an agreement between the Toledo Edison Company and the Community Traction Company relative to a reduction in the power rate, an agreement on the part of the company to keep step with the city on its paving program for a period of five years, and a program of extensions and betterments to service, including fourteen new bus routes requiring 104 new buses.

In the new ordinance the railway is granted a virtual monopoly of bus operation, since any independent line is prohibited within a quarter mile of a company railway or bus route. Under this provision it will be the policy of the railway to purchase equipment of existing lines at a fair appraisal as determined by a board named by Mayor Jackson. The bus operators have no franchise rights in the streets and have not been subject to city regulation. In the banning of motor coach operations within limits the new ordinance specifically exempts taxicabs, which have recently put into effect a 50-cent flat rate within city boulevard limits.

Among the important features of the new plan to supplement the Milner ordinance are the following:

The power rate will be reduced to a basis that will save the company \$150,000 in the next five years. It will be readjusted periodically to conform to costs of coal. The Toledo Edison Company will also rebate \$150,000 in 60 monthly installments of \$2,500 each on account of power charges in recent years.

The Community Traction Company will pay the city an old paving claim amounting to \$270,000 in which interest is included. It will also pay the city \$10,000 expended in transit surveys, pay a claim for an attorney who represented the board of control in power litigation, and some other minor claims.

A five-year rehabilitation program is set up and it will require expenditure of about \$560,000 to be furnished by the Toledo Traction, Light & Power Company, now owning the major portion of the company securities. Of this money

\$185,000 will be available the first year, \$181,000 the second year, \$57,000 the third year, \$119,000 the fourth year and \$18,000 the fifth year. During the five-year period covered by the ordinance the company will make replacements amounting to \$230,000 with \$120,000 available the first year, \$60,000 the second year and \$50,000 the third year. This will afford the company a chance to replace worn-out equipment in the next three years.

A loan fund of \$30,000 is authorized to make a down payment on bus purchases. Probably more than 100 new coaches will be purchased if the plan becomes operative.

The Community Traction Company now is obligated to its owners for about \$900,000, which is substantially the amount of the deficit in the stabilizing fund less the original \$400,000 in that fund at the time the Milner ordinance went into effect. Interest and payment of principal on this loan are to be suspended for a period of ten years unless the agreement with the city of Toledo is terminated earlier. By reason of this fact the rate of fare would be subject to reduction in case the stabilizing fund reaches \$500,000.

Railway fares will remain as at present. This will mean that all bus fares will be reduced slightly. The fare scale now is 10 cents cash, three tickets for 25 cents, and 1 cent for transfer. Buses operated by the company have been bringing a straight 10-cent fare with 3 cents for transfers.

The company will put in three new crosstown lines, conforming to general recommendations of the Milner ordinance, and eleven other routes substantially extensions to lines as contemplated under a general revision of the system provided for in the franchise.

Adoption of the ordinance agreement will also restore to the City Council control of service by suspending the deficit in the stabilizing fund.

In his letter to the City Council Mayor Jackson explained the present plan, indorsed it and recommended that it be studied carefully by individual members of the Council. He said:

It is my opinion that the proposed agreement is in every respect fair to the city. It makes possible better service by the co-ordination of the railway and bus lines. In other words, it contemplates a complete transit system for the entire city at a rate of fare governed by the service-at-cost features of the present franchise. The agreement would not bind the city for a period longer than five years, and if at the expiration of that period further concessions by the company are needed the city will be free to negotiate with the company. If at that time negotiations are of no avail the City Council can make arrangements for other bus service.

The ordinance is nullified if either party fails to live up to the agreement.

If the city fails to prohibit independent buses the financing concessions would be sacrificed, and if the company did not perform its covenants the city could bring in competing bus lines.

Chicago to Vote on Three Transportation Problems

As a result of the filing last April with the Cook County Election Commissioners of petitions asking for a referendum vote on certain questions concerning the local transportation problem in Chicago, Ill., three major proposals will appear on a ballot at the judicial election to be held in Chicago and throughout Cook County on June 4. The petitions, which carried a total of more than 300,000 signatures, were filed by a group of local civic and improvement organizations and others interested. The questions are:

1. Shall all legislation enacted by the Legislature and all ordinances passed by the city of Chicago pertaining to Chicago local transportation or subways be first submitted to a referendum of the voters of Chicago before becoming effective?

2. Shall the City Council of Chicago refuse to pass any ordinances which have for their purpose the use of the traction fund to build downtown subways?

3. Shall the city of Chicago proceed without delay to provide transportation where the present facilities are inadequate or lacking, particularly in the outlying districts, by the use of pneumatic-tired buses, the necessary expense to be paid out of the traction fund?

Surface-Car Subway in Philadelphia Approved

The Locust Street ordinance, passed by the City Council of Philadelphia, Pa., was signed by Mayor Mackey on May 16. This appropriates \$10,000,000 of loan funds toward the construction of the Locust Street surface car subway. The \$10,000,000 fund authorized will be drawn upon by the Philadelphia Rapid Transit Company for the initial construction of the \$40,000,000 subway. Under the city-company agreement, passed by the Council and signed recently by the Mayor, the transit company is empowered to enter into contracts for the building of the line. The Philadelphia Rapid Transit Company has agreed to meet the fixed charges on the money borrowed by the city for the work, and when the project is paid for, title will remain vested in the city.

The ordinance declaring the city's intention of acquiring the holdings of the underlying systems of the Philadelphia Rapid Transit was also approved by the Council. This legislation will enable the city Administration to petition the Public Service Commission for a valuation of the underliers' franchises. It has been estimated that the holdings can be purchased for \$136,000,000 and it is believed the city can save \$4,500,000 a year for itself by substituting itself as lessor of the underliers' franchises and collecting the rentals now paid those systems by the Philadelphia Rapid Transit Company.

California Commuters to Pay Higher Fare

Monthly ferry commutation rates on the Key System Transit and Southern Pacific Lines have been increased by the California Railroad Commission, but existing local railway rates and single-trip ferry fares remain at 7 cents and 21 cents respectively. Commuters from Oakland, Alameda, Berkeley and Piedmont will pay \$6.50 for monthly tickets instead of \$5.20, and those from other Bay points on the Oakland side \$7 effective July 1. The companies had asked for 10-cent local fares and a 25-cent single ferry fare.

Commissioner Clyde L. Seavey wrote the opinion for the commission, which was supported by Commissioners Thomas S. Loutitt and Leon O. Whittsell. Dissenting opinions were filed by Commissioners W. J. Carr and Ezra DeCoto, both of whom, however, voted for the rate increase.

Messrs. Carr and DeCoto held that it is unfair to throw the burden of supporting an unprofitable street railway upon the shoulders of the commuters. They expressed the belief that increased rates would not solve the difficulty when traffic fell off as rates went up. Mr. Seavey charged that the Key System had not co-operated with the commission in trying out the experimental 5-cent fare zone plan ordered last November on recommendation of A. O. Mott, the commission's chief engineer. The company obtained a rehearing on the ground that 5-cent fares would bring bankruptcy. The commission sustained the contention of the companies that they are not getting a fair return on their investment, that the Southern Pacific operates its ferry and suburban service at a loss and that the Key System makes a small profit. Further, that buses and private autos are cutting into the business.

Mr. DeCoto's opinion is that the Key System would have been better off if the traction fare had been kept at 6 cents and not raised to 7 cents. He sees rigid economy as the only hope and recommends that competitive operation of parallel lines be eliminated by the companies.

Improvements on Illinois Traction Approved in St. Louis

The attitude of the St. Louis, Mo., city administration toward the \$5,000,000 terminal improvements for the Illinois Traction System was indicated May 22 when the Board of Public Service unanimously approved a proposed ordinance vacating certain streets to permit the construction of the contemplated new freight and express office building at Twelfth Street and Lucas Avenue. The company has applied to the Board of Aldermen for a new 50-year franchise permitting the construction of the new terminal, subway and elevated lines.

Advantages to be gained by St. Louis through the project as outlined by D. W. Snyder, executive vice-president



Silver street car awarded to Lincoln Division employees of the Chicago Surface Lines for their meritorious work in accident prevention. The trophy is on display at the Women's World Fair, now in progress in Chicago

of the company, are: The building up of the entire northeastern section of St. Louis with an increase in property values and tax returns; a 50 per cent increase in passenger service over the Illinois Traction System into St. Louis and the bringing to St. Louis of shoppers who now patronize smaller towns in Illinois; a reduction in running time of from 30 minutes to one hour; halving commuter service between St. Louis and nearby Illinois towns and a \$250,000 increase in freight traffic.

One Carfare in St. Louis

Universal service throughout the entire city zone area for the price of a single carfare is now offered in St. Louis, Mo., by the St. Louis Public Service Company. This policy became effective with the granting by the Board of Public Service of a permit to the company to extend its South Grand Avenue line by means of buses. Patrons can now ride between any point within the city zone area and Carondelet Park and from Carondelet Park to any point reached by the system for one carfare. Application has been made for assignment to the St. Louis Public Service Company of the permits to operate buses on the streets of St. Louis now held by the St. Louis Bus Company, which has been affiliated with the railway. The differential of 2 cents and 3 cents charged for transfers between cars and buses will be wiped out.

Believe Higher Fare Needed by Capital Traction

Intimating that the Capital Traction Company, Washington, D. C., would seek an increased rate of fare soon after the adjournment of Congress, members of the Public Utilities Commission calculated recently that a 10-cent cash fare or six tokens for 50 cents probably would be necessary to give the company

a fair return on its valuation of \$26,750,000. The present rate of fare is 8 cents cash or six tokens for 40 cents. The company earned in 1927 only 3.8 per cent on this valuation.

Texas Property Goes Into Freight Business

The Texas Electric Railway, Dallas, Tex., handled its first carload of freight through its Italy connection with the Missouri Pacific on May 22. The car was turned over to the electric railway by the Texas Power & Light Company at Waco and moved via the electric railway line to Italy, thence by Missouri Pacific to Fort Worth, and by the Texas & Pacific to Odessa, its destination. The Texas Electric Railway staged a ceremony at Waco and there was a similar ceremony at Italy.

The company has gone into the freight business under an order issued by the Texas Railroad Commission. It is understood that later the electric railway will apply to the Interstate Commerce Commission for permission to handle interstate freight, thereby becoming, if its plea is allowed, an electrically operated railroad, with full freight interchange agreements with the steam railroads. Since the Missouri Pacific does not now enter Dallas direct, it now obtains an entrance of this kind via the electric railway. It is understood that the change means the provision of increased terminal facilities by the electric railway at Dallas and the purchase by it of electric locomotives for handling freight.

Eight-Cent Fare Sought in Rome

A petition for increased fares has been filed with the Georgia Public Service Commission by the Rome Street Railway, Rome, Ga., and set for hearing on June 12, 1928. The company is a subsidiary of the Georgia Power Com-

pany. It seeks to establish an 8-cent fare in place of a 6-cent fare now in effect; to sell two tickets for 15 cents, and to establish a 4-cent fare for school children instead of the present 3-cent fare.

According to the petition, the present rate schedule does not permit the company to obtain a fair return on its property investment.

Safety Winners in Rochester Dine on Turkey

It pays to play safe in Rochester, N. Y.—at least for operators of the New York State Railways. Fifty employees of the Main Street car line, winners in the annual safety contest, were honor guests of the railways at a turkey dinner at Hotel Seneca. This line ran 7,396 miles throughout the year for every accident point scored against it. City Safety Commissioner Nier was the speaker at the banquet.

Besides the annual competition between employees of lines, a monthly contest among divisions is held with a banner and a dinner as the award. Right now the Portland Avenue division holds the flag. Back of all this Leon R. Brown, safety director, has a carefully prepared plan to cut down accidents.

Public Responsible for Transportation System

Victor Murdock, publisher of the Wichita, Kan., *Eagle*, who served many years in the House of Representatives and has been a world traveler and speaker, in a recent editorial declared that the public must share responsibility for good or bad transportation in Wichita. He was especially urging a better rate of fare. His ideas were:

Lack of an adequate transportation system fare must necessarily curtail maintenance and extension. Without an adequate fare the entire growth of Wichita will be undermined. It is your responsibility to see that Wichita transportation lines are maintained and extended. It is your responsibility to see that the transportation company is granted a rate sufficient to maintain and surpass its present service. Without an increased rate, transportation will suffer—without transportation the growth of Wichita will suffer.

Charter for Rockford- Freeport Line

The Rockford-Freeport Railway has been organized to continue the interurban line from Rockford, Ill., to Freeport, 27 miles to the west. It is controlled by the Central Public Service Corporation, Chicago, an affiliated company with the Rockford Electric Company. This road was formerly a part of the Rockford & Interurban Railway system. It will be operated by the Rockford Electric Company in conjunction with the line running to Beloit, Wis. The interurban line running east from Rockford to Belvidere and Elgin is not a part of the Rockford Electric system.

Recent Bus Developments

Buses Run at 15 Cents in Kansas City

Following a vote of the City Council of Kansas City, Mo., on bus changes of the Kansas City Public Service Company, authorizing rerouting and a fare increase on trunk lines to 15 cents, buses started operating under this franchise for a trial period of six months, beginning June 1. The permit then will be ended or renewed, according to the findings. The new permit allows bus fares of 15 cents on all trunk lines in contrast to the former 10-cent fare. Five trunk lines and seven feeder lines are approved by the Council, in place of five trunk lines and six feeder lines.

The ordinance allowing revision of the bus system for a trial period was enacted after three hours of discussion and the introduction of seven amendments, two of which carried. The body approved the 15-cent fare on buses in the belief that the trunk lines were luxuries, paralleling the street car lines, and that tram patrons should not be penalized to support the buses.

Two amendments introduced by Mayor Beach, containing provision of the present bus franchise, but which were not incorporated in the new one, were approved unanimously. One provides that the railway must pay the city 1 cent on each gallon of gasoline purchased when the vendor does not pay the 1 cent city tax, the money to be used for upkeep of the streets on which buses operate. The other absolves the city from blame in bus accidents caused by the buses encountering defects in the streets.

The appeal of the company for relief was based on the report reviewed in the JOURNAL for May 26, page 875.

Substitution Sought by New York City Line

Representing that it may be only a matter of days before the Eighth & Ninth Avenue Railway, New York, will have to cease operation for want of revenue, the company's receivers and their attorney appeared on May 21 before the committee of the whole of the Board of Estimate to urge conversion of its perpetual railway franchises into a franchise for the operation of buses.

The receivers described the company as unable to make operating expenses with its present equipment. Its bank balance they said, was only \$300, and for many weeks the receivers and their friends have had to advance cash to meet current operating expenses. Unless some measure of relief is afforded, the receivers said, the company would shut down, operating only one car a day to retain its franchise.

The lines of the Eighth & Ninth Avenue Company run from Fulton Street

up West Broadway to Canal, along Hudson Street into Eighth Avenue and from the Battery to Gansevoort Street and then up Ninth Avenue to Broadway and 65th Street, then along Broadway to West 72d Street, then up Amsterdam Avenue to La Salle Street and Broadway, all in the borough of Manhattan.

Results in Indianapolis Do Not Reflect Co-ordination

Net operating revenues in 1927 of the People's Motor Coach Company, now owned by the Indianapolis Street Railway Company, Indianapolis, Ind., were only \$17,144. The revenue last year would indicate a 3.4 per cent return instead of an 8 per cent return on the valuation at which the properties were taken over.

Passenger revenue in the year was \$459,379, while \$1,459 was realized from rentals on charter buses and \$2,594 from advertising, making a gross of \$463,433. Operating expense, exclusive of depreciation charges, was \$348,801. The depreciation charges, at the rate of 15 per cent a year on motor equipment, were \$97,487. Had the depreciation charge been 30 per cent a year as demanded by the Public Service Commission, there would have been a deficit of about \$79,000.

Over its five routes in the city, the company carried 4,274,340 passengers. Its 39 buses traveled 2,375,566.6 miles in the year. These of course, were results that do not reflect the full program for the operation of the system in co-ordination with the street railway.

In showing assets and liabilities balancing at \$554,985, the report placed a value of \$314,269 as estimated investment at the beginning of the year. The figure, however, corresponds to the original purchase price for the 39 buses without depreciation for one, two and three years on the equipment.

Out of the earnings of the coach company, the Indianapolis Street Railway had expressed the expectation that, with the services properly co-ordinated, it could meet interest charges and amortize a \$500,000 loan made at 8 per cent to supply funds to finance the purchase of the bus company's common stock.

Injunction Against Muncie Buses

Judge Robert C. Baltzell of the southern Indiana district of the federal court has issued an injunction against the operation of buses in Muncie, Ind., by Sumner L. Denny and others who were defendants in a suit brought by the Equitable Trust Company, New York, trustee for holders of bonds secured by mortgages on property of the Union Traction Company.

The suit was predicated on the assertion of the plaintiff that the defendants, in the operation of their bus lines

under a license issued by the city of Muncie, had failed to obtain a certificate from the Public Service Commission, showing that their lines were of public convenience and necessity. A decree in support of the injunction was entered with the clerk of the court.

Attorneys for the defendants asserted they were unable to say whether they would take an appeal to the Circuit Court of Appeals in Chicago because a motion asking for a stay of an injunction obtained against the defendants in circuit court by Arthur W. Brady, receiver for the traction company, is to be heard soon by the Indiana Supreme Court.

Approve Abandonment of Short Run in New Jersey

Approval of the application of the Coast Cities Railway to substitute bus for railway service between Belmar and Manasquan, N. J., has been announced by the New Jersey Board of Public Utility Commissioners. It was contended that the railway lines had been operating at a loss for the past two years. Bus service is now supplied by the railway between Atlantic Highlands and Manasquan, skirting the coast for the most part and routed through Asbury Park, Avon, Belmar, Spring Lake, Sea Girt and other places. This operation by bus was the subject of a descriptive article contributed to *ELECTRIC RAILWAY JOURNAL* for Dec. 12, 1925, page 1023, by H. T. Pritchard, vice-president of the Utilities Power & Light Corporation.

Express Service Suggested at Indianapolis

Mayor Slack of Indianapolis, Ind., has suggested that city and electric railway officials prepare a program for rapid transit in keeping with expected growth of the city. The Mayor believes elevated lines from the business district to Broad Ripple, thence to Fairview and Riverside, are the eventual solution. James P. Tretton, operating superintendent of the Indianapolis Street Railway, believes that the city of the future will use subways. The railway recognizes the need for faster rides from the extreme north and east sections of the city to the business district. Express service, like that in Detroit using buses and trolleys, has been suggested as a means of immediate relief.

Would Extend Bus Service

Application has been made by the St. Louis Public Service Company, St. Louis, Mo., to the Board of Public Service to install a new bus line to supplement the Tower Grove Street car line. The buses will run from the end of the street car division into the Lindenwood district which is now served only by buses of the People's Motorbus Company and suburban trains.

Special Service in British Columbia

The British Columbia Rapid Transit Company, subsidiary of the British Columbia Electric Railway, has started an additional coach service between Vancouver and Abbotsford on Saturdays and Sundays only.

50 Miles of Route for Third Avenue Railway

The Surface Transportation Corporation, with other companies of the Third Avenue Railway System, New York, has acquired and is already operating nearly 50 miles of bus routes in Westchester County, including the White Plains-Yonkers line, the Harrison-Rye Beach line, the Mamaroneck Avenue line, the White Plains-Tuckahoe line, the Silver Lake line, the White Plains-Hastings line, and the White Plains-Grasslands line. The new Bronx lines will add 55 route miles, making a total of more than 100 miles of bus routes which will have been added to the system.

These and other facts were brought out in a radio talk made recently by Garrow T. Geer, secretary of the company. He also said:

The bus companies have been fortunate in obtaining unusually desirable and well qualified men for the bus operating personnel, and the inspiration of new buses, new uniforms, a clean slate, and a magnificent opportunity for transportation service, is a challenge to the new employees to give the public their very best efforts.

It is a great satisfaction to the Third Avenue management that to us has been awarded the opportunity of affording this new service to the people of the Bronx, who for so many years have been the patrons of our railway lines. We feel that they will appreciate the advantages of a co-ordinated bus and trolley service under one management, the financial and operating reliability of which has long been established.

Line in Washington Authorized

The Capital Traction Company, Washington, D. C., has been authorized to operate a parlor car coach line between 34th and Ordway Streets and 10th and D Streets, northwest. Such service can be operated until otherwise ordered by the commission.

Substitution Being Considered for Lake Ontario Route

Stockholders of the New York State Railways will meet in Rochester, N. Y., on June 14 to consider the proposed early abandonment of the Rochester & Sodus Bay Railroad. James F. Hamilton, president has stated that revenues of the 40-mile line along Lake Ontario and through the lake fruit belt have decreased steadily. He reported a loss of nearly \$50,000 for the year 1927 after operating expenses and taxes. Depreciation was not included in this computation.

The single-track interurban is a subsidiary of the New York State Railways and its revenues have been hard

hit by the private automobile. There is no competing bus line, but it is understood that the New York State Railways may substitute a bus line.

New Iowa Interurban Service

Buses between Davenport and Clinton, Iowa, operating on a staggered schedule with the present interurban cars between the two cities, operated by the Clinton, Davenport & Muscatine Railway, will be in service early in July, according to R. J. Smith, general manager of the Tri-City Railway, an associate company. Formal application for the permit was made recently. This is the first interurban coach service to be undertaken by the railway.

Taxi Purchase Contemplated by New Jersey Company

Negotiations are under way, according to the *Newark News*, for the purchase by Public Service Co-ordinated Transport of the Yellow Cab Company, Camden, N. J., which operates 47 taxicabs. The price reported is between \$400,000 and \$500,000. The Public Service has not heretofore embarked upon the taxicab business. The company at Camden, in addition to the cabs, has a large garage and a two-story office building.

Supplementary Service on One Denver Line

A bus will be used along the route of the Denver and Crown Hill line of the Denver Tramway from the city limits of Denver, Col., to the Crown Hill Cemetery, about 1 mile, to supplement the car service. Nothing has been said about discontinuing the car line, but it is understood that if the bus proves satisfactory the company has the right to substitute buses. Recently the company has refused transfers between the city line and the Crown Hill line.

New Line Out of Washington

The Washington Railway & Electric Company, Washington, D. C., may establish a bus line from a mid-city terminal to Rockville, Md., to compete with the existing bus line operated by the Montgomery Motor Bus Company, Inc. It was said the Montgomery Bus Company had been making serious inroads on the patronage of the Rockville line of the railway and the railway company considers it imperative to take such steps, since negotiations entered into by it to take over the Montgomery company have apparently failed.

Would Extend Line in Los Angeles

The Los Angeles Railway Corporation has applied to the California Railroad Commission for a certificate to extend its Florence Avenue coach line in the County of Los Angeles.

Financial and Corporate

Senator Capper Heads Merger Sub-committee at Washington

The Senatorial sub-committee that is to investigate the merger plan, under which it is proposed to bring together the Capitol Traction Company, the railway lines of the Washington Railway & Electric Company and the Washington Rapid Transit Company, has been appointed by Senator Capper, Republican, of Kansas, chairman of the Senate District committee. Mr. Capper himself will head the sub-committee. The other members will be Senators Blaine, Republican, of Wisconsin; Vandenberg, Republican, of Michigan; King, Democrat, of Utah, and Glass, Democrat, of Virginia. It is probable that the committee will assign utilities experts to investigate the merger plan and then come back in the fall to hold hearings.

Authorization for the investigation was contained in a resolution adopted by the Senate. The resolution appropriated \$10,000 for expenses.

Four members of the sub-committee, Capper, Blaine, Vandenberg and Glass, voted against a proposal to make a favorable report to the Senate on the joint resolution authorizing the merger. The fifth member of the sub-committee Mr. King, voted in favor of the motion.

The question of valuation will be the most important one in the sub-committee's investigation. The merger plan allows a fixed valuation of \$50,000,000, against a valuation of \$62,000,000 claimed by the two railways for their properties under the basis allowed by the Public Service Commission in previous cases.

First Report on Consolidated Georgia Properties

The first annual report of the consolidated Georgia Power Company, Atlanta, Ga., has been presented for the purpose of showing the progress made in simplifying the corporate and strengthening the financial structure of the company since its organization on Feb. 25, 1927. It summarizes the efforts made and results attained in co-ordinating, standardizing, and unifying the facilities of the several constituent companies. No detailed comparison is made in this report with the consolidated operations of the properties for the previous year, although the report and the Year Book contain charts and statistics showing the growth and development of the company.

Gross earnings from railway operations were \$5,367,510 and passengers carried numbered 99,340,678. Of this number 94,983,871 were carried on the Atlanta system.

The year 1927 witnessed the consummation of a program of complete modernization of the Atlanta railway system. Modern double-truck cars were

used to replace all of the old single-truck cars retired from service, with the exception of 26 retained for emergency use. The present equipment includes 407 regular passenger cars, of which 154 are equipped for one-man operation.

Stock Offerings in Montreal

An offering of stock will be made to shareholders of the Montreal Tramways, Montreal, Canada, at \$150 a share on the basis of one new share for each five shares held. The present offering means that 10,000 new shares will be offered to shareholders, and at \$150 a share will give the company \$1,500,000 of new money to be used for general expansion purposes.

This change in the Montreal Tram capital structure will strengthen the position of United Securities which, through Consolidated Securities, Ltd., owns more than 50 per cent of the common stock of the tramways.

At current levels, rights will be worth about \$10 each.

Properties Separated in West Virginia

Separation of the railway and lighting properties in Bluefield and Princeton, W. Va., has been effected following an announcement to the effect that the Tri City Traction Company, an interurban, would operate the railway and the Princeton Power Company would handle the electric light systems. All debts incurred by the Princeton Power Company prior to April 30 are to be settled by the traction company and matters pertaining to the electric light system will be under a new corporation, which will continue to be known as the Princeton Power Company, operated as a subsidiary of the American Gas & Electric Company.

Officers of the new company are as follows: S. J. Evans, president and general manager; H. E. DeJarnette, vice-president and chief counsel; S. J. Evans, in charge of railway operations; W. D. Shuff, secretary and treasurer, and E. T. Evans, head of rolling stock.

Two Chicago Issues

The Chicago, North Shore & Milwaukee Railroad received authority from the Illinois Commerce Commission on May 22 to issue and sell \$2,700,000 par value of its 6 per cent non-cumulative preferred stock. At the same time, the commission entered a formal order authorizing the Chicago Rapid Transit Company to issue under its first mortgage an additional \$3,122,000 of first and refunding mortgage gold bonds, payable in 1953 and bearing interest at 6 per cent to be sold at not less than 80.

Tax Relief Sought for Municipal Railway Employees

Employees of the Detroit Water Board and Department of Street Railways in the future will not have to pay income taxes under an amendment adopted by the Senate. Senator Arthur H. Vandenberg sought to make the exemption retroactive for the years 1925, 1926 and 1927, but this proposal was defeated. If the amendment is accepted by the house and the conference committee on the revenue bill, it will end a controversy extending over several years between the Detroit municipal government and the bureau of internal revenue.

Employees of these two municipal projects were assessed taxes as early as 1923, but these levies were abated by the revenue act of 1924. Taxes since that date have been in abeyance and a ruling of the treasury department in February of this year ordered these employees to pay up three years back taxes.

Changes on Akron Directorate

Wendell L. Wilkie has become a director in the Northern Ohio Power & Light Company, Akron, Ohio. He succeeds the late E. W. Moore, Cleveland, who with his associates founded the Cleveland-Akron interurban line. As a member of the law firm of Mather, Nesbitt & Wilkie, he has been in charge of the legal work of the Akron property for the past six years.

R. P. Stephens, New York, also has been chosen a director. He takes the place of John C. Weadock, New York, resigned.

New Directors in Oakland

Four new directors have been added to the board of the Key System Transit Company, Oakland, Cal., to fill vacancies occasioned by resignations. The new directors are the four operating vice-presidents of the company: J. P. Potter, operations; H. P. Bell, engineering; C. C. Vargas, finance; and Paul Goldsmith, public relations.

Service Discontinued in Boise

The Public Utilities Commission of Idaho granted permission on the application of the Boise Valley Traction Company, Boise, and the Colonial Trust Company of Pennsylvania to abandon its entire service on and after May 17, 1928. On that date the properties of the railway were sold by special master to John L. Porter, Pittsburgh, who represented the bondholders of the company. This sale was in pursuance of a decree of foreclosure entered by the Federal Court for the District of Idaho on April 12, 1928, this proceeding being brought to foreclose a deed of trust to the Colonial Trust Company and a mortgage of the Idaho Power Company, also the owner of the stock of the railway, against the Boise Valley Traction Company's property.

Slight Decrease in Louisville Balance

Interesting review of situation in Southern city. More extensive co-ordination ahead. Many notable achievements in realm of operation

DURING the year 1927 there was a marked increase in the density of traffic on the Louisville Railway, Louisville, Ky., during the so-called rush hours. This was met in part by the operation of 118,770 additional car miles during the year, but the relative increase in traffic during the rush hours was very great. The number of passengers carried during the other hours of the day, on the contrary, fell off considerably, so that the problem of furnishing sufficient equipment in rush hour service became extremely acute. The maintenance department functioned so well during the year that the number of cars taken from service on account of car failure was decreased 7.2 per cent compared with 1926, and 16.4 per cent compared with 1925.

In an effort to reduce service inter-

COMPARATIVE INCOME STATEMENT OF THE LOUISVILLE RAILWAY

	1927	1926
Operating Revenues:		
Revenue from transportation...	\$4,608,732	\$4,665,693
Other operating revenues.....	203,462	197,612
Total operating revenues...	\$4,812,195	\$4,863,305
Operating expenses.....	3,260,563	3,275,786
Net revenue from operations	\$1,551,631	\$1,587,518
Taxes.....	461,000	461,000
Railway operating income...	\$1,090,631	\$1,126,518
Bus operating income.....	*85,977	*31,566
Total net operating income	\$1,004,654	\$1,094,952
Non-operating income:		
Louisville and interurban railroad.		
Net income.....	73,910	82,903
Other non-operating income...	9,607	10,228
Total non-operating income	\$83,517	\$93,131
Gross income.....	\$1,088,172	\$1,188,083
Deductions from gross income:		
Interest on bonds and notes...	651,750	651,750
Miscellaneous debits.....	4,928	2,025
Total deductions.....	656,678	653,775
Balance available for dividends on stock.....	\$431,493	\$534,308

*Deficit.

ruptions to a minimum considerable study was devoted to the traffic situation. Early in the year the supervisory force was revised in an effort to insure more regular schedules. Three additional line inspectors and two supervisory inspectors were added to the

RECORD OF AUTOMOBILE LICENSES ISSUED IN JEFFERSON COUNTY

	1923	1924	1925	1926	1927
Trucks.....	6,250	7,400	8,063	8,610	8,449
Passenger automobiles.....	29,891	40,916	46,379	50,034	51,500
Motorcycles.....	.....	235	247	249	302
Dealers.....	.....	88	97	105	90
Free.....	.....	.....	.....	325	416
Total.....	36,141	48,639	54,806	59,323	60,757

transportation department staff, the latter two being provided with an automobile to enable them quickly to reach any part of the system and render assistance during interruptions to traffic. This materially reduced the length of interruptions to service.

Despite the increase in car miles operated during the year, despite the decreased failure of cars in service, and, despite the fact that there was no change in fare during the year, 1,250,249 fewer passengers were carried in 1927 than in 1926; and, 1,729,954 fewer passengers were carried in the year 1925. Increased buses were placed on the operation by reason of the increased number of automobiles and trucks operated, and a considerable program of sewer construction, all of which tended to increase the difficulty of operating cars on regular schedule. Industrial depression was reflected in the company's earnings, which show a decrease of \$51,109 compared with 1926.

There were 1,400 more automotive vehicles on the streets of Louisville during 1927 than in 1926; and, some five thousand more than in 1925. The number of automobile licenses issued in Jefferson County during the past five years is compared in the accompanying compilation.

Early in 1926 the Mayor appointed a traffic committee to review the entire traffic situation in Louisville. On Aug. 18, 1927, the committee presented its report, containing a suggested form of ordinance "Regulating the moving travel and traffic upon the public ways of the city of Louisville, Kentucky, and providing punishment for the violation thereof." This ordinance, after intensive study by the traffic committee, the public utilities bureau, and various civic organizations, was revised in part and submitted to the General Council on Jan. 24, 1928, for action by that body.

During the year, the following number of cars passed through the various shops:

Truck shop—minor repairs.....	1,402
Truck shop—general overhauling.....	315
Carpenter shop.....	871
Paint shop.....	206

The maintenance of car bodies of the older type of cars continues heavy. The repairs to car bodies during the year, due to accidents and due to maintenance has been as follows:

	No. of Cars	Cost
Due to accidents.....	239	\$8,912.07
Due to car body repairs (maintenance).....	836	\$30,932.32

Increased attention was given during the year to the cleanliness and the attractiveness of car interiors by painting ceilings a lighter shade, renewing curtains, painting seats, etc. Experiments are being conducted in flood lighting the front car dash, designing a suitable illuminated destination sign, and providing more comfortable working conditions for car operators, all of which will tend to increase safety of operation and render the car more attractive to the rider.

The comparative cost of power station operation and maintenance for the past five years is as follows:

1923	1924	1925	1926	1927
\$535,380	\$514,843	\$454,949	\$414,818	\$426,384

During the past year 45 pieces of special track work were renewed in whole or in part, at a cost of some \$84,000, 8,015 ft. of track were re-constructed with new rail, 2,767 ft. with relay rail and 1,078 ft. with the same rail. Of new track construction, 2,642 ft. on Frankfort Avenue from Eastover to Cannon Lane was constructed with new rail, and on 25th Street and St. Cecelia 1,898 ft. was constructed with relay rail, a total of 17,399 ft. During the year a total of 19,275 wood cross-ties were used.

There were only two fatalities on the city lines in 1927 compared with ten fatalities in 1926. The accident elimination contest was continued on the property with increasing success, as is evidenced from the following table:

	1923	1924	1925	1926	1927
Accidents.....	3,404	1,825	1,534	1,157	904
Miles operated per accident..	3,380	6,390	7,432	10,386	13,399

Comparing the year 1923 with 1927, with an increase of 65.8 per cent in the number of automotive vehicle licenses issued, there was a decrease of 73.5 per cent in the number of preventable accidents, and an increase of 400 per cent in the car miles operated per accident. There is to be taken into account also the fact that not only are the streets considerably more congested with automotive vehicles, but the population of Louisville increased from 287,000 in 1923 to 327,000 on Dec. 31, 1927.

The bus competition operated under the name of the Peoples Transit Company, which was stopped by injunction

COMPARISON OF REVENUE, TRANSFER, SCHOOL AND FREE PASSENGERS CARRIED BY THE LOUISVILLE RAILWAY

	1923	1924	1925	1926	1927
January.....	7,861,986	8,435,464	8,297,839	8,633,543	8,228,073
February.....	7,371,936	7,957,906	7,562,261	7,590,218	7,526,871
March.....	8,496,345	8,515,182	8,354,832	8,274,959	8,344,023
April.....	8,341,493	8,422,780	8,214,226	8,145,383	8,157,692
May.....	8,920,188	8,844,856	8,469,877	8,603,531	8,459,179
June.....	8,211,428	8,097,217	7,837,978	7,905,530	7,830,355
July.....	7,943,088	7,712,320	7,648,982	7,697,183	7,493,705
August.....	7,827,996	7,549,678	7,744,573	7,471,624	7,482,858
September.....	8,125,974	7,850,813	7,995,353	8,004,341	7,781,967
October.....	8,257,865	8,334,069	8,395,428	8,235,552	8,206,499
November.....	8,069,261	7,720,786	8,048,480	7,894,275	7,696,159
December.....	8,250,837	8,298,196	8,564,736	8,196,721	8,197,230
Total.....	97,670,397	97,739,267	97,134,565	96,654,860	95,404,611

granted under date of Jan. 28, 1927, was referred to in report for the year 1926 as pending decision in the Court of Appeals. Under date of June 24, 1927, the Court of Appeals affirmed the decision of the lower court, sustaining the contention of the railway that the Peoples Transit Company should not be permitted to operate without a franchise.

Following this decision intensive study was devoted to a co-ordinated electric car and bus system of transportation for the city and suburbs. Changes in city administration delayed consideration of the matter by the city officers.

On Jan. 10, 1928, the officers of the city held a hearing on the matter of bus operation and took under advisement the request of the Louisville Railway to create and sell a franchise for the operation of buses. Attached to this request was a proposed ordinance, which was submitted to the officers of the city. Several provisions of the ordinance drafted by the railway met with objection on the part of the city officers, and a number of conferences were held. On Feb. 7, 1928, Mayor Harrison presented to the General Council of the city an ordinance creating a new bus franchise. While the ordinance presented by Mayor Harrison is more restrictive than the railway's draft would have been to the company as holder of the franchise, the officers regard it as a workable arrangement and have stated that if the franchise is created in the terms suggested by Mayor Harrison the company will bid on it and operate under it. This has since been done.

To add to the railway's equipment, the directors last summer authorized the purchase of the automotive vehicles of the Peoples Transit Company, through which it acquired buses necessary in feeder bus lines. The company stands now in a position to commence building up a comprehensive bus and rail car transportation for the city, as soon as it is legally permitted by the city to do so. All the company needs is the legal right to operate buses and a legal means of determining and rendering the type of service the people desire and are willing to pay for.

During 1927 the current dividends were paid on preferred stock $2\frac{1}{2}$ per cent on April 1 and $2\frac{1}{2}$ per cent on Oct. 1. Dividends of \$1 a share were paid on common stock on April 1 and on July 1; and, on Dec. 13, 1927, there being more than enough balance from operation in 1927 to pay an additional dividend on common stock of \$1 per share, that dividend was declared payable on Jan. 3, 1928. There were paid out of 1926 earnings \$3 per share in common stock dividends, and a like amount out of 1927 earnings.

As was noted in *ELECTRIC RAILWAY JOURNAL* previously, the American Museum of Safety announced that the Anthony N. Brady Gold Medal, which had not been given since 1914, was awarded the Louisville Railway, the prize committee indicating in its report that the company was the "safest street railway in America."

Barstow Interests Buy Binghamton Bonds

The William S. Barstow interests, which own the Binghamton Light, Heat & Power Company, Binghamton, N. Y., have obtained control of 51 per cent of the block of \$1,782,000 general consolidated 5 per cent bonds of the Binghamton Railway. In consequence the Barstow Company is likely to become the outstanding creditor and claimant against the railway. In any event the purchase eliminates the Associated Gas & Electric Company, New York, from further consideration in the plan for control of the railway.

The sale of the property under foreclosure has been postponed indefinitely pending determination by a special master of the matter of priority of liens of the secured creditors of the railway.

Would Abandon Portion of Line in Cortland

The Cortland County Traction Company, at the request of the city of Cortland, applied to the Public Service Commission May 18 for permission to abandon a part of its line in Cortland. It was alleged that further operation of that part of its system was no longer necessary for public convenience.

Brazil Properties Bought by Electric Bond & Share

The Electric Bond & Share Company has purchased control of important public utilities of the state of Rio Grande do Sul, Brazil, including Companhia Carris Porto Alegrenses and the Companhia Energia Electrica Rio Grandense, respectively operating Porto Alegre tramway and power system. Control of the two companies will be assumed by Electric Bond & Share Company on May 30. The price paid for the two companies has not been disclosed. The railway will be rebuilt.

Increase in Revenue Passengers in Winnipeg

Industrial development in Manitoba, Canada, has been reflected in the 1927 increased railway earnings of the Winnipeg Electric Company, Winnipeg. During that year the railway carried 60,045,833 revenue passengers compared with 57,985,144 during 1926. The gross receipts of this utility increased \$124,000. These better conditions were referred to by A. W. McLimont, president, in his annual statement to the directors.

In accordance with franchise agreements and to meet service requirements, the Winnipeg Electric Company made certain additions and improvements to its railway property in 1927. An extensive track rehabilitation program materially improved the company's roadbed. The company also added to its fleet three Reo 21-passenger buses, three

Studebaker 21-passenger buses, and ten Mack 25-passenger buses.

The report refers to the demonstrations of the value in customers' good will due to the policy of distributing the company's securities through the medium of customer ownership campaigns. There are 4,014 local preferred stockholders compared with only a few in 1924.

Would Abandon Line in Illinois

Abandonment by the Illinois Traction, Inc., of 2.7 miles of line in Champaign County, Ill., is proposed in an application made public May 23 by the Interstate Commerce Commission. The line extends from a point known as State Road Elevator, on the Ogden-Homer branch of the main line, to Homer, Ill.

The applicant states that it is now operating the line at a loss and that the Illinois State Highway Department desires to use the roadbed for construction of a highway between State Road Elevator and Homer.

Negotiations Reported for Sale of Harrisburg Bridge

The Harrisburg Railways, Harrisburg, Pa., is understood to have under consideration a proposal for the purchase by Frank A. Slack of the railway's 60 per cent interest in the People's Bridge Company, owner of the Walnut Street bridge across the Susquehanna River. Mr. Slack proposes to erect a new viaduct at a cost of \$800,000. The railway bought stock in the bridge company more than twenty years ago. The present bridge has been in use since 1890. It cost \$200,000.

Power Plant in Oklahoma Sold

Halford Erickson, vice-president, H. M. Bylesby & Company, announces the purchase by the Oklahoma Gas & Electric Company of the 13,000-kw. Belle Isle generating station of the Oklahoma Railway in Oklahoma City, Okla. Consummation of this transaction follows the recent leasing of this station by the Oklahoma Gas & Electric Company together with transmission lines owned by the Oklahoma Railway, including 33,000-volt transmission lines from the Belle Isle plant to Norman, Guthrie and El Reno, and all substation equipment not used exclusively for railway transportation.

Removal of Non-Paying Oakland Lines Under Way

With the approval of the California Railroad Commission removal of all rails, poles and overhead of two lines abandoned as non-paying by the Key System Transit Company, Oakland, has been started. The lines in question are the San Lorenzo, near San Leandro outside of the Oakland city limits, and the second section of the Ashby Avenue route in Berkeley.

Legal Notes

CALIFORNIA—*Duty of Pedestrian in Crossing Interurban Rights-of-Way Defined.*

The tracks of an interurban railway were on a right-of-way but closely adjoining them was a sidewalk commonly used by pedestrians, and the district was laid out in streets and blocks with business buildings and residences adjacent to the car line on either side. The court held that a pedestrian attempting to cross such tracks must look and listen before crossing, the same rule being applicable as that applying to steam railways, though if the place was one where the public commonly crossed the tracks, in going to a street on the opposite side, evidence to this effect would throw light on the question of the extent of contributory negligence. [Phillips vs. P. E. R. Co., 264 P., 538.]

CONNECTICUT—*Contract for Percentage Payment by Railway for Use of Streets Held Valid. Payment not a "Tax."*

The grant of a city to a street railway to operate cars on its streets, where the company's charter required the consent of the city, was an act of the state so far as the necessary power was committed to the municipality by the state, and the city could attach to the grant any conditions it choose, provided these conditions did not conflict with the law. The condition that the corporation pay 2 per cent of its gross earnings to the city for such permission was valid, and the city was not required to show that it had been put to any additional expense by the construction and operation of the cars. Such a payment did not constitute a "tax" within the meaning of general statute 1887, section 3920, as a tax, according to current meaning, is a burden or charge levied upon persons or property by governmental authority for governmental or public purposes. Where a railway had exercised privileges under such a franchise for 28 years, making the payments required, it was held not entitled to attack the condition as *ultra vires*, where it proposed to continue the exercise of all the rights given to it by the city. Even if the city had no power to impose such a charge but had power to consent or refuse to grant a franchise to a public utility, the latter is bound by the conditions imposed where it has accepted the grant and has operated under it and proposes to continue to do so. [City of Hartford vs. Connecticut Company, 140 A., 734.]

FEDERAL DISTRICT COURT—*Word "railroad" in Bankruptcy Act Includes Street Railway.*

A railway company discontinued service and later was adjudicated a bankrupt. The state and city in which it operated asked that the judication be vacated on the ground that the bankrupt was "a

railroad corporation" and therefore exempted from the federal bankruptcy act. The court differentiated the case from that of other cases where electric railways were held not to be "railroads," such as *In Re Grafton Gas & Electric Light Co.* (253 F., 668), *Omaha Street Railway vs. Interstate Commerce Commission* (33 S. Ct., 890), and declared the word "railroad" in the bankruptcy act included a street railway. [In re Columbia R., G. & E. Co. 24 F. (2d), 828.]

FEDERAL DISTRICT COURT—*Boston Elevated Railway Liable to Federal Income Tax.*

Attorneys for the Boston Elevated Railway claimed that because the company, in return for payments and guarantees by the commonwealth, had abdicated its right to manage its property and affairs in favor of public trustees appointed by the Governor, it was not subject to the federal tax on corporations. The district court held, however, that as the business was still conducted in the name of the company and as the enabling act expressly provided that the trustees "shall be deemed to be acting as agents of the company and not of the commonwealth," and because of other wording in the act, the company was liable for the tax. [Boston E. R. Co. vs. Malley 24 F. (2d) 758.]

KANSAS—*Prospective Passenger, Hit by Projecting Steps of Interurban Car, Is Guilty of Negligence.*

A person who intends to get on an interurban car as a passenger at a place provided for that purpose, who goes to that place, sees a car approach and signals it to stop but stands so close to the track that he is struck by the projecting step of the car as it passes him, is guilty of contributory negligence as a matter of law. [Kern vs. K. C. L. & W. Ry., 264 P., 1067.]

KENTUCKY—*Increased Service Not Necessarily Great Public Convenience.*

An applicant for a bus franchise agreed to operate buses every hour over routes already served by buses which ran only every other hour, carrying about one-third of their capacity per trip. The Court of Appeals upheld the decision of the Commissioner of Motor Transportation denying the application on the ground that the public's needs and convenience did not require a more frequent service. [Barnes vs. Consolidated Coach Corporation, 3 S.W. (2d), 1087.]

MASSACHUSETTS—*Person Injured In Crowded Subway Station.*

The fact that a subway station is crowded with people hurrying to enter cars and that similar conditions exist at

other times is not sufficient to establish the negligence of the railroad so as to authorize recovery by a passenger injured by the crowd on the platform. [Martin vs. Boston E. R. Co., 160 N.E., 300.]

NEW JERSEY—*Authority of Commission in Limiting Franchise Upheld.*

The Public Utility Commission granted a certificate to a bus operator on condition he would not carry through passengers between the two terminal towns on its route and that he would not carry local passengers within these two towns. The reasonableness of these limitations was upheld by the Supreme Court. [Hunter vs. Board of P. U. Comm. et al, 141 A., 90.]

VIRGINIA—*Change in Transfer Point, Authorized by Police but Contrary to Ordinance, Held Invalid. Company Held Responsible for False Arrest and Malicious Prosecution of Passenger in Transfer Case.*

A city ordinance, passed in 1908, required the issue of transfers at various specified points. Another ordinance, passed in 1899, authorized the railway company to enforce reasonable regulations as to transfer tickets and systems of transfer to prevent fraud. At a conference held in 1924 between officials of the Police Department and of the railway company to reduce congestion at one of the specified transfer points, it was agreed desirable to require passengers passing the point on certain car lines to transfer at another intersection. Notices of this proposed change were posted and other means were taken to warn passengers of the change. More than two months later, a passenger transferred at the old corner, but declined to pay another fare or get off the car after his transfer was refused. He made no other disturbance, but the conductor had him arrested, and he spent 30 minutes in the Police Station, after which he was released on bail. The next morning the company's attorney prosecuted him in the police court for disorderly conduct, but the case was dismissed. It was alleged that the arrest had been made under general instructions issued by the company. In a later action for false arrest and malicious prosecution brought by the passenger against the company, the Virginia Special Court of Appeals held that neither the agreement between the company and the Police Department nor the right of the company to establish regulations on the use of transfers gave it authority to change the location of transfer points, as they had been fixed by the city ordinance. Hence there was no obligation on the passenger to pay an extra fare or leave the car. The court also held that the instructions issued by the company to its employees made it responsible for the prosecution and warranted the trial jury in assessing punitive damages. A verdict of \$2,000 against the company was upheld. [V. E. & P. Co. vs. Wynne, 141 S.E., 829]

Personal Items

Walter L. Adams Heads New Massachusetts Organization

"From horse car driver to street railway rehabilitator" would be a fitting title for Walter L. Adams of Milford, Mass., recently appointed president and general manager of the reorganized Milford, Framingham, Hopedale & Uxbridge Street Railway (formerly Milford & Uxbridge Street Railway). He is typical of the men who are doing so much to bring New England's street railways to their pre-war financial standing.

It was in 1888 that Mr. Adams had



Walter L. Adams

his first experience in railroading as a horse-car driver on the old Newbury & Amesbury Railway. His run, now remembered only by the "old timers," was on the Merrimack branch. He continued as a driver for two years and later, when cars came into existence there, he was promoted to foreman of the carhouse. Soon after when the lines were electrified his personal study and knowledge won for him the position of electrical engineer. In this capacity he received the fundamental training which stood him in good stead later.

Greater opportunity was offered him in Connecticut. In 1892 he accepted an offer to go there and equip the Norwich Street Railway with electricity. It was then a horse-car road. He was made superintendent and electrical engineer. In a short time an aggressive campaign resulted in the complete change-over and his work was successful. For a brief period he was connected with the Westinghouse Electric Company as an engineer, returning later to the Norwich Street Railway. This time he was made superintendent of the Montville Street Railway where he stayed until 1903. After his work there he went to Milford and became superintendent of the Milford & Uxbridge Street Railway. Reactions following war time inflation resulted in the company's going into a receivership on Aug. 4, 1926. Mr. Adams was appointed receiver. Early

in May, this year, the company was sold under order of the Supreme Court to the Citron-Byer Company of New Jersey. Mr. Adams was retained by the new owners as president and general manager. He is also president of the Milford, Framingham & Uxbridge Coach Company.

Mr. Adams was born in Newbury, Mass., in 1858. He was educated in the Newbury public schools.

F. W. Samworth Holds Important West Virginia Post

F. W. Samworth is now serving as district general manager of the Ohio Valley Electric Company and its affiliated companies. He has before him the gigantic task of carrying forward the development work incident to the comprehensive program initiated since the city and interurban lines in West Virginia passed from control of the Appalachian Electric Power to the Central Public Service Corporation. More recently the Cannon Ball Transportation Company and the Interstate Motor Transit Company were purchased by the Southern Gas Securities Company, a subsidiary of the Central Public Service Corporation. The Central Public Service Corporation now controls all of the urban and interurban transportation systems in and between Huntington, W. Va., and Portsmouth, Ohio. The services will be co-ordinated with other transportation companies owned by the Central Public Service Corporation.

Mr. Samworth started his electric railway career in 1910 as a motorman with the Wilmington City Railway, Wilmington, Del. Prior to his position in Huntington and the assumption of his present job, he worked successively as



F. W. Samworth

motorman, receiver, dispatcher, superintendent and general superintendent.

Mr. Samworth was born on Feb. 23, 1892, at Wilmington. His education was received at the Mount Herman School, Mount Herman, Mass.

H. R. Bowie Advanced on Penn-Ohio

H. R. Bowie has been appointed auditor of the Pennsylvania-Ohio Power & Light Company and Pennsylvania Power Company, and auditor and secretary of associated companies of the Penn-Ohio System, Youngstown, Ohio. In this work he succeeds F. E. Wilkin, who resigned to join the staff of Stevens & Wood, Inc.

Mr. Bowie has been assistant auditor of the Penn-Ohio System for the last nine years. During the war he served in the cost accounting section of the army ordnance department. Stationed in New Haven, Conn., he had charge of the government accounting of one of the largest army contracts at the plant of the Winchester Repeating Arms Corporation. Prior to his war service Mr.



H. R. Bowie

Bowie was an accountant for the Pacific Light & Power Company and Southern California Edison Company. He is a native of Uniontown, Pa., and was graduated from the University of Southern California in accounting and commercial law.

Obituary

W. H. McLARIN, president of the Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., since 1922, died on May 20. Mr. McLarin was 75 years old.

FRANK STARK, associated with the late E. P. Shaw in the construction of the Salisbury Beach & Plum Island Street Railway lines over which he served as superintendent for many years, died in Newburyport, Mass., on May 15. He retired from active work about five years ago, just previous to which he had been starter for all lines centering in Market Square, Newburyport, into which both the Eastern Massachusetts Street Railway and the Massachusetts Northeastern operate.

MARC STANFIELD, superintendent of the bus division of the Indiana Service Corporation, Fort Wayne, Ind., for the last two years, died on May 5.

Manufactures and the Markets

Manufacturers Talk of Price Cutting

A group of selected letters, discussing who's to blame and commenting on possibilities for reform

MANY manufacturers have testified to the price cowardice of sellers as the chief cause of demoralization in the market place, as a result of the recently published articles by Earl White-horne on price cutting. Also many constructive ideas have been advanced. Some purchasing agents have stoutly contested the innocence of the buyer. Others have frankly argued for a broader recognition of the economics of purchasing and more ethical practices. The following series of extracts from letters from the executives of manufacturing companies has been selected from the pile to present a cross-section of the sellers' viewpoint, as it has been reflected by readers of these articles.

Destroying Price Levels for Allied Lines

By a Manufacturer of Control Apparatus

Since the seller has the privilege of either accepting or refusing business, weak-kneed selling is principally to be blamed for the present price cutting situation. . . .

A contributing factor to the bad price situation also lies in the lack of loyalty among the allied industries. While the motor manufacturer may maintain the price on his motors, because of the longer discount which he is receiving from the control manufacturer he has quite a bit of leeway in discount to play with, and does not hesitate at all to turn a good portion of this discount over to the buyer. Time and again we control manufacturers are up against a situation where the customer can buy our control cheaper through a motor manufacturer than from us direct. This naturally gives the control buyer a considerable leverage with which to lower the control manufacturer's price.

One-Price Policy a Cure

By a Bearing Manufacturer

The only practical solution is to encourage both purchasing agent and seller to submit closed quotations which shall not be subject to further change. If the manufacturer would stick by his first price the purchasing agent would be unable to gain anything by quasi-crooked purchasing methods. If the purchasing agent would at the outset state that he would not lend himself to such practices and insist upon the best price once and for all, then many of the complaints would be avoided.

Too Much Salesmen's Gossip

By a Pole Line Hardware Manufacturer

We do not believe that the manufacturers who are selling a competitive line are close enough that they can sit down and talk over their difficulties without the conversation being broadcast.

The manufacturers pay too much attention to salesmen's gossip about his competitor cutting prices, but if the competitive manufacturers were so lined up that

they could discuss costs with each other, I believe a lot of the trouble would be eliminated.

Most Purchasing Agents Absolutely Square

By a Lighting Equipment Manufacturer

Our experience has been that not much of the temptation for price cutting is due to any desire of the purchasing agents of large buyers to keep us from a legitimate profit. The purchasing agent is more concerned in a fair price, coupled with quality of goods and prompt deliveries.

We find purchasing agents of large buyers are absolutely "square" and willing to see us make a legitimate profit. There are still a few of the "old school" who feel a day's work well done only when they have lied to a bunch of salesmen, thereby keeping their companies from earning a legitimate profit, but that type is fast dying out or being placed in other positions where they are not so harmful to their employers.

Untrained Salesmen a Weakness

By a Manufacturer of Fans and Blowers

The tendency today in our own industry is to have untrained men and place them out in the field. The result is their lack of real engineering ability, their lack of ingenuity in meeting the unusual situation causing them to waver in their determination to sell at the right price, and consequently they phone the factory for reduction in price, making their case as strong as possible with the factory that the competitors are cutting prices. Invariably the salesman either deliberately misrepresents conditions or he merely took the word of the purchasing department or the buyer.

Sliding Scale and Reciprocity

By a Controller Manufacturer

There are two other phases of merchandising electrical apparatus that have crept in during the last few years that I feel are detrimental to the business. One is the practice of establishing a sliding scale of discounts, started by one of the large electrical manufacturers, and copied by many others in self-defense. This system gives large purchasers preferential discounts on account of the potential buying power of these big customers, and additional quantity discounts worked out on a sliding scale, paid in the form of rebates at the end of the year. Any manufacturer expects to make a certain over-all profit on his products and in order to give big discounts, his list prices must be based accordingly. The customer of small purchasing power consequently pays an excessive price for the apparatus that he buys and the additional profit made on these sales helps the large and powerful purchaser to obtain his goods at a discount.

The other condition is the use of reciprocity to coerce purchasers to buy electrical equipment. The ultimate outcome, if the buyers of electrical equipment do not offer strenuous resistance, would be to eliminate

Exhibitograph No. 10

BIG SHOW!

A.E.R.A. Exhibit Committee

Reports

to May 31

186 Exhibitors

103,613 Sq.ft. of Space Sold

**BIGGER AND BETTER
THAN EVER**

the small electrical manufacturer who does not have big tonnages of steel and other commodities to place. This company has suffered to a considerable extent from the reciprocity pressure, as a number of good sized orders which were about to be placed with us have been diverted to the large manufacturers due to threats on their part to cease buying from the customer unless the orders were placed with them.

Product Prestige Proof Against Price

By an Insulator Manufacturer

The purchasing agent is simply a salesman on the other side of the fence or a salesman a purchasing agent with change of residence and both aping the Dutch and Indians on the Manhattan purchase—where both thought they had, and wondered if they had, put over a good deal.

The purchasing agent, in a seller's market, doesn't dare ask, "Is this your best price?"—the sales agent insults easily. So, in a buyer's market, the purchasing agent dares and does ask and by the time this reaches the sales end it is amplified orally into a demand and visually into an ogre across the desk.

Constructively, I will say that I don't blame either side; that the most salutary movement among the large buyers is the selection of engineers of purchase instead of purchasing machines (clerks). To an engineering mind, one need not get blue in the face trying to explain that the reason "Your price is high" on 60,000 bolts (insulators?) is that there are 50 different kinds of steel and as many methods of making bolts.

Finally, all this dilemma may be avoided by making and selling a product so good that buying and using it is a pleasure not to be contaminated by "an extra 10 and two 5's."

Tie Requirements Will Decline

As the day of large railroad expansion is past and the yearly increase in track mileage has greatly slowed down, there is seen a prospect of a diminishing demand for crossties until the minimum annual renewal, as fixed by the life of treated ties, is reached. When this point is reached, only such increase in the demand may be expected as will be due to the construction of new lines or the addition of tracks to existing facilities.

Treated ties have been used for years in increasing numbers until in 1926 the treated ties were 69 per cent of all ties used. In 1923 the amount of treated ties in use was 50 per cent and if the

rate of increase of the past three years continues, by 1932 practically all ties used will be treated ties.

The effect of the treated tie on the number of ties required for renewals, according to Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio Railroad, is clearly indicated by the number of ties used and the total miles of all tracks on which renewals were made, for which the figures for the years 1921 to 1926, inclusive, are available: In 1921, there were used 86,521,556 ties in 379,254 miles of track, or 228 ties per mile. In 1926, there were used 80,745,509 ties in 394,945 miles of track, or 204 ties per mile.

Thus, notwithstanding the fact that there was an increase of 15,691 miles of track during this period, 5,776,047 less ties were required for renewals in 1926 than in 1921.

In 1926 there were used for renewals 80,745,509 ties, or 204 per mile of track, and in the same year there were used for the construction of additional tracks 9,530,926 ties, or about 2,600 ties per mile of track. The decrease in renewals since 1921 is 24 ties per mile of track, or at the rate of 4 ties per mile, per year. The net increase in track mileage for the same period is 2,615 miles per year, and for the purpose of computation assume a gross added mileage per year of 3,000, which will require a total of 7,800,000 ties to construct.

Assuming a twenty-year life for treated ties, with all ties in track treated, the renewal will finally resolve itself into 130 ties per mile per year. Projecting by the straight line method, the present rate of decrease of renewals of four ties per mile per year, it will require 18½ years to reduce the 1926 renewal of 204 ties per mile a year to this figure of 130 ties per mile a year. This will be in the year 1944. When this state of renewals is reached the annual renewal requirements will be uniform and for the 1926 mileage of 394,945 will be 51,342,850 ties.

With this, however, must be considered the ties used in constructing new lines and extensions during this period which are assumed at 7,800,000 per year and which gives a total for the 18½ years of 144,300,000 ties, of which about 40,000,000 ties would have been renewed at the end of the 18½ years.

The average renewal in this group at the end of the 18½ years would be approximately 4,000,000, which added to the 51,342,850 ties required for the 1926 mileage, gives a total of 55,342,850 ties for the 1944 renewal, plus the 7,800,000 for the construction of new lines and extensions, making a total of 62,142,850 ties to meet the demands in the year 1944, as compared with the demands of 1926 of 90,276,435 ties, which is a reduction of 31 per cent.

At this point the full benefit of the treated tie has been secured and the average low level of crosstie requirements has been reached. Beyond this point the renewals per mile should remain stationary, but the total number of ties required for both renewals and for new tracks will increase as the track mileage increases.

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

	May 29 1928
Metals—New York	
Copper, electrolytic, cents per lb.....	14.525
Copper wire, cents per lb.....	16.625
Lead, cents per lb.....	6.30
Zinc, cents per lb.....	6.475
Tin, Straits, cents per lb.....	50.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	4.175
Somerset mine run, f.o.b. mines, net tons...	1.875
Pittsburgh mine run, Pittsburgh, net tons..	1.8
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons..	1.5
Kansas screenings, Kansas City, net tons...	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	5.65
Weatherproof wire base, N. Y., cents per lb.	17.125
Cement, Chicago net prices, without bags..	2.05
Linseed oil (5-bbl. lots) N. Y., cents per lb.	10.8
White lead in oil (100-lb. keg), N. Y., cents per lb.....	13.75
Turpentine (bbl. lots), N. Y., per gal.....	\$0.59

Air-Magnetic Brake Test Made

Demonstrating the operation and effectiveness of its air-magnetic brake, the Cincinnati Car Company gave a series of tests on the tracks of the Indianapolis & Southeastern Railway, on May 25 under the supervision of the A. C. Nielsen Company of Chicago.

The tests were made with the Cincinnati experimental car on a measured stretch of track. It will be noted from the accompanying table that the air-magnetic brake stopped the car in approximately two-thirds of the time and distance required by the air brake alone. It is also interesting to note that the efficiency of the air brakes alone was decreased considerably on the greased track while the magnetic brake alone stopped the car in nearly the same distance on the oiled track as on the dry track, thus illustrating the magnetic function of the brake.

LIST SHOWING COMPARISON OF AIR-1 MAGNETIC BRAKES WITH AIR BRAKES ALONE AND MAGNETIC BRAKES ALONE

Speed of car at brake application was 60 m.p.h.

	Test	Track	Distance to Stop, Feet	Line to Stop, Seconds
Air brakes only.....	1	Dry	1,100	22
	2	Dry	1,162	23 2/5
	3	Oiled	1,958	38 1/5
Magnetic brakes only	1	Dry	2,048	40 2/5
	2	Dry	2,036	39 2/5
	3	Oiled	2,116	42 2/5
Air-magnetic brakes	1	Dry	755	14 2/5
	2	Dry	722	14
	3	Oiled	1,357	29 1/5

ROLLING STOCK

NORTHERN OHIO POWER & LIGHT COMPANY, Akron, Ohio, has received one gas-electric drive, urban type Twin Coach from the Twin Coach Corporation, Kent, Ohio.

CUMBERLAND & WESTERN PORT TRANSIT COMPANY, Frostburg, Md., has purchased two 100-hp. six-cylinder White buses.

INTERBOROUGH RAPID TRANSIT COMPANY, New York, has ordered G.E. equipments for the conversion of 30 trailer cars to motor cars.

DALLAS RAILWAY & TERMINAL COMPANY, Dallas, Tex., will purchase about fifteen Peter Witt street cars at an approximate cost of \$240,000 according to plans being made by city officials and the railway.

WORCESTER CONSOLIDATED STREET RAILWAY, Worcester, Mass., has ordered ten 33-passenger, Yellow coaches.

INDIANAPOLIS & SOUTHEASTERN RAILWAY, Indianapolis, Ind., is reported to be buying ten cars from the Cincinnati Car Company.

TRACK AND LINE

BERKSHIRE STREET RAILWAY, Pittsfield, Mass., is planning to install a 600-ft. diamond switch for the benefit of trolley service to employees of the General Electric Company. The work is to be done at the same time the city does paving work in that section, bids for which are now out.

SPRINGFIELD STREET RAILWAY, Springfield, Mass., will soon begin the replacement of 2,746 ft. of double track on State Street between the New York, New Haven and Hartford Railroad crossing and Benton Street. Progress is being made in replacing the single tracks on a somewhat longer stretch on Wilbraham Road, from the New York, New Haven & Hartford crossing to the eastern end of the line.

NORTHERN OHIO POWER & LIGHT COMPANY, Akron, Ohio, is laying new double track on Cornell Street in Barberton.

SHOPS AND BUILDINGS

APPALACHIAN ELECTRIC POWER COMPANY, Charleston, W. Va., plans a substation to cost about \$150,000.

UNION ELECTRIC LIGHT & POWER COMPANY, St. Louis, Mo., is planning a substation to cost approximately \$200,000.

NEW YORK CENTRAL RAILROAD, New York, is receiving bids for a 2,000-kw. rotary converter and a 2,100-kva. transformer for substation service.

OHIO PUBLIC SERVICE COMPANY, Cleveland, Ohio, will build an addition to its Edgewater power plant to cost \$450,000.

TRADE NOTES

C. O. BARTLETT & SNOW COMPANY, Cleveland, Ohio, announces the appointment of J. R. Allison, in its Pittsburgh office at 406 Bessemer Building. Mr. Allison has a wide experience in both maintenance and construction in steel mills and railroads.

NORTHERN ENGINEERING WORKS, Detroit, Mich., recently appointed the Interstate Supply Company, Philadelphia, Pa., as direct factory representative for the Philadelphia district; W. H. Beyer assuming charge of the account.

Washington Railway New Cars Scheduled for April Delivery

Details of the twelve cars for the Washington Railway & Electric Company, the order for which was mentioned in the JOURNAL for Dec. 17, 1927, have recently been released. The order for the units was placed with the J. G. Brill Company, Philadelphia, Pa. The cars will have an overall length of 42 ft. 3 in., a seating capacity for 49 passengers, and will be of semi-steel construction. The exterior color scheme is to be cream and blue and the interior trim gray enamel and cherry. Four GE-265-A outside-hung motors are specified. Subjoined are the specifications as released by the Washington Railway & Electric Company.

Number of units.....	12
Type of unit.....	One-man, motor, passenger, city double-end, double-truck
Number of seats.....	49
Builder of car body.....	J. G. Brill Company, Philadelphia, Pa.
Date of delivery about.....	April 1, 1928.
Weight of car body.....	21,840 lb.
Total weight.....	18,360 lb.
Bolster centers.....	40,200 lb.
Length over all.....	42 ft. 3 in.
Truck wheelbase.....	28 ft. 5 in.
Width over all.....	4 ft. 10 in.
Height, rail to trolley base.....	8 ft. 5 in.
Window post spacing.....	11 ft. 8 in.
Body.....	Semi-Steel
Roof.....	Monitor
Doors.....	End, folding feature
Air brakes.....	Westinghouse with variable load feature
Armature bearings.....	Plain
Axles.....	A.S.T.M. Specification A-20-21
Car signal system.....	Faraday high voltage DH-16
Compressors.....	Westinghouse K-35-JJ
Conduit.....	Flexible
Control.....	Curtain Supply Company
Curtain fixtures.....	Pantastote
Curtain material.....	Keystone
Destination signs.....	National Pneumatic
Door mechanism.....	Arthur power recorder
Energy saving device.....	Cleveland
Fare boxes.....	Flexolith
Finish.....	Paint
Floor covering.....	Tool Steel Gear & Pinion Company
Gears and pinions.....	Plain
Glass.....	Peacock Staffless
Hand brakes.....	Buffalo type
Hand straps.....	Railway Utility
Heaters.....	Crouse-Hinds
Headlights.....	Gray enamel and cherry
Headlining.....	Plain
Interior trim.....	Brill
Journal bearings.....	Electric Service Supplies
Journal boxes.....	Company, dome type
Lamp fixtures.....	Four GE-265-A, outside hung
Motors.....	Cream and blue
Painting scheme.....	Canvas
Roof material.....	Brill de luxe
Safety car devices.....	Westinghouse
Sash fixtures.....	Curtain Supply Company
Seats.....	29 1/2 in.
Seat spacing.....	Genuine leather
Seating material.....	Folding
Steps.....	Kasa
Step treads.....	Ohio Brass
Trolley catchers.....	Ohio Brass
Trolley base.....	More-Jones
Trolley wheels.....	Brill 76-E-1
Trucks.....	Railway Utility Company
Ventilators.....	30-in., chilled iron
Wheelguards.....	Root

Nation's Capital repeats on "Peacock" Staffless Brakes

Reg. U. S. Pat. Off.

Twelve new one-man, double-end, double-truck city cars have just been placed in service by the Washington Railway & Electric Co., Washington, D. C.

Built by the J. G. Brill Co., the new cars have a seating capacity of 49 passengers and are of semi-steel construction.

Not only in its Capital, but throughout the Nation, when new cars are ordered "Peacock" Staffless Brakes are usually found in the "repeat" specifications.

May we tell you why?



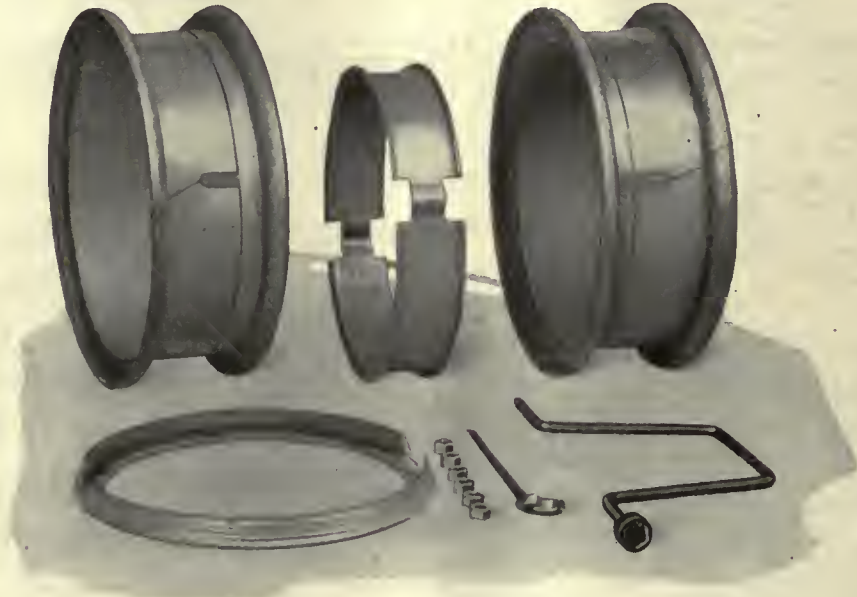
The Peacock Staffless

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

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

Demount your Truck Tires— In Half the Time, With Half the Effort, and only Half the Weight to Handle



with GOODYEAR TYPE "K" RIMS

Goodyear Type "K" Rims, made in two parts, an endless section and one split section, make changing pneumatic tires on trucks and buses an easy task—no trouble or strain. The tire is demountable at the rim and there is only half as much weight to handle.

Type "K" Rims are adaptable to all wheels, single or dual. They save tires by reducing brake drum heat through ventilated wheels. Though light in weight, these rims are powerful. When replacement is necessary, the cost is small.

Truck owners changing from solid or

cushion tires to pneumatics will find them *efficient, economical and practical*. They meet every possible requirement in truck or bus rims.

Truck manufacturers who wish to meet popular demand by equipping their trucks with Type "K" Rims will receive active cooperation from Goodyear engineers. These rims will be the standard for pneumatic tired trucks of the future.

Truck, bus and tire dealers should write *at once* to Goodyear, Akron, Ohio, or Los Angeles, California, for full information on this revolutionary rim equipment.

GOODYEAR

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Type K Truck & Bus Rim Equipment

Modern Cars

for increased earnings



With all the
Modern Features
the street car is becoming
the preferred method
of transportation

ON many properties, both city and interurban lines, new cars of the modern type are attracting more patronage and operating at less expense than the older cars they replaced. New cars will do the same on your property.



CUMMINGS CAR AND COACH CO.
111 W. Monroe St.
Chicago, Ill.



No. 392-A

Walkover

deep spring edge
divided cushions
divided concave
spring edge
back



*A seat that invites
even the most
discriminating!*

THIS H. & K. Walkover Seat No. 392-A with its wealth of comfort and its de luxe appearance, invites the most discriminating among passengers. An ideal seat for city lines! The 50 new cars for the Worcester (Mass.) Consolidated Railway are excellent examples of modern interiors fitted with this type of Hale & Kilburn Seats.

Whatever type of up-to-date seats you require—whether for city or interurban lines—whether for new cars and buses or for remodelled cars and buses—if you want the best get in touch with Hale & Kilburn. Hale & Kilburn seats set the highest standards of modern design, comfort, appearance and durability. *Write for latest Bulletins.*

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T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jeffries, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
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**Hale and
Kilburn SEATS**



The Tires Deluxe for Motor Buses—

More than four hundred bus lines throughout the country are profiting from Firestone experience and leadership in the bus tire field. This is the result of better engineering, better materials and absolute uniformity in quality and workmanship. Firestone's special mileage-building processes and methods, such as Gum-Dipping, are establishing remarkable records in every field of tire service—but especially in heavy duty bus service where stamina counts the most.

Every day, the safety and trouble-free performance of Gum-Dipped Tires are playing a vital part in main-

taining schedules, improving operating efficiency, adding to profits and strengthening the public Good Will.

No bus line in America can afford to ignore the work that Firestone is doing toward the advancement of Motorbus Industry. No matter what tires you are now using, nor where you are located, it will pay you to investigate Firestone equipment and the Firestone Proposal of Service, which Firestone Dealers are making available to operators at terminal points and intermediate stops along every main highway in the country.

MOST MILES PER DOLLAR

Firestone

Gum-Dipped **TIRES**

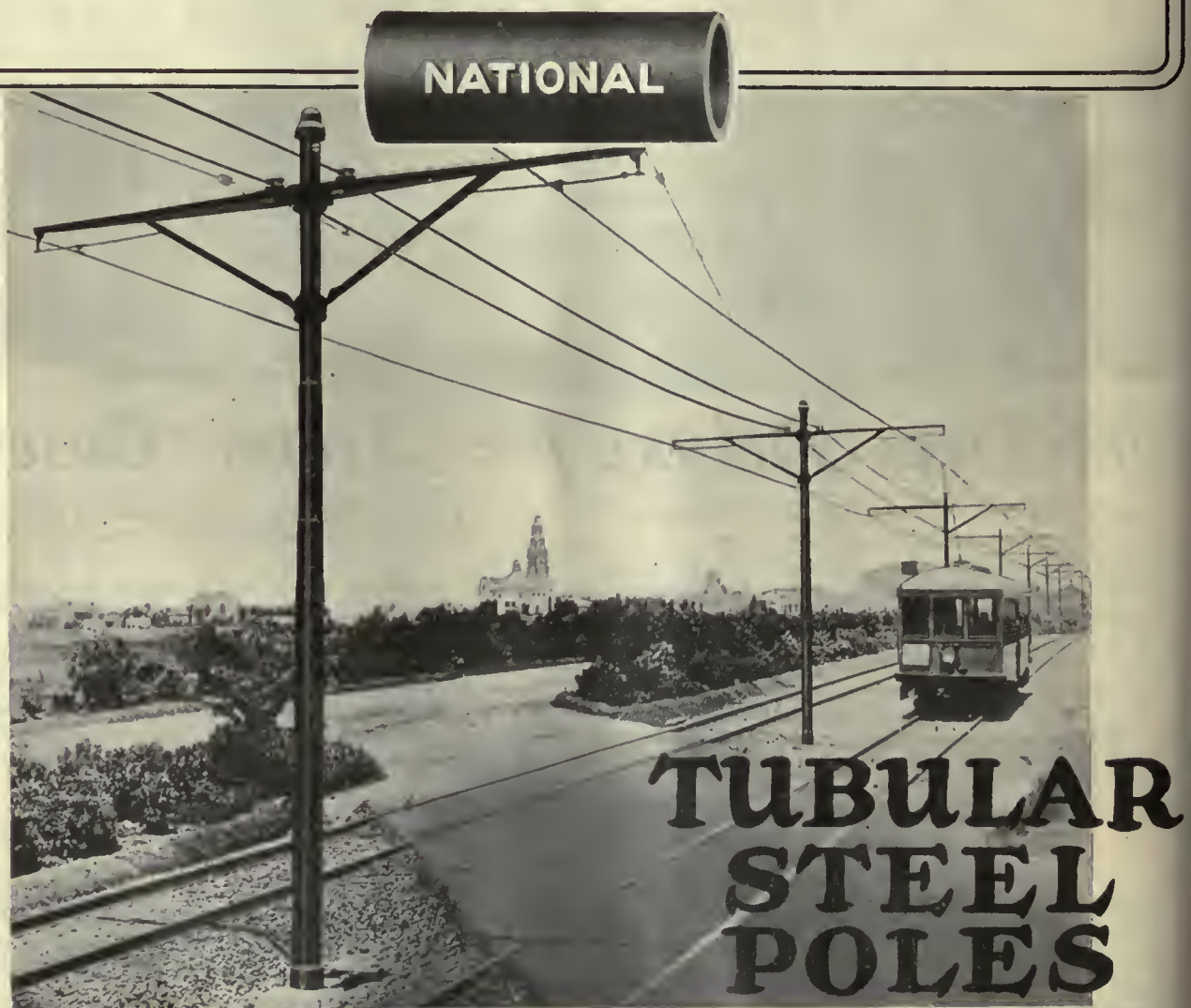
AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . *Harvey Firestone*

Preference from this standpoint

GENERAL dependability, the necessary factor demanded today in line poles, is represented in a high degree in "NATIONAL" Tubular Steel Poles—the principal reason for their preference by leading traction companies throughout the country.

Made by the largest manufacturer of tubular products in the world, by skilled workmen under expert supervision; put through severe tests which represent the hardest kind of service conditions—"NATIONAL" Poles include the desired advantages of durability—strength—low upkeep—and attractiveness—which make up general dependability in service.

Note in the illustration below the clean-cut, neat appearance which "NATIONAL" Poles give to this electric line. Our engineers will be glad to cooperate with you and offer suggestions concerning installation of these poles. Bulletin No. 14—"NATIONAL" Tubular Steel Poles—will be sent upon request.



TUBULAR STEEL POLES

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
District Sales Offices in The Larger Cities

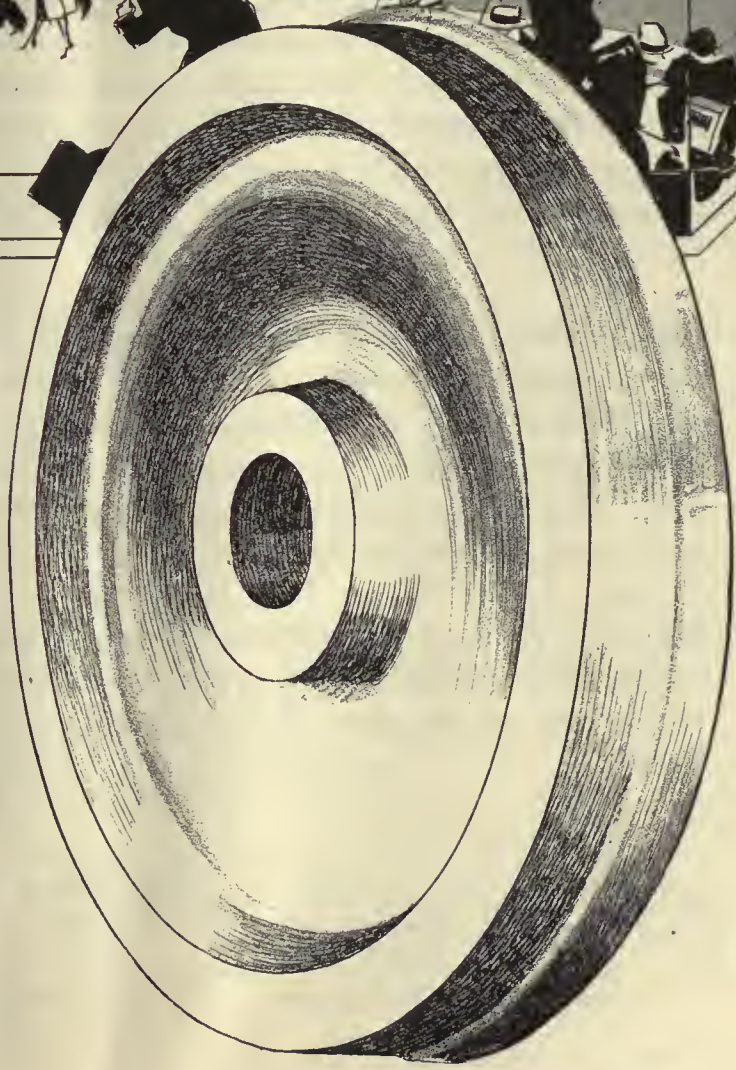


Underground, Overhead and on the Surface

Underground, overhead and on the surface the electric railway works to carry out its titanic daily task—the movement of a large portion of the city's population in the narrow confines of the rush hour.

In such circumstances *dependability* must be the first requirement of electric railway equipment. GARY WROUGHT STEEL WHEELS are designed, made and inspected with this requirement in mind. Our wheel engineers are at your service.

Illinois Steel Company
 General Offices: 208 South La Salle Street
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American Steel and Wire Company

A Bond of the Past

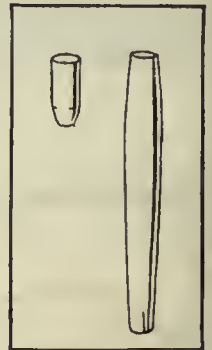


- of the Present - and of the Future

Various types of bonds have been developed to simplify installation without sacrificing performance, but none have met with greater favor than the Pin Terminal Rail Bond.

No cumbersome machinery or special tools are required to install this type of bond. A few blows from a hammer and the rail is efficiently bonded:—as simple as driving a nail. The only requisite for a lasting contact is a clean hole of proper size.

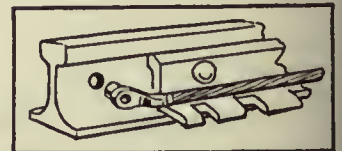
For the future:—high electrical conductivity and simplicity of application, assure extension of the use of Pin Terminal Rail Bonds.



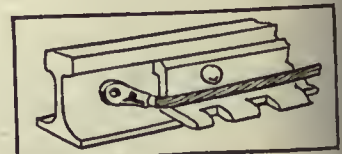
The pin and taper punch



The bond



The bond in position for application. Drive the taper punch through, then the permanent pin.



The bond installed. What can be easier?

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*United States Steel Products Co.

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A Public Indication to provide easy means of inspection and supervision.

Printed Ticket to reduce expenses, to enforce accurate records of fares and to prevent over-riding.

Printed Trip Sheet to furnish complete, unchangeable records of each trip showing each transaction handled.

Motor, to connect fare register with electric current, thereby obtaining fast, convenient and inexpensive operation.

Individual Operators' Keys to identify each operator with the fares he collects.

Flexible Amount Keys to furnish easy, convenient means of registering fares of any amount from 1 cent to \$9.99.

Kind of Fare and Zone number keys to identify the kind of fare collected and the points of loading and destination.

Repeat Key to speed up the loading of the car when several passengers get aboard at one fare point to go to the same destination.

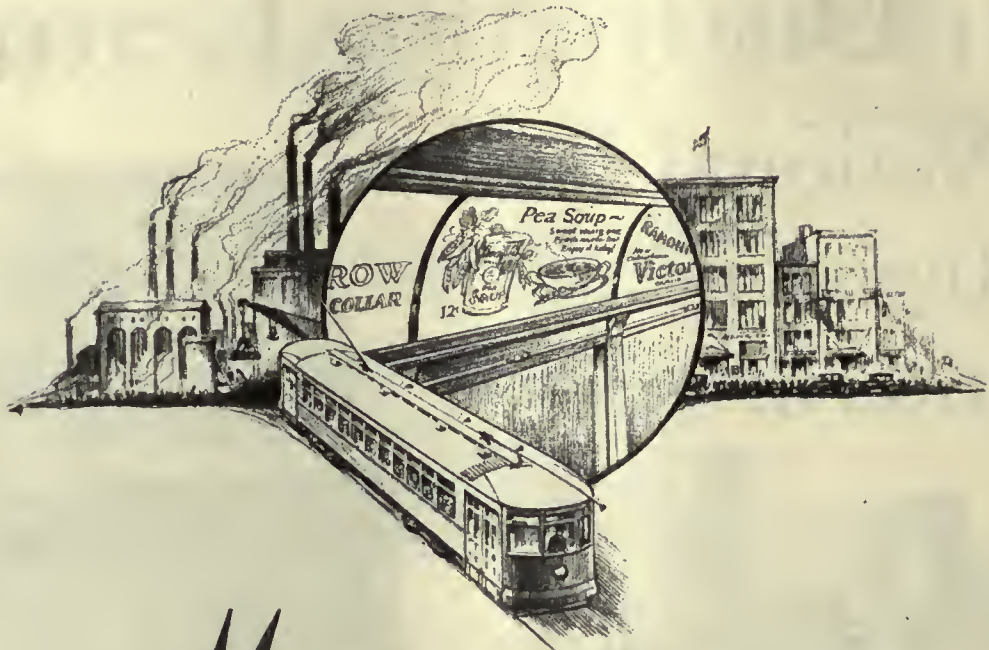
Printed Total to show the amount of cash that must be accounted for.

Small Size—to fit beside the operator within easy reach, but without interfering with entrance or exit passage way.

National Fare Registers are the result of long tests in the transportation field and are backed by nation-wide service.

National Fare Registers

Product of The National Cash Register Company
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TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



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To better handle the Summer peak—



- Brake Pins
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- Spring Posts
- Transom Chafing
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BOYERIZE!

Boyerized cars stay out on the road. Cars equipped with Boyerized Car Parts are equal to and meet the most severe service strains. Boyerized parts wear three to four times longer than ordinary hardened steel parts. Yet their cost is low!

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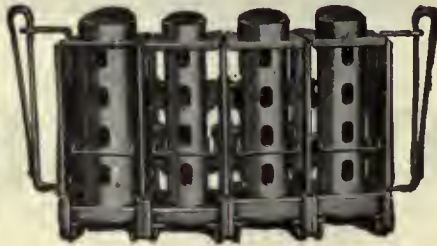
JOHNSON FARE COLLECTING SYSTEMS



Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

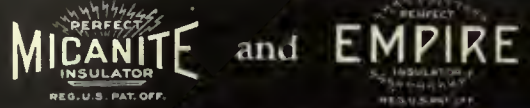
Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates. It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.



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Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings

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Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

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Preserved Ties
with Confidence

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Chilled Back of Flanges
For Street and Interurban
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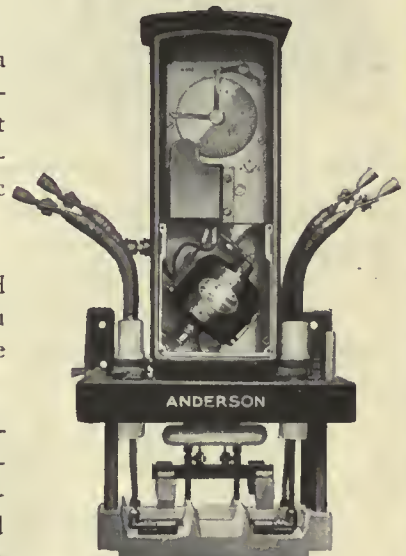
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There has been a substantial reduction in the List Prices of Anderson Automatic Time Switches.

We shall be glad to forward you the revised price list on request.

If you do not already have Bulletin No. 37, illustrating and describing these dependable Time Switches, we will be glad to forward you the bulletin also.



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HIGHWAY CROSSING SIGNALS



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NEW YORK DETECTIVES BOSTON

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DYNAMOTORS
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ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
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BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

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Double Register
Type R-11

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

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Railway Supplies and Equipment

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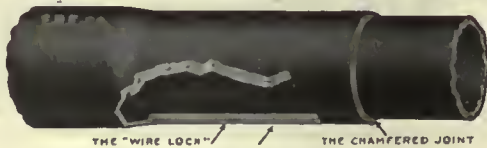
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THE "WIRE LOCK" THE CHAMFERED JOINT

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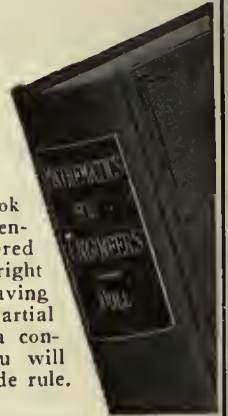
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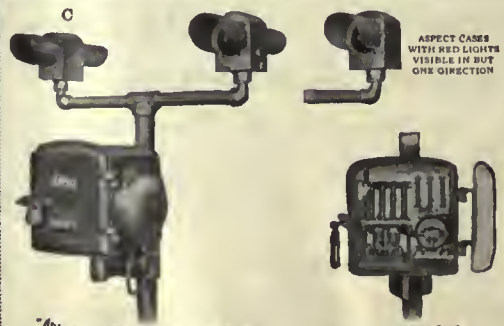
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(Continued on page 38)

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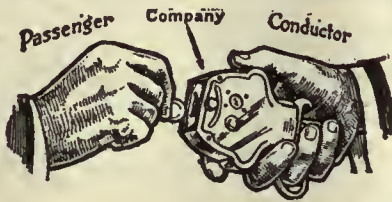
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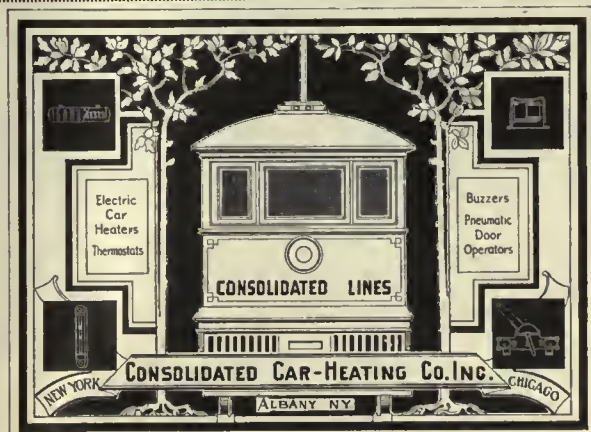
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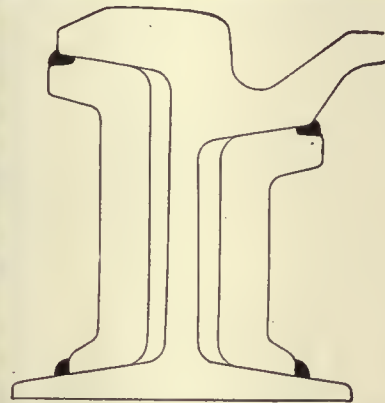


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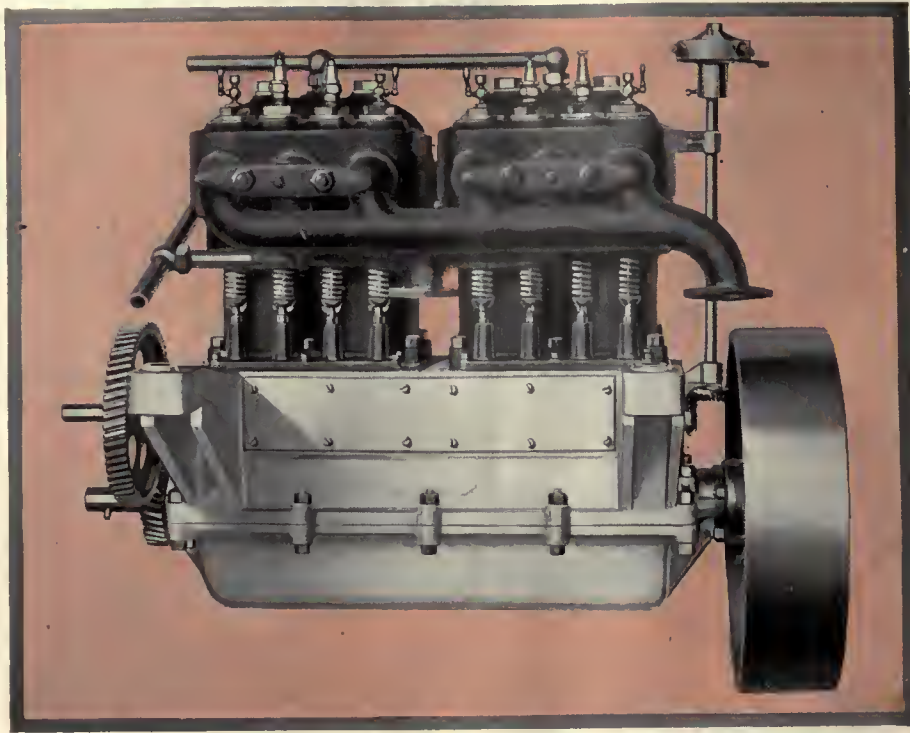
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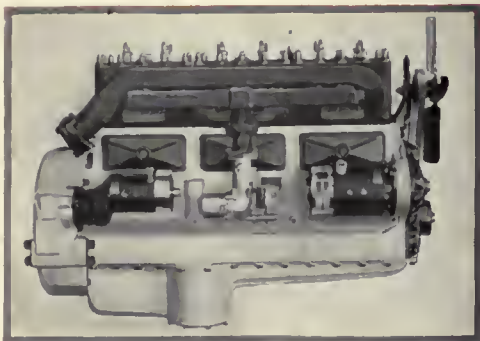


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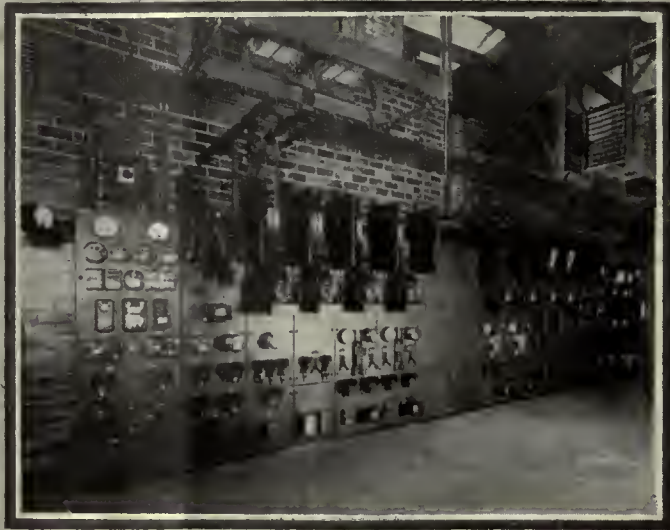


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SPEED is the demand in present-day methods of transportation. Automobiles and busses have attained their present popularity through ability to meet this modern and imperative demand.

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Westinghouse automatics have proved over a period of years, that they do increase scheduled speed by maintaining proper trolley voltage conditions at all times. Their superior features of design are responsible for the success of Westinghouse automatic substations.

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1928

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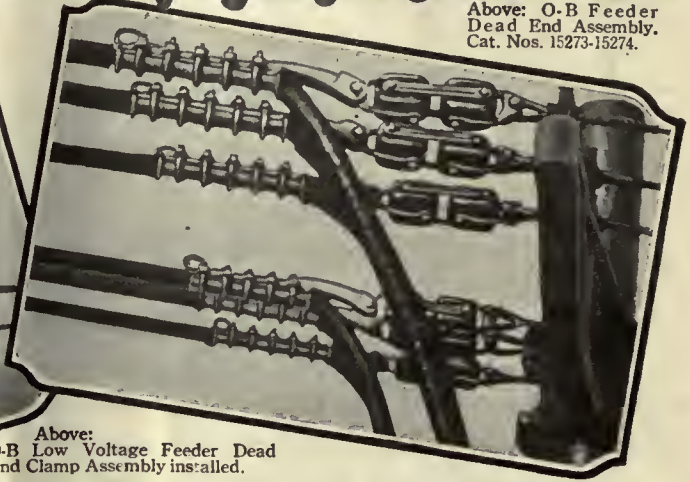
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Above: O-B Feeder Dead End Assembly. Cat. Nos. 15273-15274.



Above: O-B Low Voltage Feeder Dead End Clamp Assembly installed.



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Considering that only 1% saved in operating expenses adds nearly 20% to net income, the importance of taking advantage of many possible small savings is readily apparent. O-B Low Voltage Feeder Cable Clamp Assemblies afford another opportunity to cut operating costs.

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1. Eliminates serving, soldering, and taping of cable at dead ends.
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BETTER RAIL, BETTER TRANSPORTATION

Abso- lutely!

“A new car will prove no more satisfactory to the travelling public when operated over poor track than a 1928 automobile if operated over a poor highway full of holes and ruts. It may not be as fashionable, but it is certainly more comfortable and less aggravating to ride in a rattling “Lizzie” over a smooth concrete road than in a luxurious, expensive limousine over a rough highway. It is a matter of common, every-day observation that automobile drivers shun a highway in poor condition and will go miles out of their way to use a road in perfect condition. A part of this phenomena is to be explained by the desire for speed, but the basic reason is the insistence upon a comfortable ride.”

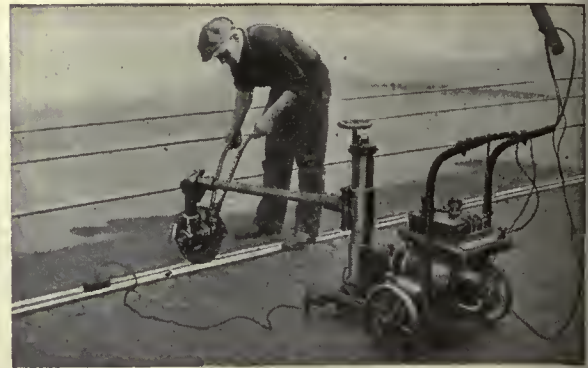
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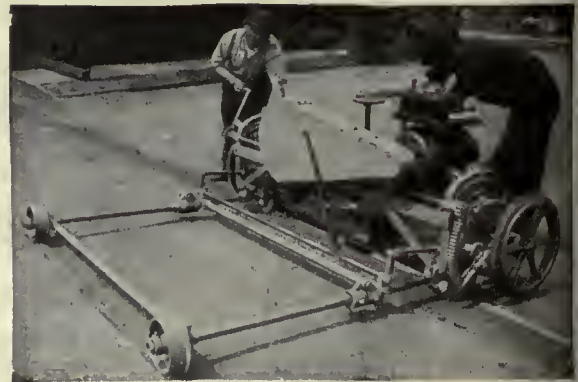
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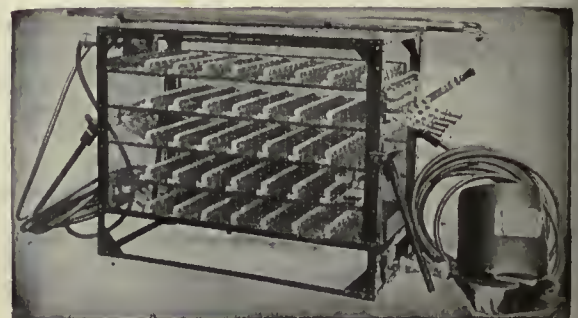
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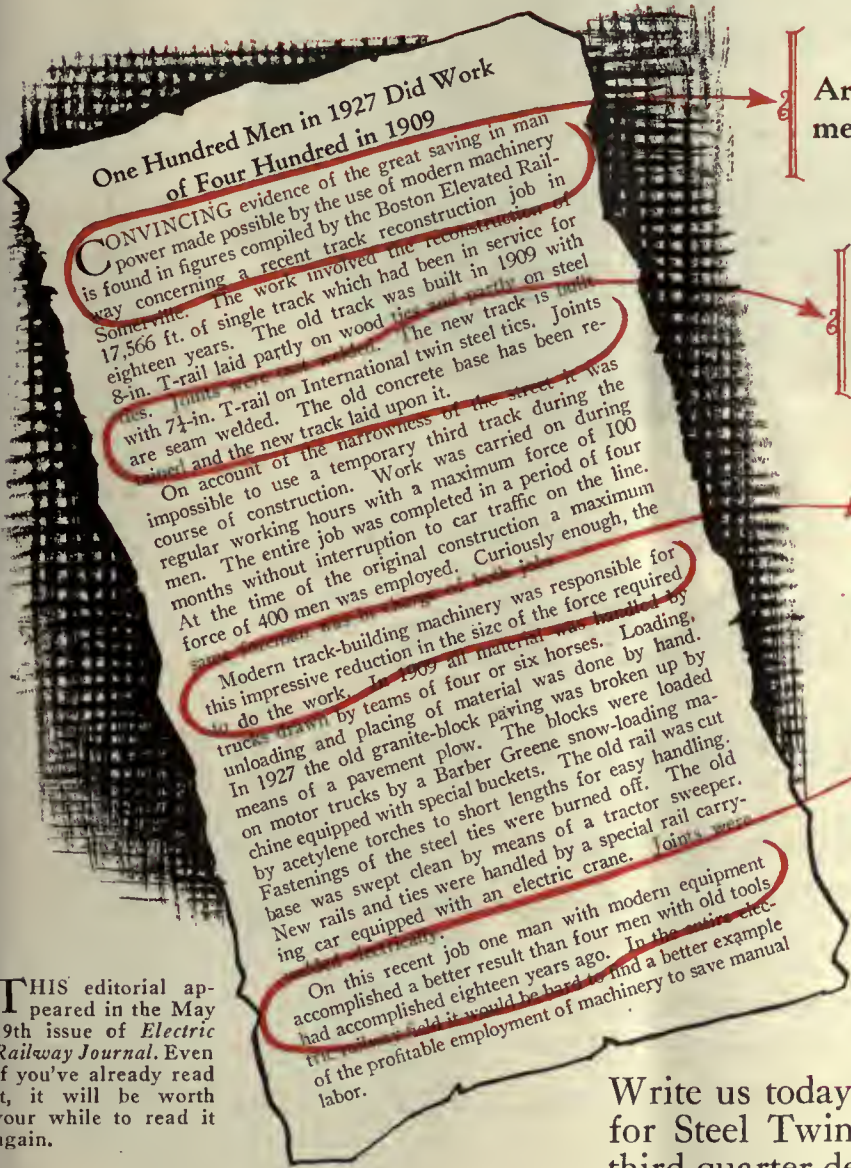


“Ajax” Electric Arc Welder

⊕ 2330

BETTER RAIL, BETTER TRANSPORTATION

READ THIS EDITORIAL



One Hundred Men in 1927 Did Work of Four Hundred in 1909

CONVINCING evidence of the great saving in manpower made possible by the use of modern machinery is found in figures compiled by the Boston Elevated Railway concerning a recent track reconstruction job in Somerville. The work involved the reconstruction of 17,566 ft. of single track which had been in service for eighteen years. The old track was built in 1909 with 8-in. T-rail laid partly on wood ties and partly on steel ties. The new track is laid with 7 1/2-in. T-rail on International twin steel ties. Joints are seam welded. The old concrete base has been removed and the new track laid upon it.

On account of the narrowness of the street it was impossible to use a temporary third track during the course of construction. Work was carried on during regular working hours with a maximum force of 100 men. The entire job was completed in a period of four months without interruption to car traffic on the line. At the time of the original construction a maximum force of 400 men was employed. Curiously enough, the

Modern track-building machinery was responsible for this impressive reduction in the size of the force required to do the work. In 1909 all material was handled by trucks drawn by teams of four or six horses. Loading, unloading and placing of material was done by hand. In 1927 the old granite-block paving was broken up by means of a pavement plow. The blocks were loaded on motor trucks by a Barber Greene snow-loading machine equipped with special buckets. The old rail was cut by acetylene torches to short lengths for easy handling. Fastenings of the steel ties were burned off. The old base was swept clean by means of a tractor rail carrying New rails and ties were handled by a special rail carrying car equipped with an electric crane. Joints were

On this recent job one man with modern equipment accomplished a better result than four men with old tools had accomplished eighteen years ago. In the entire electric railway field it would be hard to find a better example of the profitable employment of machinery to save manual labor.

- Are your track construction methods modern?
- Are you using the modern methods of saving old concrete base with Twin Ties?
- Are you using modern track building machinery?
- Are you using *four* men where *one* will do a better job?

THIS editorial appeared in the May 19th issue of *Electric Railway Journal*. Even if you've already read it, it will be worth your while to read it again.

Write us today for delivered prices for Steel Twin Ties for second or third quarter delivery, and let us tell you about modern track building machinery.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

Steel Twin Tie Track

THE BASE OF MODERNIZATION



Clasp Brakes Speed Subway Operation

In no other service does railroad traffic density approach that of the subways.

Trains accelerate rapidly; they must decelerate the same way. To this end Clasp Brakes are a necessity.

With two brake shoes per wheel instead of one, the Clasp Brake produces the maximum retarding effect, with minimum wear and tear on truck and journal parts.

The Simplex Multiple Unit Clasp Brake affords smoother braking with less heating of brake shoes and reduces the number of "slid flat" wheels. It is an essential part of modern electric railway equipment.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



Simplex Multiple Unit Clasp Brake
for Motor Trucks



This combination ends many trolley worries

Samson Spot Trolley Cord

Here's a trolley cord that has been made especially to meet *all* the conditions of exposure found in electric railway service. It is smoothly braided, pliable, waterproof, uniform in thickness and guaranteed free from rough places. It will not kink, swell or shrink, is free running and will give years of wear. You'll know it by the colored spots.

Combine this famous trolley cord

—and Keystone Trolley Catchers

and you have an unbeatable combination.

New Type Keystone Trolley catchers have several new and important features to insure long life and positive action. There is a new universal oiling system with a large oil reservoir; larger rope capacity and a larger reel; increased size of openings to allow free movement of the rope and a simpler method of rope attachment. Positive catch when the trolley leaves the wire is assured by a new method of mounting pawls.

Write for further details on the Keystone Trolley Catcher and Samson Spot Cord.

Home office and plant at 17th & Cambria St., PHILADELPHIA; District office at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.



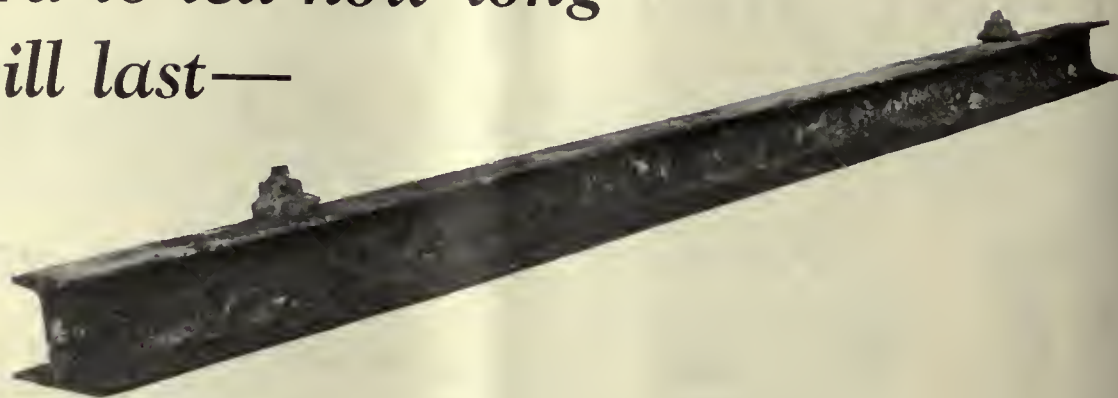
ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

AND INDUSTRIAL ELECTRICAL MATERIAL



*It's hard to tell how long
they will last—*



The unretouched photograph above shows a Carnegie Tie, just as it was taken from the road-bed, after eighteen years of service. The chief engineer, in charge of the reconstruction work, stated the ties were in excellent state of preservation after this long time, and both ties and clips were in fit condition for rail renewal.

Service records like this, and we have many others in our files, prove the wisdom and economy of laying track on a permanent foundation. The unit cost (cost per foot of track per year) is less than for wood ties. The use of these ties also insures a smooth-riding, repair-free track that will attract patronage and aid in securing the satisfaction of passengers.

CARNEGIE STEEL COMPANY
PITTSBURGH, PENNA.

**Carnegie Products
for
Electric Railways**

Steel Cross Ties

Standard Rails
and Rail Joints

Wrought Steel
Wheels

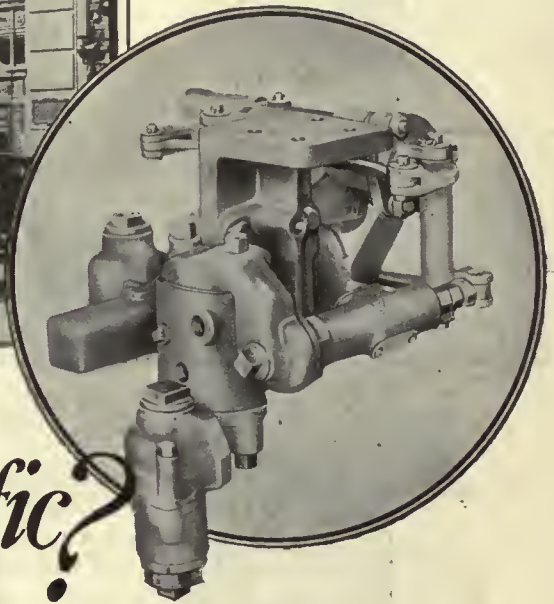
Forged Steel
Axles

Steel Shapes,
Plates and Bars

CARNEGIE
STEEL CROSS TIES



The Westinghouse Variable Load Brake is an attachment for use with straight air or semi-automatic equipments by means of which the brake cylinder pressure is automatically adjusted as the car weight changes, to provide the same retarding effect throughout range of passenger load.



Can your cars lead the traffic?

WHEN thoroughfares are congested . . . when other vehicles are contending for the right of way . . . when traffic demands are greatest . . . are your cars as mobile as other conveyances that use the streets . . . can they lead the traffic rather than lag behind?

They can if equipped with the Westinghouse Variable Load Brake. This modern brake for modern cars is as effective on loaded cars as on empty cars and assures uniformly short stops under all conditions. It furnishes adequate control to enable cars to hold their place in the traffic stream.



Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for your new cars.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

TIMKEN *Tapered Roller*



SELF-PROPELLED cars, trolley cars and railroad cars have totaled millions of miles, in revenue service, on journals equipped with Timken Bearings. The record is clear that utmost power and maintenance economies demand Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS*, and Timken electric steel—the exclusive combination for highest endurance in anti-friction bearings.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

BEARINGS

To Those Who Have TREADLE-IZED

IT WILL develop new riders and please your present riders if you feature your treadles in your public relations work. A treadle, you see, is more than "just a piece of new equipment." It is an advertisement for your property.

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TREADLES



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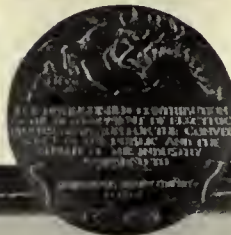
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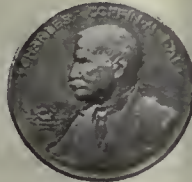
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The Charles A. Coffin Medal awarded to the Grand Rapids Railway Company, Grand Rapids, Mich.



CHARLES A. COFFIN FOUNDATION

ESTABLISHED BY GENERAL ELECTRIC COMPANY

FOR THE ADVANCEMENT OF THE ELECTRICAL ART

AWARDS

THE CHARLES A. COFFIN MEDAL

TO

GRAND RAPIDS RAILWAY COMPANY

IN RECOGNITION OF ITS DISTINGUISHED CONTRIBUTION DURING THE PAST YEAR TO THE DEVELOPMENT OF ELECTRIC TRANSPORTATION FOR THE CONVENIENCE OF THE PUBLIC AND THE BENEFIT OF THE INDUSTRY.

CHARLES A. COFFIN PRIZE COMMITTEE OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

W. H. C. ...

CHAIRMAN

CLEVELAND, OHIO, OCTOBER 4, 1927

W. W. ...
SECRETARY

The Grand Rapids Railway Company

—Another CHARLES A. COFFIN AWARD WINNER that uses TEXACO Lubricants

IT is a big thing for the Grand Rapids Railway Company to have won the coveted Charles A. Coffin medal for its distinguished contribution to the development of electric transportation.

It is also a big thing to us.

The Grand Rapids Railway Company uses TEXACO Lubricants—TEXACO Electric Car Oils,

TEXACO Electric Railway Compressor Oil and TEXACO Crater Compound.

We, of The Texas Company, cannot detract from this Railway's splendid achievement. Indeed, we can only add to its glory (and gladly) by proudly and publicly congratulating the Grand Rapids Railway Company.

This Company is the second Coffin award winner that uses TEXACO Lubricants. The other is the Penn Ohio System.

By far the greatest quantity of lubricants used on Electric Railway Lines throughout the United States are TEXACO Electric Railway lubricants.



THE TEXAS COMPANY

Texaco Petroleum Products

Dept. E6, 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES





—the Upholstery
that invites and
holds patronage
—saves and serves
as only this regal
Mohair Velvet can



Chase VELMO — Made by Sanford Mills, Sanford, Me.
L. C. Chase & Co., Selling Agents, Boston
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Carey Elastite System of Track Insulation—a guarantee of easier riding for America's city millions. Recommended by street railway officials everywhere.



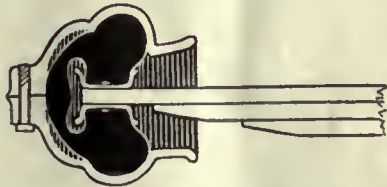
ELECTRIC transit ... a step in advance of the automobile

PASSENGER comfort!
Competition for passenger traffic!

And now the higher priced automobiles come out with rubber-set springs—spring shackles replaced by blocks of solid rubber. Today's improvement, in the automotive field.

But *today's* improvement, for the auto, is *yesterday's*, for the trolley!

For street railway companies, you know, have for years set their rails in yielding cushions of shock-absorbing asphalt. A step in advance of the automobile—a safeguard for street car supremacy.



The use of solid rubber blocks to replace spring shackles—today's improvement in the automotive field.

Carey Elastite System of Track Insulation! Easier riding for America's city millions. An un-failing means of maintaining passenger traffic. Smoother, more quiet

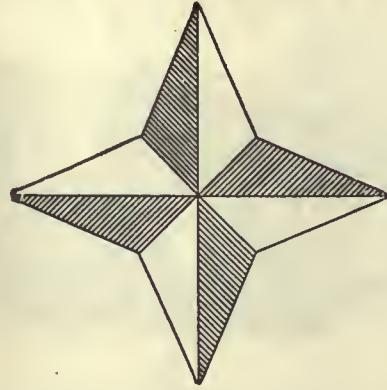
operation—a saving in railway maintenance and a route to faster schedules.

Carey Elastite System of Track Insulation, as you know, consists of a durable, asphaltic compound substantially reinforced with asphalt-saturated fibre pre-formed under heavy pressure. Its use is recommended by leading street railway officials in more than 150 cities, large and small. Of course you will want full information on this modern traction improvement. Write.

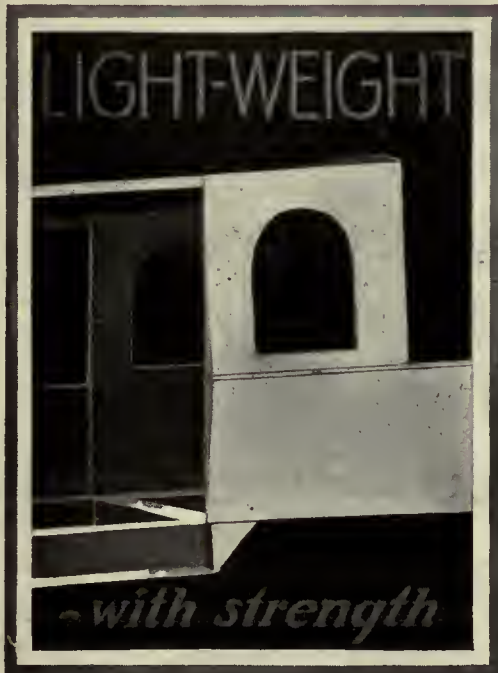
THE PHILIP CAREY COMPANY, Lockland, CINCINNATI, O.

Carey Elastite
SYSTEM OF TRACK INSULATION





It will prove profitable to **KNOW** how we have reduced weight and retained strength



When the time comes that you are close to the subject of purchasing new cars we want you to have all the details of Cincinnati **BALANCED LIGHTWEIGHT** Car construction.

We want you to be intimately informed on the economies we have brought about through modern engineering and modern construction—to know how lightweight steels and the liberal use of aluminum have reduced weight and retained great strength. When may we present the data?

CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI **BALANCED LIGHTWEIGHT** **CARS**

The Four Features of BALANCED DESIGN are the Cardinal Points of Today's Demand



How long can you afford to put off buying equipment that is yielding more than 25 per cent annually? Modern cars are consistently earning this, and more, for progressive properties.

An investment that returned 40 per cent

The Toledo and Indiana Railway in November, 1924, replaced nine old cars weighing 32 tons each with seven modern light-weight one-man cars. In two years these cars have covered approximately 1,050,000 miles.

The new cars reduced maintenance costs 2.01 cents per car-mile, power costs 4.2 cents per car-mile, and platform expense 1.7 cents per car-mile even though there was an 8 cents per hour wage increase on account of one-man operation.

A review of actual operating costs reveals that an investment of \$105,000 is saving annually:

Maintenance of equipment	\$10,060
Power	23,824
Operators' wages	8,784
Total Savings	\$42,668



Reliability, so vital in railway operation, is not sacrificed in the equipment which General Electric produces to effect reductions in car weight. The GE-265 motors, K-35 control, and CP compressors on these new cars are daily proving this statement, as the T. & I. will testify.

330-52

GENERAL ELECTRIC

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

Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
Street Railway Journal and
Electric Railway Review

CHARLES GORDON
Editor

Volume 71

New York, Saturday, June 9, 1928

Number 23

Enlivening the Cold Figures

EXECUTIVES surveying the various phases of their company's activities are called upon to study them principally from cold figures. These figures are almost always accompanied by discussions of the trends but these, too, frequently lack the vital punch. The executive may pore over them for hours and at the end of the period be very much in the dark as to the actual trends. At best, he is likely to gain a conception of the results for the past two weeks or two months only, and does not get a picture of the activities for a sufficiently long period to draw really worthwhile conclusions. As a result, he is handicapped in making recommendations or issuing orders for much-needed improvements.

It is particularly difficult when making a special study to have to resort to plain figures. For example, in analyzing the causes of claims for merchandise damaged in transit, if each claim merely was listed with its cause, no very definite conclusions could be drawn. However, if this same information was summarized in a table with the figures totaled for similar causes for each commodity and for all months over a period of a year or more, and these data presented in a carefully prepared table or even plotted on charts, an extremely valuable analysis could be made. Likewise, it would be difficult to make a train-service check over any extended period of time without actually putting down in table form the data on each train for each day, including the number of cars scheduled, the number actually operated, and how many were in excess of schedule or needed in addition to the number actually run.

Companies that are making use of charts and graphs to study the figures for the various activities are reaping much benefit. An excellent example of what can be done with charts is afforded in the experience of the Chicago, North Shore & Milwaukee Railroad, which makes extensive use of them. An article in this issue describes a few of the many forms of tables, charts and graphs used by this company. The success which the North Shore has had with them indicates that they hold many possibilities for other systems, too. The company has realized much improvement in service and has reduced many of its operating expenses because the charts made it possible for the management to get a true picture of the various trends. Also, the practice of using these charts before the department superintendents and their supervisors and foremen, brings to these leaders the actual facts and causes them to realize that all improvements or shortcomings in their respective departments are being noted.

The energy consumption curves used by the North Shore management were very effective in reducing the power demand. The curves were studied periodically by the general manager, the superintendents of the several divisions and finally by those in charge of the motormen. Records were kept of the performance of each individual motorman, and those who were not showing any improve-

ment, or who were getting careless in handling their trains, were given further instructions. The result was that during the first nine months of 1927 the kilowatt hours per car-mile figure was reduced from 2.92 to 2.63. This saving is typical of others made possible by using charts.

Many forms of graphs and tables can be used to show the widely varying phases of an electric railway's operation. There are, however, certain forms which are more suitable for particular subjects and the management must be careful to select the most effective form. The North Shore employs a great many forms of charts, and much of the success in their use of them can be attributed to their careful selection.

Many other companies are making use of charts in various forms, but hardly any are using them to full advantage. There are many possibilities in connection with their use and managements will profit by investigating them thoroughly.

A New Kind of Transportation Needed

MASS transportation of the kind to which the public has become accustomed and which has been developed by the advent of the street car, will always be in demand. But there is plenty of information available to show that mass transportation is only one of the forms of service that can be rendered for carrying people from one point to another. Bearing on this point J. W. Swaine of the United Railways & Electric Company of Baltimore, in an article in this issue, points out that there are trends in riding irrespective of the fare. In other words, since the rank and file of the urban population have become as prosperous as they are today they will ride the cars, regardless of the fare, if the service provided is the service they want. If not, they will seek some other means of travel and pay for it.

Before regulatory bodies the plea made by the company for a particular rate of fare almost invariably is based on the actual cost of the then existing service. Thus there is no incentive to determine if there is some other kind of service that will appeal to the public and so produce an additional number of riders or a greater income from the individual rider. In other lines of business there is unlimited proof that a change has come in the demands of the public. Economists may rave about extravagance in women's dress, but try, if you will, to buy a pair of cotton stockings in any metropolitan store! Try to find a 10-cent movie in any city! Try to get a 5-cent sandwich! Not only has the price gone up because of higher cost, but the quality has been improved to meet the demands of an ever-insistent public.

In transportation, of course, there have been more radical changes than in many other industries, because of the development of the automobile. But the automobile has not robbed its owner of the ability to buy

other things. Least of all has it deprived him of the desire for more transportation. Rather has it whetted his desire for more transportation. Even with the drive for "two cars to a family" there are many times when it is neither necessary nor desirable to use the auto. In the average family, with its members going to various destinations for the day's work or the evening's pleasure, it is not possible for one vehicle to serve all.

What is needed is not more mass transportation of the type we have known in the past, but development of a type of transportation that people will want to patronize in the future. Whether it will be by street cars or by some other medium is a problem to be worked out, not in the future but now. The modern street cars that are being tried in various places are part of the solution, but even modern cars used in the old-established way will not qualify to fill all the demands of the public. What is needed most is a thorough study to determine what the people will buy in the way of transportation. With that type of transportation to sell, the railway will not have much difficulty in getting the right to furnish it, and at a price that will be remunerative.

Consider the Customer-Owner Carefully in Conversions

BANKERS and utility company executives can ill afford to ignore the bearing which the present disposition to call in high-grade preferred stocks has on the matter of public relations. The theory is correct that in periods of easy money the effort should be made to redeem both high interest bonds and high dividend-bearing preferred stock, but as a writer in the *Electrical World* points out, thousands upon thousands of customers and employees are facing the problem of reinvesting the proceeds of preferred stocks now being redeemed at stated call prices. Probably most of these security owners are reaping a profit on the purchase price of their holdings, but to them the process of conversion or retirement is one with which they are not familiar. A definite reduction in income from the one now being received from preferred issues stares them in the face, and the course for the customer or employee owner to follow needs sympathetic consideration by the investment banker and by the utility man concerned in the distribution of company securities.

The utility company which has conducted vigorous customer-ownership campaigns may well do what it can to send its preferred stock holders financial explanations which will enable them to understand the situation and in the long run to suffer as little as possible from a change due to the working of the unchangeable law of supply and demand. Where the operating or holding company has sought investment money from customers or employees, it now has a real opportunity to perform an important task in public relations by helping its investors to adjust themselves to the new conditions. That all of the companies are not taking advantage of this opportunity is shown by the perfunctory tenor of call notices issued by some of the utilities. True, various incentives to invest in lower-rate preferreds are being offered holders of called stocks, but that has not always been so. In many cases the preferred stock holder need lose little or no income if he "switches" with intelligence, and opportunities still exist, indeed, for actual increase of total income through purchase of listed equities. For others

the possibilities of bond appreciation should not be overlooked. There is no need to embark on a program of responsibility for advice concerning investments, but the opportunity exists for the utilities to build warm business friendships with customer and employee owners during this transition period in security values. Certainly the utilities should be careful not to do anything that will tend to destroy the spirit of good will engendered in the past by their intelligent handling of the customer-ownership plan.

Twenty-five Years of Accomplishment in New Jersey

IT IS no mere flower of speech to say that New Jersey is a diamond mine richer than Kimberley. Comparatively speaking, the state has just begun to grow. In the near future a vast community will exist between the Hudson and the Delaware Rivers. These natural barriers have only recently yielded to the work of man in tunnels and bridges of which the present evidences are merely the beginning. All this means obligation for the Public Service Corporation of New Jersey and its personnel, but that corporation, through its officials, is fully conscious of the responsibility imposed by the growth of the territory served.

As Owen D. Young said at the dinner to President McCarter which marked the high point in the celebration of the 25th anniversary of the founding of the corporation, in imagination is the leadership of the world. The founder of the New Jersey company certainly had imagination. But a corporation can be no more articulate than is its personnel, and it is the accomplishment of the Public Service personnel, from the president down, that marks the corporation as worthy of the trust a whole state has reposed in it. Among the many things which illustrate this is the loyalty of all the employees, best evidenced perhaps by the 750 of all ranks eligible for the 10 per cent salary bonus which Mr. McCarter himself announced as a slight token of appreciation to all employees who have been with the company since its inception.

There have been trials and tribulations in New Jersey, many of them, but through prosperity and adversity the officers and employees have been dominated by the purpose to make the vision of the founder of the company a reality. That is a never-ending task, since the vision of the founder is a vision that constantly sees ahead. As tangible evidence of that vision there is the \$293,000,000 expended by the corporation on its system since the company was founded in 1903. But even that amount will seem small by comparison with the sum that will undoubtedly go into the property in the next 25 years.

In the past the transportation problem has caused the company concern, but with the co-ordination of trolley, bus and de luxe bus on a statewide scale and the more recently indicated disposition even to go into the taxicab business, the solution of that problem appears to be at hand. The New Jersey company is a striking instance of the fact that public utilities have assumed a place in the social structure second in importance only to that of the government. That the officers and the rank and file of the Public Service Corporation recognize fully that the interdependence of the people and the utilities becomes greater as the extent of the service grows and its uses multiply is proved by the record of their accomplishment.

Opinions Differed in Key System Fare Case

JUST how much nearer is a solution of the fare problem on the Key System Transit Company than it was last fall remains to be seen. An advance has been allowed in commutation rates, but the so-called local fares have been kept by the commission at 7 cents, and the single-trip ferry fare at 21 cents. The plea of the company was for a 10-cent local fare and a 25-cent single ferry fare. Apparently the commissioners were reluctant to throw an added burden on ferry riders and they appear to have agreed that the company would not benefit by a 10-cent local fare. In fact, one of the commissioners expressed the opinion that the company would probably have been better off had it retained the 6-cent fare, since there were more than 4,000,000 fewer riders in the first seven months after the increase to 7 cents. This very result appears to have been the determining factor in the recommendation of the commission last November that the company experiment with a 5-cent zone plan. To this proposal the company demurred. Coupled with the suggestion of the commission at that time was a 10-cent cash fare, a \$1 weekly pass, and an off-peak 5-cent cash fare between the hours of 9 a.m. and 4:30 p.m. A \$1.50 weekly pass good in two or three zones also was part of this plan. The disposition of the commission in its latest ruling was to criticize the company for its unwillingness to adopt the experimental fare suggested by the commission.

It must, of course, be acknowledged that fare experiments are fraught with danger, particularly since the opportunity for the carrier to recoup any losses is always so remote. On the other hand, it would be priceless to know in any particular situation just what had better be done. And that cannot be determined without recourse to experiment. According to Mr. Swaine's article elsewhere in this issue, fare is not the chief factor affecting travel. Even the doctors disagreed in the recent Key System case. As one of the commissioners put the matter, "competition and economic conditions have become far more potent than the order of any regulatory body such as the Railroad Commission." The further point made by one of the commissioners also is admissible, that to a very large extent the riding public, by its disposition to use or reject service, fixes and determines the rate of fare. Certainly the variety of the service rendered by the company and the disposition of the residents of the territory to constitute themselves into units tend to complicate the situation on the Key System.

Widening Horizons

WHEN a group of railway accountants held a committee meeting the other day in a central western city it presaged little out of the ordinary. It was supposedly just one of the necessary business sessions devoted to preparing a program for a forthcoming convention.

With their immediate business dispatched promptly, these men chose to linger for discussion; chose to abandon for the moment consideration of matters strictly within their profession and to view instead the broad problems of the transportation industry in which they were engaged. And as sometimes happens when men pause to take stock of themselves and of their immediate activities, this group soon became inspired with the idea that they might

be of greatest usefulness to the industry by disregarding for the nonce the details of their profession and devoting themselves to a search for new and untried methods of securing business for their companies.

While several very promising ideas were born of that meeting and arrangements are already under way to adopt at least one of them, the outstanding thing remains that these men gained a broader vision of the part they might play in improving the affairs of their companies. Beyond the existing boundaries of their present program of work they envisioned a broadening horizon of usefulness for the accountant through the application of accounting experience to the outstanding problem of the industry—that of building revenue in the face of a constantly increasing swarm of private automobiles. Let us hope that other groups in the industry will take it upon themselves to match these accountants in spirit and viewpoint.

Successful Selling Requires a Constant Search for Buyers

WHEN electric railways undertake to employ advertising for the several purposes to which it may be adapted, they accept the obligation to produce as advertised. Although the ride, whether by car or bus, is a salable product, its character varies widely on different properties. Advertising becomes impotent when its promise outreaches performance. Nor can advertising used to inform the public regarding transportation matters be expected to work miracles in changing public opinion overnight on a question in controversy.

Advertising, to be effective, must be sincere and it must stay within the facts. When used to sell a product it puts upon management and employees the obligation to produce as advertised. When employed to disseminate information, ample time must be allowed for the public to absorb the message; the various facts of the railway story must be told and retold, regularly and persistently.

Speaking before the Illinois Electric Railway Association several weeks ago, E. E. Soules, publicity manager Illinois Power & Light Corporation, said that the modern manager has learned that it is futile to rush into print and to expect the public to join in the mourning after his company is in trouble. Co-operation and understanding can be expected only if he has been telling the public all along his hopes and ideals and the facts of his business.

In this merchandising age electric railways, like other industries, must recognize that the advertising specialist can do his work effectively only when given the opportunity to plan a consistent campaign over a period of years. It is true that advertising tends to bring about improvement of the product. It does so through the effect the promise of good service has upon the attitude of the company's own employees. But, to repeat, the promise must not over-reach the actual performance—otherwise the advertising becomes not only dishonest but ridiculous as well.

Granted a really worth-while product, the creation of new customers is dependent on constant and compelling reiteration. The qualities of the Gold Dust Twins or Palmolive Soap are well known only because they have been far more than twice-told tales. The same principles apply in the merchandising of railway rides. The search for buyers must be constant, consistent and cumulative.

Graphs Assist in Lowering Costs and Improving Service

North Shore management uses charts to study work of its several departments. Merchandise handled, wages, passenger service delays, equipment costs and energy consumption are some of the items charted

By J. R. Blackhall

General Manager Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

EXTENSIVE use of graphs is made by the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., to check the work of its several departments and the activities of the company as a whole. Their use has enabled the management to analyze the regular reports more closely, with the result that many economies have been effected and several service improvements made.

In the merchandising dispatch department the tonnage has been increased, station labor reduced, more efficient methods of handling adopted, the cost per ton for handling reduced and the general movement of freight accelerated. In addition, tables showing the causes of damage to commodities and the kind of commodities for which claims were entered, have enabled the company to reduce its total amount of claims an appreciable amount. Passenger train delays have been reduced to a minimum and revenue built up because of the improved service. Electrical energy has been saved not only on the short runs but also on the long runs of both the passenger and freight trains. Other accounts also have been reduced and budgets have been planned more closely. In many other ways the charts have aided in effecting economies.

Figures for plotting the graphs are secured from regular reports submitted by the department heads and from the records of the company. These graphs, especially those dealing with budget control, are presented to the budget and expense committee, which meets every second Tuesday. Here, before all the department heads, the general manager reads from the tables and graphs the record, by accounts, of each department for the month and the period to date.

Any account showing an unexpected fluctuation is questioned and if the department head cannot at once explain this, he finds and reports later the reason for the deviation from the budget. After a careful analysis by this committee the information is distributed among the department chiefs or used to illustrate talks given before the superintendents as a group. Department heads, in turn, use them in talking before their supervisors and foremen. Many phases of the work, such as freight handling, train delays, passenger revenue and energy consumption, are discussed before the groups at regular intervals.

Numerous forms of charts are prepared to illustrate the data. Among these are straight line graphs, horizontal straight line graphs, tables and ledger sheets with colored squares to indicate important figures, as amounts



Fig. 1—Curves showing total tons of merchandise handled at all stations of the system, average cost per ton for station labor, merchandise dispatch car-miles and train wages

overspent and cars used in excess. Combinations of other conventional forms are used for special illustrations. Some of the graphs compare actual figures for a certain year with those of the preceding year, while others compare the data by months. Still others present the actual amounts with the budgeted amounts for a definite period. Separate graphs are plotted for the individual items of certain accounts, permitting a more thorough analysis.

Several charts are prepared each month showing the figures for the merchandise dispatch department. In addition to monthly comparisons of tonnage, cost per ton

and the number of warehouse and office men employed, curves are plotted showing the figures for the past year and the year previous for total tons of merchandise handled at all stations, the tonnage handled at each station, the average cost per ton for station labor, train wages and the merchandise dispatch per mile. A typical group of merchandise curves is shown in Fig. 1. A similar group of charts is made up for each freight station of the system and these charts are used in meetings with the freight agents for the respective stations. Tables listing the claims by commodities and by causes are prepared and used also in meetings with the freight agents. These have proved very helpful in reducing the claims for the department. In the accompanying table is a typical classification of claims by causes.

TRAIN SCHEDULING SIMPLIFIED BY SERVICE CHECKS

Service checks are made of all trains and the data plotted on charts for use in scheduling the trains on future runs. The system schedules an average of 360 trains of one to six cars through a densely-populated territory in which the traffic is different each day of the week. Because of these reasons it is a difficult task to assign the proper number of cars to the various trains. The company wishes to furnish sufficient cars to satisfy the customers, yet must not because of the excessive cost provide cars in excess of what are needed. Economical scheduling requires a uniformly distributed load on the trains, so the company makes very close checks of the trains in the following manner:

Every conductor prepares a traffic card, indicating the number of passengers on his train and listing the stations of the particular division on which he is serving. These traffic cards are turned in to the transportation department, where they are compiled and entered on a sheet giving the train number, the number of cars and the

		OCTOBER												
Train No.		17	18	19	20	21	22	23	24	25	26	27	28	29
		M	T	W	T	F	S	S	M	T	W	T	F	S
401	B	3 1/E	2	2 1/E	2 1/E	2 1/E	2 1/E	2 1/E	2 1/E	2 1/E	2	2	2	2
403	B	3	3	3	3	3	3	3	3	3	3	3	3	3
405	B	3	3	3	3	3	3	3	3	3	3	3	3	3
407	D	3	3	3	3	3	3	3	3	3	3	3	3	3
409	P	3	3	3	3	3	3	3	3	3	3	3	3	3
411	B	3	3	3	3	3	3	3	3	3	3	3	3	3
413	P	3 1/E	3	3	3	3	3	3	3	3	3	3	3	3
415	DB	3	3	3	3	3	3	3	3	3	3	3	3	3
417	D	3	3	3	3	3	3	3	3	3	3	3	3	3

LEGEND
 Two cars scheduled, 5 run, 3 extra deadheaded
 Two cars scheduled, 2 run, 2 were allright
 Three cars scheduled, 2 run, 1 short, needed three
 Three cars scheduled, 4 run, 1 car extra, not deadheaded

Fig. 2—Service check of nine trains for an eight-day period. The scheduled cars for five days in advance also are given

passengers at the various stations. A chart is prepared showing for each day of the month and for each train the number of cars scheduled for that particular run, the number actually run, the number that were dead-headed and whether the train as operated had enough or an excess of equipment. This chart also shows the number of cars the transportation department proposes to run for each train, the number being checked by data of previous runs. For example, if the company on Tuesday was deciding what number of cars to schedule for the coming Thursday, it would check back three Thursdays to see what equipment had been used and whether it was sufficient or not. Use of this method has saved the company a considerable number of car-miles in its interurban service.

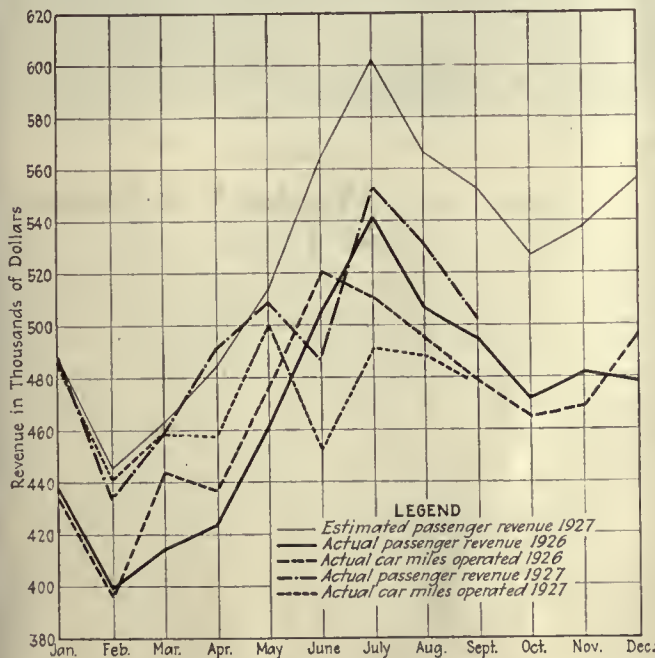


Fig. 3—Comparison of passenger revenue and car-miles for 1926 and 1927. Estimated passenger revenue for 1927 is plotted also

MERCHANDISE DISPATCH CLAIMS BY CAUSES, SHOWING AMOUNTS PAID FOR ALL STATIONS

Causes	1927					
	January	February	March	April	May	June
Rough handling.....	\$177	\$352	\$150	\$189	\$134	\$168
Concealed damage.....	196	126	327	244	158	66
Shortage entire package.....	98	195	149	128	159	137
Pilferage.....	8	..	2	9	..	2
Concealed loss.....	..	3	12	..	1	5
Freezing.....	2	23	..	..	..	..
Fire.....	..	..	..	..	..	..
Wreck.....	..	..	..	..	..	..
Damage by water.....	..	5	..	..	6	20
Unlocated loss.....	..	41	..	..	..	..
Delay.....	..	..	..	6	..	50
Improper loading.....	..	..	..	..	6	..
Improper refrigeration.....	..	9	..	..	..	5
Unlocated damage.....	..	..	57	..	15	19
Error in delivery.....	..	..	10	97	..	6
Total.....	\$481	\$754	\$707	\$673	\$478	\$480

Fig. 2 shows a train service check of nine trains for eight days and the number of cars scheduled for five days in advance. In addition to the car scheduling checks, passenger revenue and car-miles, both actual and estimated, are plotted. Figures, by months, for the past year and the year previous are used.

MUCH HAS BEEN DONE TO REDUCE CAR DELAYS

Car delays have been reduced to a minimum on the North Shore by classified checks of the causes of delays and constant effort on the part of both management and employees to eliminate them. Each month a report is prepared which lists all delays for the period and gives the date, number of the train, the time lost and the cause for each delay. The delays are allocated to the following departments according to the responsibility for their occurrence: Trolley, equipment, transportation, power and way. Copies of the monthly reports are furnished to all supervisors and the delays are discussed at their meetings. Because the delays are charged to the various

EQUIPMENT		JAN.	FEB.	MAR.	APR.	MAY
29 Superintendence of Equipment						
Legend	2901 Salaries	137	23	471	437	147
	2902 Supplies and Expenses		22	6	18	77
Amounts overspent, shaded.	30 Passenger and Combination Cars					
More than \$500 909	3001 Painting and Varnishing	2043	1797	1714	1627	1607
	3002 Car Bodies	560	18	352	567	227
	3003 Draw Bars and Draft Rigging	469	0	176	163	437
Less than \$500 143	3004 Trucks	2031	1294	747	1512	119
	3005 Brake Shoes	20	38	113	750	17
Amounts underspent, unshaded.	3006 Air Brake Equipment	12	52	245	10	85
	3007 Air Compressors and Governors	19	42	11	20	1
	3008 Heaters	116	34	65	172	111
	3009 Repairs Due to Accidents	2856	1058	183	758	731
	3010 Wiring, except for Electrical Equipment of Cars	79	143	433	120	15
	3011 Wheels and Axles	909	280	853	1370	567
	31 Freight, Express and Mail Cars					
	3101 Express Cars	21	558	433	1156	81
	3102 Freight and Mail Cars	332	847	164	159	142
37 Shop Expense						
	3701 Heating and Lighting Shops	312	188	412	105	210
	3702 Misc. Supplies and Expenses, incl. small hand tools, etc.	203	214	66	1	26
	Actual Expenses - No Depreciation	56173	55320	51616	50321	32473
	Budget Allowed - Depreciation Deducted	34220	34220	33170	32220	31920
	Difference in actual and budgeted amounts for total equipment	1953	1100	1554	1989	559

Fig. 4—Section of an equipment account showing for five months the amounts under-spent and over-spent for each particular item

departments, a rivalry exists among them and every employee makes an effort to keep down the delays in his department.

Closer and more accurate budgeting is made possible by using budget control sheets. One of the sheets prepared for equipment is shown in part as Fig. 4. The complete sheet gives the amount that each individual account was over-expended or under-expended with respect to the budget. Similar sheets are kept for power, conducting transportation, way and structures, traffic, advertising and miscellaneous. The equipment report shows that the mechanical department was able to perform its work with little more than the amount allowed it on the budget. Those directly responsible for the work of the departments, the various supervisors and foremen, are conferred with in regard to the charts, so that these men as well as the management know the costs. This results in a much better esprit de corps among the men at all times.

Checks are made of energy consumption on every branch of service of the company, and the data on a kilowatt-hour per car-mile basis plotted on charts. Because of the extremely high speed of the trains and the

rigid schedules, a number of the motormen did not consider it possible to effect any energy saving. However, the preparation of charts showing the energy consumed and the further instruction of motormen who were careless and unmindful, resulted in huge savings. During the nine months in 1927 from January to September, inclusive, the kilowatt-hours per car-mile were reduced from 2.92 to 2.63. Additional charts are kept which record the performance of each motorman in the various classes of service. This information is furnished the division superintendents and the power inspector, so that an immediate check can be made of each individual motorman. If a motorman is using more than the average, he is given additional instruction in energy saving. Some of the motormen who previously have operated their trains economically become lax and waste energy. The system enables the inspectors to check these men also.

Only a few of the large number of charts used successfully by the company have been described. Others are playing equally as important parts in lowering operating costs and improving the company's service to the public.

Electrically Welded Car Bodies and Trucks

SUCCESS following the substitution of electric welding for rivets in building construction, has suggested to some European electric railway managers that electric welding might be used to advantage to car body and truck construction. The Liège Consolidated Tramway has actually built a car in which the members of the steel framework were joined by welding rather than by rivets. The saving in weight is estimated as between 9 and 10 per cent. The reduction in energy consumption thus gained is not the only advantage, in the opinion of the company, as there is thought to be also a saving in car maintenance and also a reduction in noise. The use of the same system for car body construction is proposed by the Turin Tramways, and the Lausanne Tramways has built truck frames by the same system.

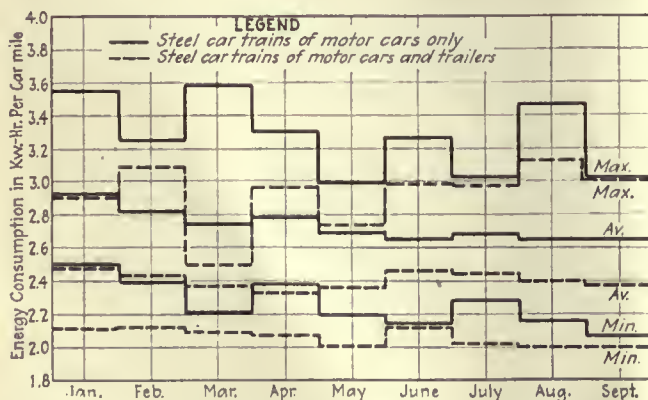


Fig. 5—Maximum, minimum and average kilowatt-hours per car-mile for steel car trains composed of motor cars and for trains of motor cars and trailers in Milwaukee limited service

What Happens to an Anti-Climber

In a severe collision between two trains in a station on the Hamburg Elevated Railway, the anti-climber on one car was bent and a coupler support broke. Otherwise, the damage was slight and there was no overriding of one car by the other

By Dr. W. Mattersdorf

Manager Elevated Division Hamburg Elevated Railway, Hamburg, Germany



At left, end of Hamburg elevated car before addition of automatic coupling and anti-climber. At right, after their addition

CARS of the Hamburg elevated railway were equipped last year with an automatic universal coupler and also with an anti-climber, consisting of horizontal projecting ribs. The first two illustrations show the front of the car before and after this remodeling. The new coupler served very well during normal operation, but until recently experience as to how it would behave during a wreck was lacking. A collision which occurred on March 30 of this year, however, has now provided remarkable testimony of the excellent properties of this equipment.

The collision occurred at the Brückenstrasse station on the Elevated line, and its cause was that the station attendant by mistake gave a clear signal for the entrance into the station, although the train ahead was still standing there. Consequently the second train entered and hit the solidly braked train ahead of it at the consider-

able speed of 30 km. (19 miles) per hour. The effect of the impact upon the standing train was great. In fact, it was pushed bodily along the tracks, while the incoming train, losing its inertia, stopped almost immediately after giving its blow. Before the second train stopped the distance between it and the colliding train was 8 m. (26 ft.). The following describes what happened during the collision.

The colliding trains coupled automatically without damage to the couplers. This provided a rigid connection between the two trains and, with the anti-climber, helped to keep the platform of the first car of the incoming train from climbing over the platform of the rear car of the stationary train. However, the draft gear guide directly behind the coupler head of the incoming train broke, causing the coupler to drop down. It hung onto the struck car, as shown in the third illus-



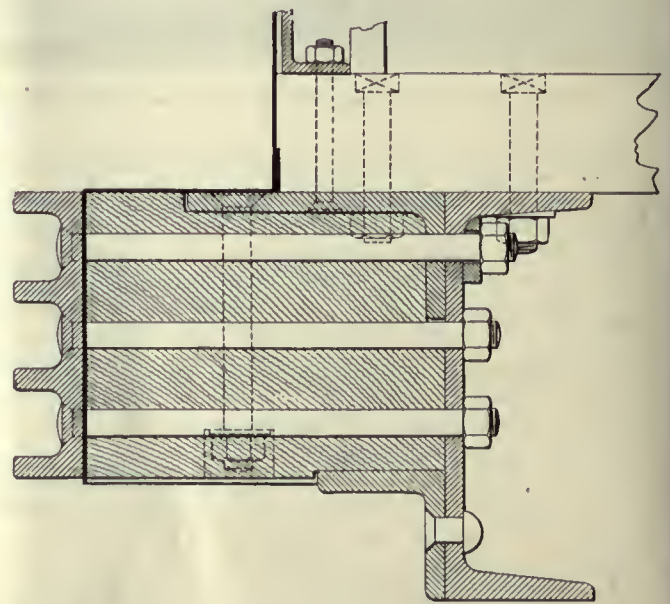
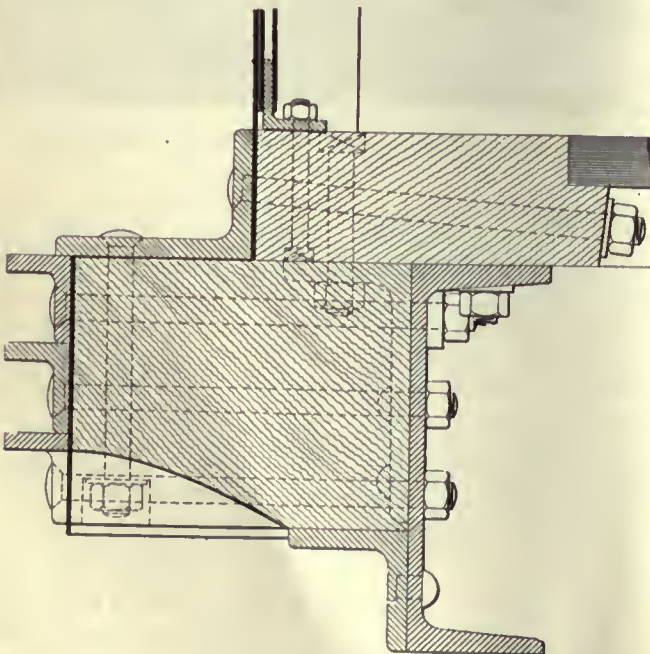
The cars became coupled at the time of the collision, but the impact broke the coupler support of the colliding car. As the stationary car went forward from the blow, it took both couplers with it, as shown in the left-hand view. The right-hand view shows the end of the colliding car with the damage done to the anti-climber. Except for broken glass, there was practically no other injury to the cars

tration, falling upon the roadbed. The two colliding cars were undamaged, aside from broken glass panes from the heavy shock.

How well the anti-climber took up the shock can be seen from the fourth illustration. It was the first type of this device installed made up of three angle irons, as illustrated in the first line drawing. From the view

given of the anti-climber after the collision, it is evident that the round faces of the coupler heads bent down the lower angle iron and that the rivet heads fastening the angle irons on the stationary car left their marks on the horizontal rib of the oncoming car.

This accident, for the first time on the Hamburg system, demonstrated the great value of the anti-climber in



Anti-climbers in Hamburg were formerly built up from several angles (see left-hand section). Now they are made in one piece, as shown at the right

a serious collision. When it is considered that telescoping of the cars causes most of the injuries, the safety afforded by the anti-climber in such accidents cannot be too highly stressed.

In the latest anti-climber used on the Hamburg Elevated division, the ribbing no longer is provided by riveting angle irons together, but the anti-climber is rolled in one piece, as shown in the second line drawing. How slight the damage was to the cars is best indicated by the statement that both trains proceeded to the repair shop under their own power. Since the electric coupling cables between the cars were ruptured, it was, of course, first necessary to make the needed electrical reconnections.

A detailed account of the coupling with which the cars are equipped was published in the issue of ELECTRIC RAILWAY JOURNAL for Sept. 10, 1927, page 435. It was patterned after one of a somewhat similar type used by the Philadelphia elevated railway but is of somewhat lighter design.

The mechanical and pneumatic parts were supplied by the Scharfenberts-Kupp'ung, A.G., and the electrical parts by the railway department of the Allgemeine Electricitäts Gesellschaft of Berlin.

Has The Economic Limit in Car Fare Been Reached?

Records by months since 1920 of passengers carried in Baltimore, Cleveland, Brooklyn, Pittsburgh, St. Louis and Boston show no definite connection between changes in traffic and changes in fares, and indicate that a charge of 10 cents a ride is not the economic limit in street railway fares

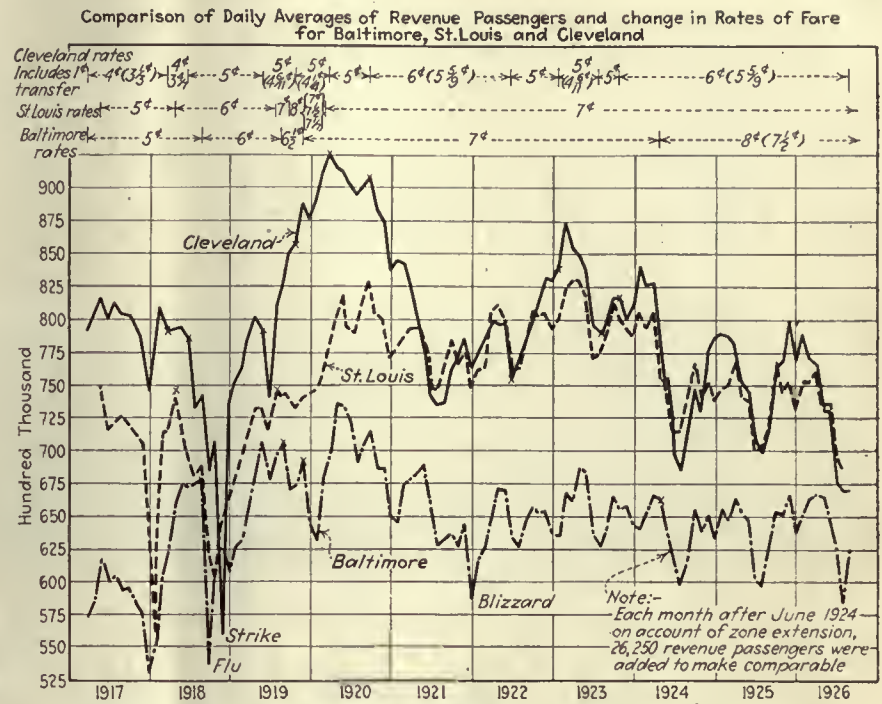
By JAMES W. SWAINE

Statistician United Railways & Electric Company, Baltimore, Md.

SOMETIMES it is claimed that the economic limit in car fares is reached when a fare of 7½ cents is charged, and that any higher rate will greatly discourage travel. This assertion is made without due consideration of all of the facts. To determine them, the writer has compiled the accompanying charts to find what effect, if any, changes in fares have had on the riding habits in several cities where a number of fare changes have been made.

The problem is admittedly not the same in small cities as in large cities. As information was wanted for cities about the size of Baltimore, those cities selected for comparison with it were Boston, Brooklyn, Cleveland, Pittsburgh and St. Louis. In these cities the present rates of car fare vary from 5 cents flat to 10 cents flat.

The chart on page 936 shows the number of passen-



It will be noticed that from 1920, on the right hand side of the chart, there is a striking similarity in the graphs of the three properties. During the period

shown there was no change in fare in St. Louis, but there were a number of changes in fare on each of the other two properties.

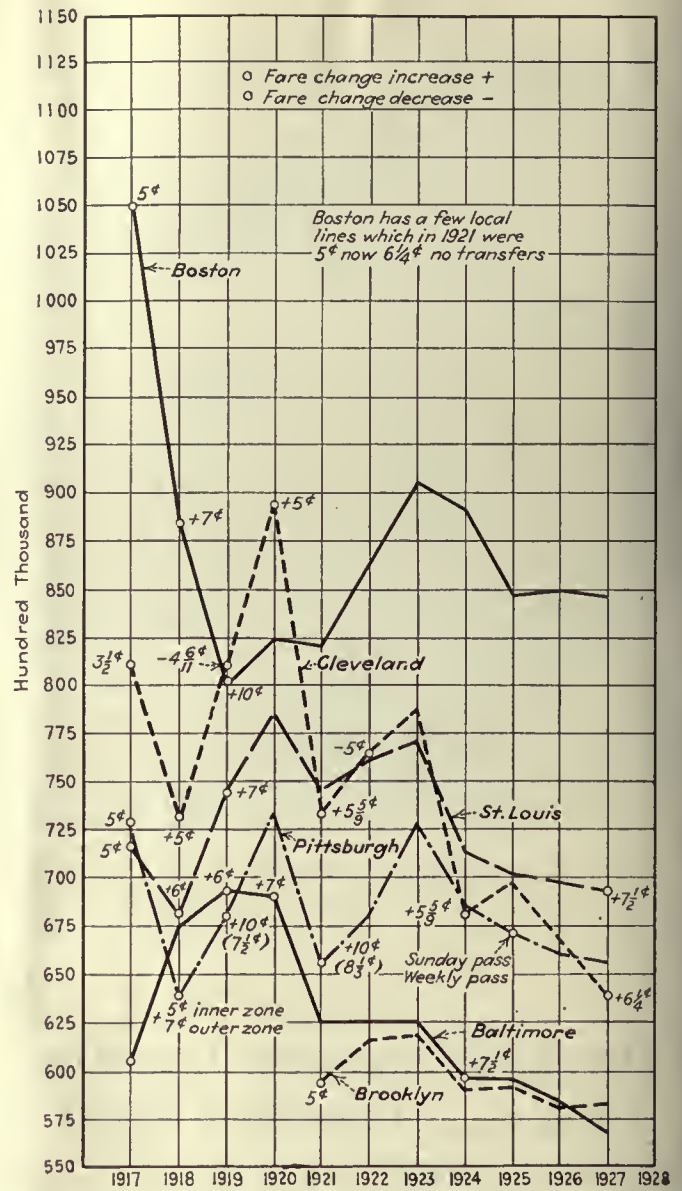
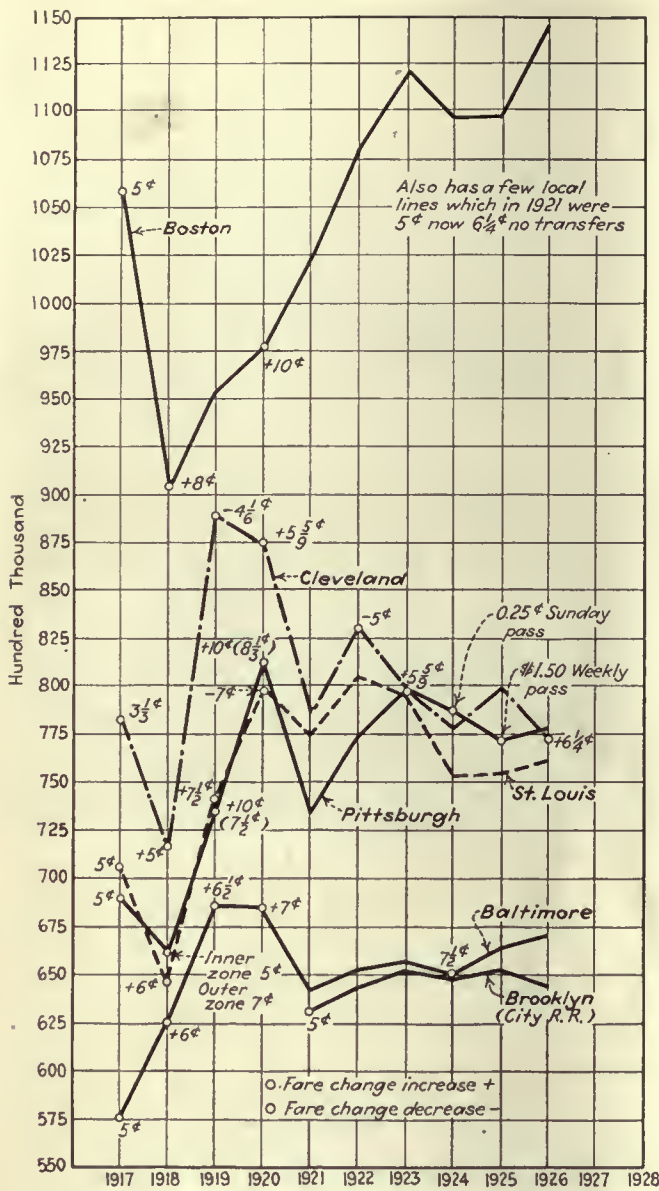
gers carried during December for several years by the electric railways in the cities named, together with the dates of the changes in fares on those properties. The second chart shows similar data for the month of August.

In the first chart it will be seen that in Boston, where a 10-cent flat fare is in effect (except on a few local lines, on which the fare in 1921 was 5 cents and is now 6½ cents), there has been a constant increase in revenue passengers carried since 1919 except in one year. In the other cities whose records are charted, varying figures for passengers carried are shown, but in general the traffic is somewhat more than in 1917 and has been fairly constant since 1920. The fact stands out clearly, however, that the variations in passengers carried bear little, if any, relation to the changes in fares.

Attention will now be directed to the second chart of passengers carried during the same years but in the month of August. Here the trend since 1920, in all cities except Boston, has been steadily downward. It will also be seen that this chart, like the other, shows the striking fact that this trend has occurred irrespective of the changes in fares, whether they have been up or down. Thus in both charts, the line for Brooklyn, (Brooklyn City Railroad) has about the same direction as those for Baltimore, Cleveland, Pittsburgh and St. Louis, although in Brooklyn the fares were kept at 5 cents flat, whereas the fares in the other cities were increased. The one exception in both of these charts is Boston, the one city of the six charging a 10 cent flat fare. Here revenue passengers have steadily increased during the winter months ever since the 10 cent flat fare was inaugurated, and the summer months have held their own.

REASONS FOR LESS TRAFFIC IN THE SUMMER

The reasons for this falling off of traffic in the summer time as compared with winter must be sought in other causes than changes in fares, as the trend is so



These charts show the daily average of revenue passengers during a typical winter and a typical summer month in five American cities of approximately the same size. The chart at the left is for the month of December for eleven years; that at the right is for the month of August during the same years

uniform and general. The chief reason is undoubtedly the growth of automobile riding, which has brought about a substitution of the automobile for the street car, especially in the summer, whereas during the inclement days in the winter, automobiles are more likely to remain in the garage. This same theory probably explains the marked difference in trend for winter travel in Boston, as compared with the other five cities. The cold winters with their heavy snows in the narrow streets of that city undoubtedly discourage winter automobile travel to a greater extent than in any of the other five cities mentioned.

Another cause for the falling off of travel in summer, though probably of less importance than the influence of the automobile, is the growing tendency in summer for stores and offices to suspend work on all or part of Saturday. This custom permits many people to make weekend trips from Friday night or Saturday noon to Monday morning and takes out of the city many who would otherwise patronize the street railway. In Baltimore, for example, where the figures are available, while week-

day riding during the summer has remained fairly constant, heavy losses have occurred in revenue passengers on Saturdays and Sundays.

To resume, then, these charts indicate that fares as high as 10 cents flat are not responsible for losses in revenue passengers. For this reason it cannot fairly be said that a flat rate of 10 cents even approaches the economic fare limit.

MONTHLY RECORDS FROM THREE CITIES

The chart reproduced on page 935 compares the daily averages of revenue passengers (with change in rates of fare) for Cleveland, St. Louis, and Baltimore, from 1917 to the middle of 1926. It will be noted that the fluctuations in almost every case occur independently of a change in the rate of fare. This is particularly striking, as St. Louis had no change in fare from early in 1920 to the end of the chart, yet its trend is almost identical with Cleveland and very similar to Baltimore. Both of these two cities had fare changes during the period shown in the chart.



Latest type yard construction in Bavaria, with simple insulation, grounded cross-spans and track isolation

Many German Railroads Are Electrified

Expansion of electric lines has been steady. Distribution systems, locomotives and other equipment differ on various units of the German Federal Railroad

By *Kent T. Healy*

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PROGRESS in the electrification of the German main-line railroads has been rapid since the formation of the new operating company pursuant to the reorganization of railroads in that country under the Dawes plan. The mileage of electrified track has gone up from 382 in 1924 to 773 at the end of 1927. More than that, there are 201 additional miles of track on which the installation of electrical equipment is under way at present. The number of electric locomotives went up from 114 in the earlier year to 316 at the close of the last year, and 98 more locomotives are on order. Corresponding increases in multiple-unit cars have been made. From 1924 to 1926 the ton-miles hauled went up from 1,236,000,000 to 4,000,000,000, an increase of 225 per cent. More complete figures are given in an accompanying table.

The change in the situation is the more marked in that electrification of the German railroads was begun many years ago. The first installation was in 1903, when two suburban lines in the Berlin district were equipped, one for direct current and the other for single-phase alternating current. The latter was installed for experimental purposes, but was followed with a commercial single-

phase road in 1907, when the Hamburg suburban lines were equipped with this system utilizing 3,300 volts at 25 cycles.

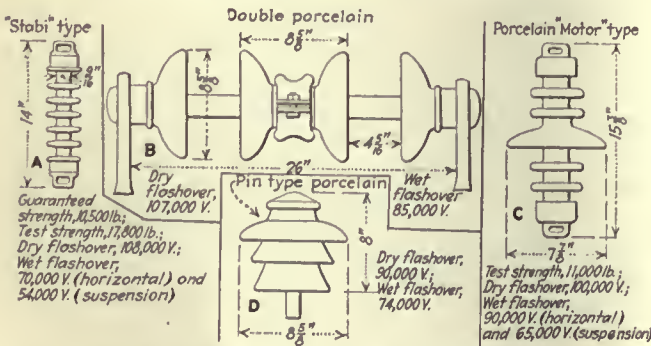
In 1910 the heavy traffic lines north of Leipzig were electrified, also for single-phase alternating current but at a pressure of 15,000 volts and a frequency of 16 $\frac{2}{3}$ cycles. The Mittenwald Railroad on the Austrian frontier was constructed for electric operation in 1913. This served as the beginning of the Bavarian electrification, which has become the largest unit in Germany. The lines in the mountainous territory in Silesia, equipped for electric operation in 1919, have become the second largest group. Electrification of all the suburban lines out of Berlin was started in 1924, when a preliminary line to Oranienburg was equipped with a third-rail system for 800 volts direct current. The electrification of the Berlin lines is the outstanding feature of the German Federal Railroad Company's electric traction program at the present time. Articles appearing in the Nov. 5 and Nov. 26, 1927, issues of this paper described in detail the Berlin electrification and the cars to be used on the line.

In general, the policy of the various railroad units



Five principal regions are served by the electrified lines of the German Federal Railroad Company

has been to generate their electrical energy individually, rather than to buy from independent power companies. The power plant which supplied the Silesian group was first privately owned, but the arrangement proved so unsatisfactory that it was later purchased by the railroad company. Proponents of the two plans again advanced arguments when the decision to electrify the Berlin suburban lines was made. The situation was particularly tense, since three-phase current at commercial frequencies was to be used for transmission instead of the single-phase, low-frequency system adopted on the trunk lines. The railroad company argued that it would be cheaper to produce the electrical energy than to buy it, that the com-



Four types of insulators for 15 kv. overhead construction

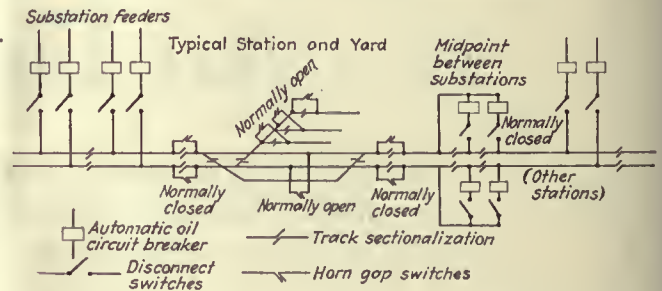
- A: "Stabi" type—Guaranteed strength, 10,500 lb.; test strength, 17,800 lb.; dry flashover, 108,000 volts; wet flashover, 70,000 volts (horizontal), and 54,000 volts (suspension).
- B: Double porcelain—Dry flashover, 107,000 volts; wet flash-over, 85,000 volts.
- C: Porcelain "motor" type—Test strength, 11,000 lb.; dry flash-over, 100,000 volts; wet flash-over, 90,000 volts (horizontal) and 65,000 volts (suspension).
- D: Pin type porcelain—Dry flashover, 90,000 volts; wet flash-over, 74,000 volts.

pany did not wish to be electrically connected with a net that would spread the damage of other failures to its own service, and that it seemed better from an organization point of view to have so important an element in the production of transportation under its own wing. Representatives of the power companies replied that the railroad was not fairly nor soundly figuring its costs as to freight and depreciation, that modern switching and protective equipment prevented the spread of failures in the network, and that the advantage of several power sources was considerable. Only recently, and after much pressure, did the railroad give up the plan to build its own power plant.

Most of the power plants are steam operated. Both the Silesian and Leipzig plants are in coal fields, the former using hard coal and the latter the so-called brown coal. The Bavarian group is supplied by energy from one main hydro-electric plant at the headwaters of the Isar River and several smaller plants lower down on the same river. Coal is expensive in this region, so that a considerable saving is being effected in the use of water power.

SUBSTATIONS CHIEFLY OF INDOOR TYPE

Electrical energy for the railroad is transmitted at potentials varying from 60 kv. to 100 kv. All lines are designed for single-phase a.c. at low frequency, so that no phase or frequency conversion is necessary at the



Distribution of switching system for a typical station and yard

substations, which supply an unusually large area, causing high load factors. In the Leipzig section the substations are from 3,600 to 6,000 kva. capacity, each supplying approximately 37 route-miles. In the Silesian section the capacity of two substations is 6,400 kva. and of a third 4,800 kva. with an average mileage of 54 for each. Three substations, two with 10,000 kva. capacity and one with 15,000 kva. capacity, supply 273 miles of road in the Bavarian territory, an average of 91 miles each.

Most of these substations are of the indoor type. The high-tension switching arrangement is standard, though the switches themselves open through resistances incorporated in the tanks. The transformers are placed in isolated compartments with frail doors, a safety measure in case of blowouts. The transformers are rated at 130 per cent load for two hours, 150 per cent for 30 minutes, and 200 per cent for ten minutes. The impedance permits about 9 per cent normal voltage on short circuit.

The 15-kv. switching in the modern substations is handled by resistance breakers, with a rupturing capacity of 200,000 kva. in each feeder circuit. These open on overload with a definite time limit. They are connected to either of two buses by disconnect switches. In conjunction with these buses is a high resistance that can be connected between either bus and the full voltage terminal of the transformers, so that a given feeder can be ener-

gized at full voltage from the spare bus with a minimum of 10 amp. flowing. This is used for testing a given circuit, having the advantage that full potential is applied at the fault with a low current that is not destructive.

For over-voltage protection fairly satisfactory results are obtained by a sphere gap to ground, shunted by an oil switch and resistance, which automatically shorts the gap when it discharges. The switch immediately opens following the discharge.

BAVARIAN DISTRIBUTION SYSTEM HAS NOTABLE FEATURES

The distribution system of the most recent electrification in Bavaria is of particular interest because of its effectiveness in isolating faults, its simplicity and its low cost. Each main-line track is fed separately from the substations at both ends through oil circuit breakers. Midway between the two substations is another automatic oil switch separating the two halves. This switch is normally closed, but it opens instantaneously on about 350 amp. overload. It thus divides the track section in halves, allowing operation on the unaffected portion to continue with energy from the corresponding substation. This intermediate oil switch is also arranged to close automatically if the voltages on the two sides are in proper phase relation. The main-line tracks are sectionalized at all stations with motor or manually-operated horn-gap switches. There are ties between tracks which are normally open. Sidings and yards are fed off either track through other horn-gap switches which are kept open when the tracks are not in use.

This distribution system is under the control of the substation operators in the districts. With the opening



Single-track line showing use of concrete poles

of a breaker on a feeder, the circuit is first tested through the current limiting resistance. If 8 to 10 amp. flows there is a serious short on the line, not merely a flashover.

The operator gets in touch with the station-masters and signal men who operate the various sectionalizing switches, and asks them to cut off the track section by section, starting from the point where the middle breaker has sectionalized the line. As each section is cut off a test is made with the low current circuit, and if it does not show clear other sections are opened in turn until the faulty section is found. The maintenance men are then sent out to repair the fault.

The maintenance groups usually are furnished with small rail motor cars for maintenance requiring only light ladders. For heavier work tower cars are handled by steam locomotives drafted from some other

MILES OF ELECTRIFIED TRACK AT ENDS OF YEARS 1924-1927, GERMAN FEDERAL RAILROADS

	1923	1924	1925	1926	1927	Build- ing
Miles electrified....	382	405	582	652	773	201
Electric locomotives	114	152	246	301	316	98
Multiple-unit cars...	191	250	287	343	341	699
Ton-miles hauled...	1,236,000,000	1,730,000,000	3,080,000,000	4,000,000,000	...	...
Kilowatt-hours used	64,000,000	84,000,000	148,000,000	192,000,000	...	...

CHARACTERISTICS OF GERMAN ELECTRIFIED SECTIONS

Section	Service	End of 1927					Year 1926		
		Miles of Electrified Lines	Locomo- tives	Multiple Units	Power Plant, Kw.	Millions of Kw.- Hr.	Ton- Miles	Load Factor in Per Cent	
Silesia....	Heavy grade, general..	158	71	21	21	24,000	46	1,170	38
Leipzig....	Heavy local, passenger.	113	75	29	3	26,500	34	1,087	42
Bavaria....	Some grades, general..	378	50	49	25	79,600	51	1,130	31 to 37
Baden....	Miscellaneous.....	30	16	..	..	..	7	73	..
Berlin....	Suburban.....	70	95	..	1	140	341	25	102
Hamburg.	Suburban.....	20	..	..	150	..	28,500	29	436
Others....	Miscellaneous.....	4	..	5	..	2	..	..	..



Old type yard construction with crossbeams in Silesia. Note absence of deflectors and use of intermediate wire

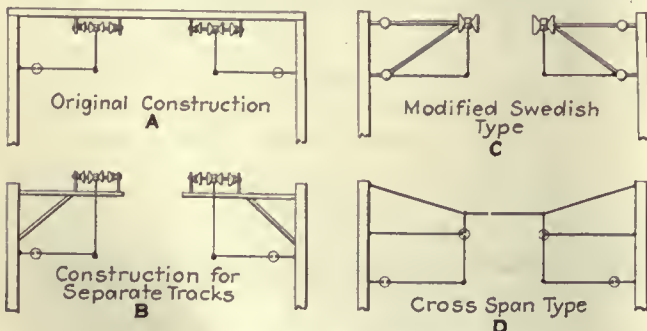


Yard section breakers with simple insulation. Messenger insulator removed from arcing region for protection

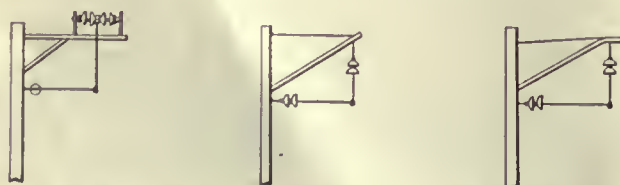
service when needed. The latest equipment for the heavy work is a self-propelled car, with a collecting pantograph for operating a motor-generator set off the 15-kv. contact wire when in live sections. The car is driven by d.c. motors, which are supplied from either the motor-generator set or storage batteries charged by it. A second pantograph is used when in a dead section for grounding the contact wire readily and for gaging its alignment at the same time. The size of maintenance crew varies. A typical group, however, is one of seventeen men which takes care of 62 route-miles, of which 12 miles have four tracks and the remainder double-track.

MANY TYPES OF OVERHEAD IN USE

The overhead construction of the various groups has been through many stages of development, and nearly every type of design has been given a trial. In the Silesian section, for instance, the types as shown below have been installed. The original 328-ft. spans were found to be too long because the wind blew the contact out of line. Also, the two tracks were not mechanically separate. A modified Swedish Z construction was tried but the longitudinal strength was not considered sufficient. Cross-spans were also tried, but the possibilities of breakage were considered too great to permit their use on the main line. In the yards, crossbeam supports were used at first, but the visibility through the structures was found too low, so various forms of cross-span design have been installed. Concrete poles made by the centrifugal method are in service in some places. Their expense is too great to justify their use. The construction contemplated for line extensions in Silesia is for use with mechanically separated tracks and normally makes use of bracket poles. Two-track brackets will be used for some distance at



Types of overhead used on Silesian main lines



Bavarian single pole construction for mechanical separation of tracks

each signal to permit an unobscured view of the signal for the enginemen. Pin insulators are to be used at the points of support because of their cheapness and the need for shorter poles. Spans 460 ft. long will be used with intermediate steady braces on the shorter poles. In the last few years the Bavarian group has expanded more than any of the other groups and has done considerable developmental work. Originally heavy yard construction of the cross-span type, with double insulators throughout, was used. With the advent of the so-called "stabi" and suspension type insulators much lighter yard and main-line designs have been possible. Mechanical separation of tracks has been retained in all designs and the separation is considered most essential to safety. Grounding of steady spans in all yard construction has been insisted on as a safety measure for linemen and to keep all insulators under voltage continually.

General details of the catenary design have been standardized for all groups. A copper contact wire of 198,000 circ.mil cross-section is used on the main-line sections and of 158,000 circ.mil on branch and yard lines. Weight devices hold the contact wire in constant tension. On the Silesian system tensions of 2,600 lb. are used.

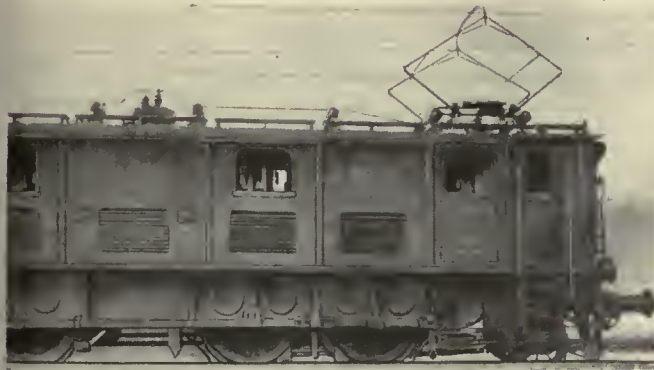
A messenger cable of bronze or galvanized steel is used, having a cross-section of 0.078 sq.in. and a diameter of nearly 3/8 in. The hangers are made of stranded bronze cable spaced every 41 ft. Fittings are all of non-corrosive material. The catenary design allows for wind loads of 14.3 lb. per square foot and ice loads of about 0.5 lb. per running foot of catenary at 18 deg. F. The minimum temperature allowed for is -4 deg. F. The first catenary design was based on the use of an intermediate strand to give flexibility to the contact, but experience has shown that this is unnecessary if flexible hangers and "soft" steady devices are used. In the earlier designs many pantograph failures were caused by the wind swinging the catenary to the side on the long spans. A study has shown that with the simple catenary 246 ft. is the maximum distance between lateral supports that can be used with a maximum wind velocity of 69 m.p.h. and an allowed displacement of 29 1/2 in. from the center line of the track.

PANTOGRAPHS EMPLOY AUXILIARY BOWS

The pantograph used is typically European, with a main frame and an auxiliary bow. The shoe itself is usually of aluminum, greased or not, as local practice dictates. Some experiments have been made recently with carbon shoes. If these shoes are used on sections along with others they are worn down in a short time, but if the carbon shoes alone are used a hardened surface is formed on the copper contact on which the shoe glides with practically no wear and with almost perfect collection. The wear of the contact wire is slight with the aluminum shoes and eliminated with the carbon. The pressure on the wire averages about 8 to 10 lb. per shoe. The wire is arranged to zigzag from one side of the center line to the other at each pole with a maximum displacement of 23 1/2 in. The usual practice is to run with two pantographs up, which eliminates the sparking. The pantographs are built the full width of the shoe so there are no horns on the ends of the shoe under which the contact might catch if it should drop off the shoe.

The various groups of the German Federal Railroad which have used electric traction have experimented extensively with electric locomotives. There has been little attempt at standardization because of the different man-

agements, the different requirements and the lack of sufficient experience with any one type to justify adopting it as a standard. The recent development of the Buchli and quill drives in Europe has made the situation all the more uncertain in passenger locomotive design. The side-rod type with a single large motor and two rods connecting to jackshafts in line with the driving wheels seems to retain its popularity, particularly in Silesia. Light weight and cheapness are points in favor of this type. In Bavaria, the Buchli drive has been tried with success. The easy riding qualities of this locomotive are noticeable. More recently the quill drive has become prominent and bids fair to be the main type for passenger service. The wide range of gear ratios possible



Brown Boveri passenger locomotive using Buchli drive. The pantographs are of light construction with auxiliary bows

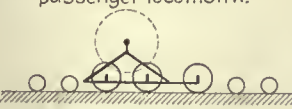
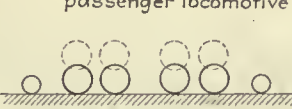
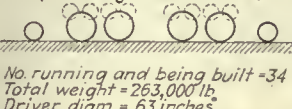
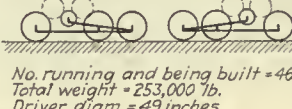
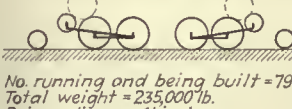
and the use of higher twin motors, together with the ease of handling the running gear and motors seem to give it an advantage over the Buchli drive, in the opinion of the engineers. For freight service the geared side-rod drive is still standard.

Electric control equipment for the locomotives shows many new developments. In some types a contact slides over the transformer taps on top or alongside of the transformer, with an arrangement to prevent short-circuiting of the winding. An ingenious commutator device has been constructed to give continuous voltage variation between taps so there is no arcing. In other types contactors are used as in American practice.

Resistance braking is to be tried on some of the locomotives used in mountainous territory, with a view both to decreasing brakeshoe wear and reducing the motor troubles caused by metal particles from the shoes.

INVESTMENT FIGURES ARE IMPORTANT

The capital invested in the various electrifications was given in the Reparation Commissioner's fifth report for the year ending Dec. 31, 1926. The Silesian work represents some \$7,800,000, about \$27,000 per route-mile for roadway accounts, and an average of \$42,000 per locomotive. The route figures include both single and double-track lines. The Leipzig territory has an investment of about \$7,700,000, with \$39,000 per route-mile for roadway accounts and an average of \$44,000 per locomotive. The roadway average in this case is higher because of the extensive four-track and two-track operation. The Bavarian electrification is by far the largest, with about \$15,800,000 invested. Of this, \$7,700,000 is in roadway accounts, an average of \$28,000 per route-mile with both double and single-track operation. The equipment accounts show an average of about \$60,000 per locomotive. The general cost of the overhead system averages about

<p>Single motor, side rod drive, passenger locomotive</p>  <p>No. running and being built = 12 Total weight = 238,000 lb. Driver diam. = 63 inches Length overall = 51½ ft. Continuous hp. = 2,350</p> <p>A</p>	<p>Buchli drive passenger locomotive</p>  <p>No. running and being built = 17 Total weight = 242,000 lb. Driver diam. = 64½ inches Length overall = 53½ ft. Continuous hp. = 2,050</p> <p>B</p>
<p>Quill drive passenger locomotive</p>  <p>No. running and being built = 34 Total weight = 263,000 lb. Driver diam. = 63 inches Length overall = 50 ft. Continuous hp. = 2,550</p> <p>C</p>	<p>Geared motor, side rod drive, freight locomotive</p>  <p>No. running and being built = 46 Total weight = 253,000 lb. Driver diam. = 49 inches Length overall = 55 ft. Continuous hp. = 1,960</p> <p>D</p>
<p>Geared motor, side rod drive freight locomotive</p>  <p>No. running and being built = 79 Total weight = 235,000 lb. Driver diam. = 41 inches Length overall = 48 ft. Continuous hp. = 1,600</p> <p>E</p>	<p>Modern Locomotive Designs Showing the Side Rod Quill and Buchli Drive</p>

A: Single motor, side rod drive passenger locomotive—Number running and being built, 12; total weight, 238,000 lb.; driver diameter, 63 in.; length over all, 51½ ft.; continuous horsepower, 2,350.
 B: Buchli drive, passenger locomotive—Number running and being built, 17; total weight, 242,000 lb.; driver diameter, 64½ in.; length over all, 53½ ft.; continuous horsepower, 2,050.
 C: Quill drive, passenger locomotive—Number running and being built, 34; total weight, 263,000 lb.; driver diameter, 63 in.; length over all, 50 ft.; continuous horsepower, 2,550.
 D: Geared motor, side-rod drive, freight locomotive—Number running and being built, 46; total weight, 253,000 lb.; driver diameter, 49 in.; length over all, 55 ft.; continuous horsepower, 1,960.
 E: Geared motor, side-rod drive, freight locomotive—Number running and being built, 79; total weight, 235,000 lb.; driver diameter, 41 in.; length over all, 48 ft.; continuous horsepower, 1,600.

\$5,000 per track-mile for main lines and \$3,500 for branch lines, not including yards. The electrification of the suburban lines about Berlin will call for an investment of \$40,000,000, more than the combined totals of all the others. One estimate allows \$14,000,000 for cars; more than \$2,000,000 for the third rail distribution system for 90 route-miles; about \$12,000,000 for transmission cable and the 44 substations; more than \$2,000,000 for signals, telephone changes and the electrolysis prevention, and more than \$5,000,000 for shops, inspection facilities and right-of-way changes.



Two-track main line with long span in the Silesian territory

Electrical Equipment for Broad Street Subway Cars

Has Interesting Features

Cars for Philadelphia's new rapid transit system will be powered with 420 hp. each. The control makes it possible to accelerate any number of cars in a train automatically and provides for high-speed schedules

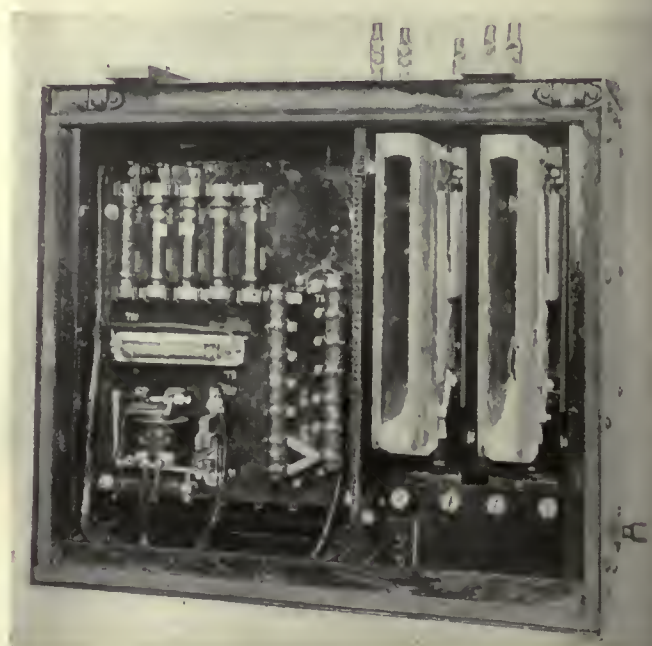
MOTIVE power of the 150 all-steel cars for the new Broad Street subway to be operated by the Philadelphia Rapid Transit Company will consist of two Westinghouse No. 581-A-1 motors for each car. These motors will have a one-hour rating of 210 hp. at 600 volts, and as there will be two of them mounted on one of the two trucks of each car, the total power will be 420 hp. Both motors will be axle-mounted with nose suspension. The armature coils are in one piece, with "double-deck" construction. This minimizes the joints and gives mechanical strength and low losses. The dual ventilation system used affords protection to the brushes and commutator from brake dust, and makes possible a high motor rating for the weight. Heat treated helical gears of forged steel are pressed on the axle. The gears have 63 teeth and the motor pinions 20 teeth. The complete weight of the motor with gears and gear case, is 5,710 lb.

Westinghouse type ABF multiple-unit automatic control is arranged for series-parallel connections of the motors, with automatic acceleration and provision for tapped field on the last running notch in parallel. Current to actuate the control apparatus is taken from a 32-volt type B-2-H Edison storage battery. Trains will consist normally of from one to eight cars, and can be run from any one of the master controllers.

Twelve electro-pneumatic switches establish the motor circuit connections, transfer the motors from series to parallel and commutate the motor circuit resistance. The control circuit gives six steps with the motors in series and four steps in parallel. The tapped field connection is effective only on the last parallel step. Transition from series to parallel is by the bridging method.

Automatic acceleration is accomplished by a current limit relay actuated by the current through one of the motors. It is adjusted for an average acceleration of 1.9 m.p.h.p.s. with an unloaded car. A supplementary relay will advance the control notch by notch under emergency conditions with excessive loads. The air for actuating the control devices is taken from the brake system through a reducing valve adjusted to maintain a relatively constant pressure of 70 lb. per square inch.

An important feature of the control equipment is the use of integral, interchangeable switches. Each switch is a complete unit, including contacts, blowout coil, arc chute, magnet valve and operating cylinder. Two units mounted in a separate frame act as a line switch. The



Front view of line switch showing arc chutes, adjustable resistance in operating coil circuit and interlocking relay

other ten are included in the control box. The units in the line switch and control box differ only in the size of the magnet valve exhaust port and in the length of the arc chute. Any switch may be removed as a unit from either the control box or the line switch by breaking the air and electric connections and removing three mounting bolts.

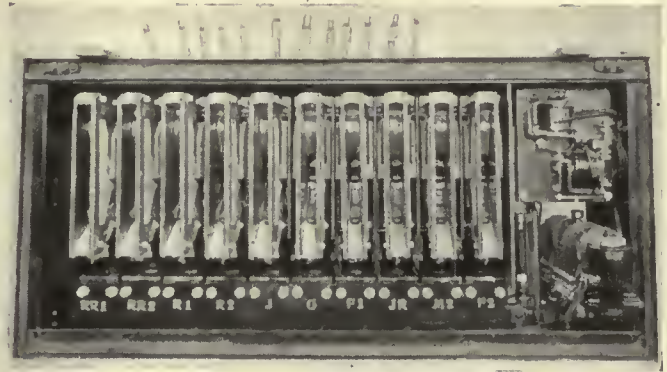
The control box is an assembly of ten of the unit switches, a sequence drum and an advance relay in a structural steel box. A skeleton frame on which the apparatus is mounted, is built up of angles between two end plates. Two side covers are latched in place and are easily removable, while the bottom cover has a fixed hinge and is bolted in place. The only parts requiring attention from the front are the arcing contacts of the switches and the advance relay. By opening the rear cover the air connections, interlocks, valve magnets and switch shunts are exposed for inspection. The main wiring connections are made at the rear of the group at the cable terminals located on a vertical panel on the back of each switch. All main circuit leads are brought out

through treated maple bushings and extend 12 in. beyond the limits of the box. The extended leads permit the semi-conduit type of car wiring which allows the box to be disconnected from the car cables.

The sequence drum is essentially an auxiliary, remote-controlled master controller. A set of contact fingers mounted on a base make contact with copper plates on a drum, which is rotated through a rack and bevel gears by a balanced pressure air engine. This drum is directly under control of the current limit relay, and it stops and starts on each notch in direct response to the lifting and dropping of this relay at a pre-determined value of motor current.

When abnormal loads or grades would prevent normal automatic acceleration, pressure on the advance button in the motorman's cab causes the advance relay to short-circuit the contacts of the limit relay and the sequence drum will move to the next notch. As it moves, an additional coil of the advance relay is energized, opening the short-circuit across the limit relay contacts and again leaving the progression of the sequence drum under the control of the current limit relay. This action can only be repeated by first releasing the advance button located in the cab.

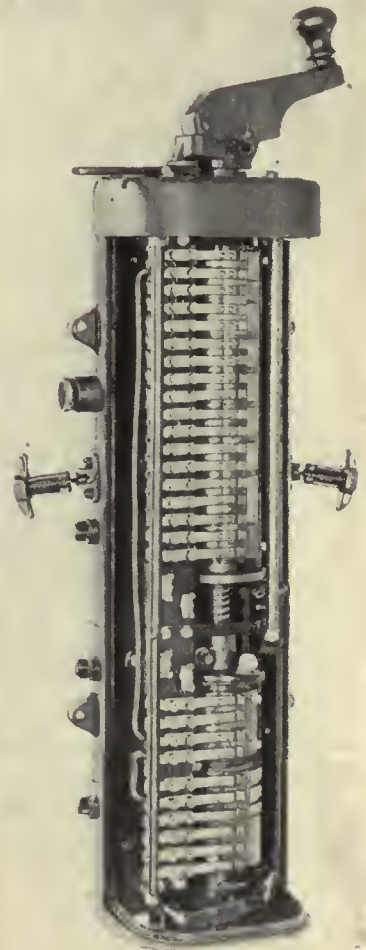
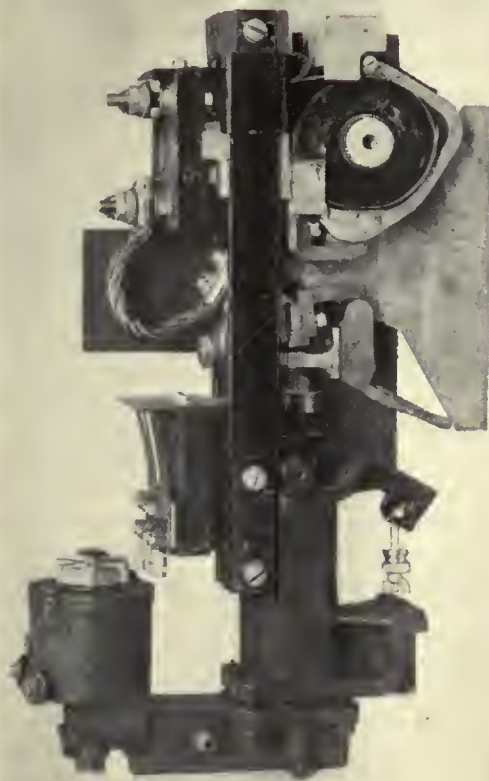
Two unit switches, practically duplicates of these in the control box, two overload relays, a line switch interlocking relay and the necessary resistor tubes and a fuse all assembled in a box of similar construction to the control box, constitute the line switch. Both of these units



Control box with cover removed

are connected in series, with the first series resistance for the switching position connected across one switch. The latter, therefore, also acts as a resistance switch to short-circuit this resistance on the second and succeeding notches. This series connection of the line switches is of particular importance with a short-circuit, the introduction of resistance reducing the maximum current taken from the line and also lessening the severity of the arc rupturing duty.

The operating coils of the line switches are energized directly from the third rail circuit so that the main motor circuit is opened immediately upon loss of power for any reason. This direct control of the line switch oper-



At left, low-voltage auxiliary panel. In center, unit switch with sides removed. At right, master controller with cover removed

ating coils from the line without the intervening time element of a line relay, and the use of magnet valves with unusually large exhaust ports makes it particularly effective in protecting the main motors against flashing when crossing gaps in the third rail. The line switch is so interlocked that if it is opened for any cause, the control returns to the first position before power can again be applied, and advances automatically after line voltage is restored to the position indicated by the master controller. Since the line switches are quick opening, the arcing duty is removed largely from the switches in the control box, either while the equipment is operating normally or with overload.



Map of Philadelphia Rapid Transit Lines showing extent of Broad Street subway

Two overload relays are used, one in each motor circuit. Each relay may be set to trip at a value slightly above the peak current drawn by one motor in regular service. Both relays have a common reset coil, which further is interlocked so that in a train only the reset coil of that relay, or relays, which is in the tripped position is energized when the reset button is pushed in the motorman's cab. This minimizes the current in the reset wire, insuring adequate voltage for operating the reset coil, even in the rear car of a long train.

The interlocking relay in the line switch is used only for interlocking the reverser, which is controlled from the battery circuits, with the line switch, which is controlled from the trolley circuit, so that the line switch cannot close until the reverser is fully thrown. The reverser, which is of the drum type, is completely isolated from the other main current-carrying parts.

The master controller has a main or accelerating drum, a reverse drum and an emergency drum. On the main

drum are four positions, namely, off, switching, series and parallel. In the switching position, a circuit is established from the power supply through the two motors of the car and all of the accelerating resistance in series, to ground.

In the series position control circuits are progressively established until the motors are connected directly in series. In the parallel position the control is advanced to connect the motors in full parallel. The main handle performs two functions; first that of accelerating or shutting off power; and second, that of stopping the train in emergency by applying the air brakes, both by energizing the emergency brake valve in the electro-pneumatic brake system through contacts on the emergency drum and by operation of a pilot valve which in turn actuates an application valve connected directly in the emergency brake pipe line. The first function is performed by rotation of the handle, the second by vertical spring action which is initiated if the operator's hand is removed with the controller in an operative position. This "dead-man's" feature can only be cut out when both the main and reverse drums are in the "off" position. A separate reverse drum controls the direction of motion of the train and also operates several auxiliary circuits as required.

A push-button box adjacent to the master controller provides a means for energizing the main control circuit and the overload reset and advance relays when required. At the front of each car arranged conveniently for the motorman, are two control panel boards. On the low-voltage panel are the battery charging relays, main motor control cutout switch, door control and signal lamp relays and the disconnecting switches for the various low voltage auxiliary circuits. On the high-voltage panel are the disconnecting switches for the high-voltage auxiliary circuits, including car and cab heaters, door-engine heaters, lamps, fans and air compressor, and also the emergency lamp relay, main motor limit relay and heater circuit relays.

Relays on the upper part of the low-voltage panel provide for keeping the storage battery fully charged. Current for charging the battery is taken both from the compressor circuit and direct from the line. When the compressor is running, a contactor closes, shunting a part of the current through the battery. To supplement the charge from this source a pilot relay, connected across the battery and adjusted to the required range, controls a second contactor which closes or opens the circuit from the line through a current-limiting resistor and the battery in series. Line relay protection prevents draining the battery if the line voltage fails.

Door control, heater, fan, lighting and other auxiliary details in general, follow established practice. A feature of the heater control is the use of a peak load relay which automatically cuts off the heaters at current peaks during acceleration to decrease the total drain on the system. Five Westinghouse fans are provided as a part of the equipment for each car.

Normal lighting of the car is provided by 22 lamps connected in series. Both the sockets and the lamps are short-circuiting, so that if a lamp is removed, or burns out, the circuit is not opened. In series with the lamp circuit is the operating coil of an emergency lamp relay, located on the upper portion of one of the panels, which closes the circuit to emergency lamps operated from the storage battery in case of failure of the main lighting circuit or of loss of contact rail voltage.

Maintenance Methods and Devices

Connections on Bell Box Saves Time*

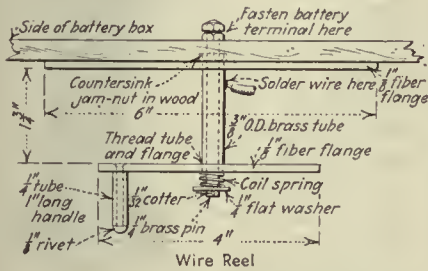
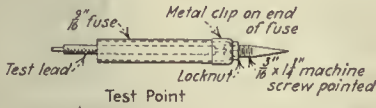
By CHARLES HERMS
General Foreman, San Diego Electric Railway, San Diego, Cal.

BELL BOXES used in the shops of the San Diego Electric Railway have a particular feature in the provision of reels for the leads, which are made of No. 20 flexible rubber-covered wire. Each lead is 50 ft.

the circuit thus being completed through the shaft to the brass reel core. This type of construction has proved a great time saver, for any length of lead can be drawn out quickly and independently. The annoyance of having to untangle leads is prevented; due to the method of mounting on the reels and fastening them to the test points, there is little danger of broken leads. Each test point is mounted on a standard fuse clip, one on each side of the box. This provides for instant use and eliminates the necessity for having to hunt for the ends of the leads.



These booms were not expensive to construct and have been satisfactory for truck overhauling



Details of wire reel and test points used on bell boxes



Type of bell box used in the shop of the San Diego Electric Railway

long. To keep the wire from un-reeling at random a friction spring is placed on the reel shaft.

The ends of the test leads are fitted with test points made of discarded $\frac{1}{8}$ -in. cartridge fuses. One end of the fuse is cut off and a hole drilled through the brass clip on the opposite end to permit the insertion of a $\frac{1}{8}$ -in. pointed machine screw. The end of the test lead is looped around the head of the screw and a long nut draws this tight.

Positive and negative leads are fastened respectively, one to each reel shaft as indicated in the sketch,

"T" Rail Swinging Boom

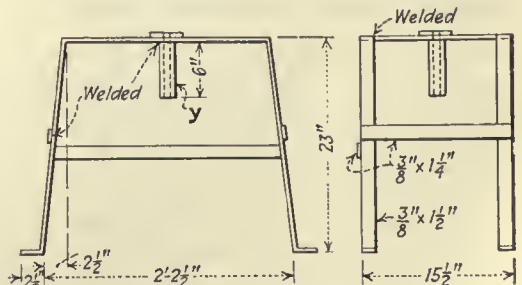
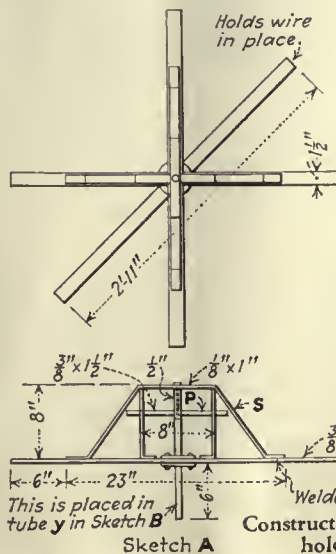
WHEN traveling cranes are not available some other provision must be made in the shop for lifting heavy parts undergoing overhaul. This has been done in the shop of the Jamaica Central Railways, Jamaica, N. Y., by the installation of swinging booms fastened to the wall or other support. These are located in various parts of the shop where needed. The horizontal member is an 80-lb. T-rail inverted. A chain hoist is suspended on a trolley, which runs on the base of the rail. A solid forging drilled for a 1-in. pin, bolted to one end of the rail, fits into a $\frac{5}{8}$ x4-in. "U"-shaped bracket fastened to a $\frac{5}{8}$ x4-in. plate bolted to the wall. The other end of the rail is fitted with two $\frac{1}{2}$ x2-in. "L" brackets bolted to either side of the web. The tension

member is a 1-in. round rod fastened to these brackets with a 1-in. bolt. Its other end is held by a $\frac{5}{8}$ x4-in. "U" bracket fastened to a $\frac{5}{8}$ x4-in. plate bolted to the wall. This rod is installed at about a 45-deg. angle with the T-rail.

The chain hoist trolley is made from 1x3-in. stock and the rollers, spaced at 9-in. centers, have 3 in. diameter and rotate on 1-in. axles. The lifting hook is fastened to a bracket made from 1x3-in. stock. Guide plates secured to the inside of the bracket prevent tipping.

Adjustable Wire Reel

DIFFICULTY always is experienced in keeping the turns of a reel of wire from becoming entangled when being unrolled if precautionary methods are not employed. This is being prevented in the shop of the New York, Westchester & Boston Railroad, Westchester, N. Y., by the reel illustrated. This is made in two parts, a base and a revolving support for the coil of wire. The base is



Construction details of reel for holding coil of wire

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

New Equipment Available

made of $\frac{3}{8} \times 1\frac{1}{2}$ -in. bar braced with $\frac{3}{8} \times 1\frac{1}{4}$ -in. straps. All parts are welded. In the center is a tube 6 in. long and $\frac{5}{8}$ -in. inside diameter. This acts as a centering device and bearing for the revolving element, which is made with two $\frac{3}{8} \times 1\frac{1}{2}$ -in. crossbars 35 in. long, welded at their centers at right angles.

A conical framework support made of $\frac{1}{8} \times 1$ -in. material and 8 in. high is welded to these cross bars. Additional strength is provided by vertical straps of the same material. A $\frac{1}{2}$ -in. rod, 6 in. long, welded to the center of the crossbars, drops into the $\frac{5}{8}$ -in. tube installed in the center of the base. The coil of wire is placed on the surface S. A $\frac{3}{8} \times 1\frac{1}{2}$ -in. bar, P, 35 in. long, suspended on a $\frac{3}{8}$ -in. bolt fastened to the center of the conical frame, rests upon the top of the coil and prevents entanglement of its turns.

Support Prevents Breaking of Sand Hopper Bases*

By R. T. CHILES

Master Mechanic Cumberland County Power & Light Company, Portland, Me.

Due to the design of the sand hoppers used on the safety cars of the Cumberland County Power & Light Company, the weight of the sand is not directly over the base. This resulted in breaking the base of some



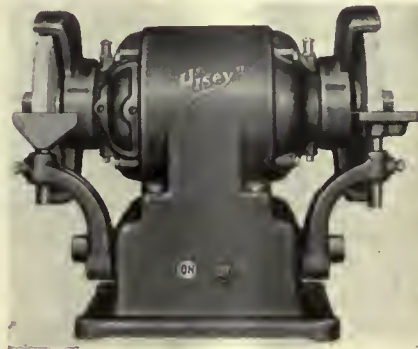
Additional support installed on sand hopper

of the sand hoppers and increased maintenance. To overcome the trouble, a support has been added with one end fastened to the car floor and the other to the top side of the sand hopper. The support is made of 2-in. x $\frac{1}{4}$ -in. soft steel. This corrected the fault and prevented the breaking.

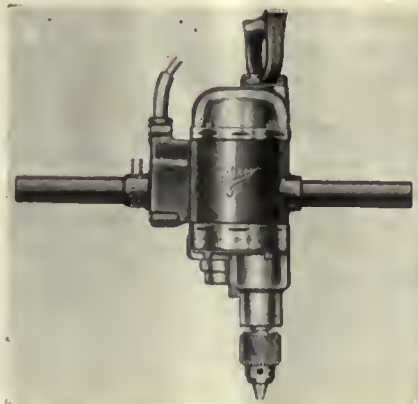
*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Grinder and Portable Electric Drills

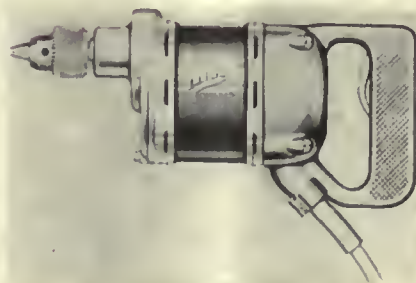
ELECTRIC tools of interest, three in number, are announced by the Hisey-Wolf Machine Company, Cincinnati, Ohio. These include a $\frac{1}{4}$ -in. drill, a $\frac{1}{2}$ -in. drill and a 6-in.



6-in., $\frac{1}{4}$ -hp. grinder



$\frac{1}{4}$ -in. electric drill



$\frac{1}{2}$ -in. electric drill

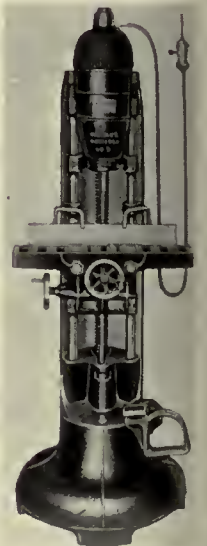
$\frac{1}{4}$ -hp. grinder. Noteworthy features include motors mounted with ball bearings which are fitted so as to eliminate the slip and creeping action. Spindles are of liberal dimensions and are hardened and ground where necessary. Brush-holders are mounted as a separate unit on a Bakelite yoke and have adjustable spring tension. These small tools are

of the same general construction as are incorporated in larger machines by the company.

"Safety first" — "tram your trucks" — don't ram them.

Portable Hollow Chisel Mortiser

BORING of square holes in wood has been common for years and improved equipment for this work is being made frequently. Now a portable hollow chisel mortiser has been announced by J. D. Wallace & Company, Chicago, Ill. Three easy rolling casters in the round cast-iron base make it easy to move the machine. Mounted on the upper carriage is a General Electric vertical motor designed to meet the requirements of this machine. A current of air drawn through a screen at the top is forced downward by a fan on the armature shaft and cools the chisel and bit and also blows chips away.



New electrically driven portable hollow chisel mortiser

The chisel holder is built into the lower motor end flange which completely incloses the bit chuck mounted on the motor shaft. Normal speed is 3,450 r.p.m. This has been found correct for all work falling within the capacity of this machine, which bores square holes up to $\frac{1}{2}$ in. and round holes up to $\frac{1}{4}$ in. diameter. The motor is inclosed and dustproof.

The motor head is depressed for mortising by means of a treadle with an iron stirrup which always hangs vertically. The head may be limited to any desired lower position by a set-screw in the rear of the base and is carried back automatically to the upper position by an adjustable tension spring. Vertical and horizontal adjustments are made through hand wheels, the tables sliding on machined rods.

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Association Activities

Transportation and Engineering Topics Receive Attention at Rome

Technical sessions with several neighboring trips extend over a week. Later the delegates visit Turin and Milan. Attendants at the convention represented 28 countries

THE Rome convention of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Public Automobiles began informally on Sunday, May 6, when there was a reception to the delegates and their friends in attendance at the meeting.

The first official session of the Congress was held the next morning at the National Capitol. The Salon of the Palace of Senators was put at the disposal of the association by the Italian government. Here the session was called to order at 9:30 a.m. About 28 countries were represented. This was also attended by a large number of ladies. The delegates were welcomed to Rome by the governor of Rome and also by the Italian Minister of Communications, Mr. Ciano. The latter brought greetings from the King and also from Premier Mussolini, saying that the latter expected to be presented at the opening session but was unavoidably detained. Mr. Ciano declared that the government was pleased that Rome had been selected for this meeting and emphasized the importance of transportation in the social and economic life of every country.

President De Lancker expressed the appreciation of the association for the hospitality shown to the delegates and asked Mr. Ciano to express its gratitude to Premier Mussolini for his interest in its work. He referred to the fact that the present convention of the association was the first since the war representing all the countries in Europe. It now has more than 1,000 members. He gave his address, successively, in French, Italian and German.

ONE-MAN CARS

The first technical question taken up was the report on "One-Man Cars" by Mr. Bacqueyrise, general manager S.T.C.R.P. (Paris Surface and Bus Lines). An abstract was published on page 910 of the issue of June 2.

The discussion was animated, the delegates expressing their interest in the advantages of one-man operation, brought out in the report. An Italian delegate declared it especially important for roads with a slight margin between receipts and expenses. He said popular approval and permission from the authorities would be more easily secured



F. de Lancker

President Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles and general manager Brussels Tramways.

if the association should formally endorse one-man operation as desirable. President de Lancker said he would appoint a committee to consider such action and report.

In the afternoon, by invitation, the delegates were received in a special audience at the Vatican. In his talk to them, the Pope spoke about the means of transportation as one of the most important factors in the civilization of the world. He gave to all his Apostolic blessing.

AIR VS. ELECTRIC BRAKES

A large part of the session on Tuesday, which was held in the Doria Palace, Rome, was given up to a consideration of street railway brakes. Three reports were presented on this subject, namely, by Mr. Vente, chief engineer Marseilles Tramways; Mr. Allard, chief operating engineer Société Nationale de Chemins de fer Vicinax of Brussels, and Mr. Cuccoli, engineer Milan Tramways.

The report of Mr. Vente related to the braking of city cars and comprised seven chapters, relating respectively to: Brake rigging acting through shoes on the wheels, mechanical and axle brakes, vacuum brakes, compressed air brakes, compressors and vacuum pumps, electric braking with resistance and with magnetic shoes, special types of brakes. There were also appendices on auto-

matic adjusters for brake rigging, the speed of modern compressors and magnetic brakeshoes. In discussing the choice of brakes the speaker pointed out that for heavy cars, the compressed air brake dominates in America whereas the rheostatic or electromagnetic brake is the most popular in Germany. In recent years, he said, the design of electric braking equipment has been considerably improved. In Germany 84 per cent of the motor cars and 76 per cent of the trailers have been equipped with electric brakes.

Mr. Allard, while mentioning all types of brakes which are used on electric tramway rolling stock, devoted his discussion primarily to recent improvements in braking equipment for suburban railways, both steam or electric. In this connection he outlined the characteristics of the Pieper system, as manufactured by the International Automatic Brake Company of Liège, Belgium, i.e., an automatic continuous brake with vacuum release, particularly suitable for steam trains, and a quick-acting electropneumatic brake and with automatic adjustment of clearance between shoes and wheels. In both systems there is a supply of compressed air, at constant pressure, the transmission being made by means of oil. In the first system the release is made with a vacuum and the control is either through vacuum or electricity (battery). In the second system, which is suitable for electric cars, the release and the application are electric. The two systems are continuous and automatic. The second dispenses with adjustment of the rigging; it permits its reduction to very simple terms, and through its action it maintains between two oil cylinders a difference of pressure which may be utilized for the operation of auxiliary apparatus, such as collecting current, closing doors, etc. Mr. Allard also pointed out the extent of use, chiefly in Germany, of the rheostatic brake, sometimes combined with an electromagnetic brake on the rail or with the solenoid brake. He also referred to the drum brake on the axle or on the armature shaft and mentioned tests which have been made with shoes filled with abrasive material acting against the rails.

Mr. Cuccoli's report related principally to the regenerative braking equipment of the Somajni type which has been installed on several motor cars of the Milan Tramways. He said that on one level line the saving of energy with regeneration, compared with the ordinary equipment, has been found to be about 24 per cent. The economy so found was measured on the same cars before and after they were so equipped. At the substations the saving in energy consumption was increased to 30 per

cent. The cost of maintenance of motors, controllers and motor-generators has not been higher than with ordinary equipments. Mr. Cuccoli, in closing, gave a description of the Della Riccia recuperative system as well as a review of the tests which have been made with that system.

In the discussion, Mr. Castaing, engineer S.T.C.R.P. (Paris Surface Railway and Bus Lines), gave some details of the braking system used by his company's Type L car which is equipped with Cardan drive. Brakes are applied to the motor driving shaft and not to the wheels. A delegate from the Warsaw Tramways declared electric brakes superior to air brakes for emergency braking. Mr. Pforr, Berlin Surface Lines, said that tests with different types of brakes were being conducted in Germany. The results will be available to the members of the association after their completion.

The presentation of the paper by Mr. Allard led to a discussion between him and Mr. Castaing on the effect of the motors and gears when the braking is applied to drums or disks on the motor shaft and when it is applied directly to the wheels.

The paper by Mr. Cuccoli on recuperation was followed by an extended and somewhat involved discussion on the economies to be gained by the Della Riccia and the Somajni systems. This discussion, in which Messrs. Della Riccia and Cuccoli took a prominent part, occupied a good part of the session, but no definite conclusions were reached.

Mr. Bacqueyrisse said that the Paris Surface Lines had obtained very satisfactory results with standard (or non-recuperative) equipment. He believed that the expenses of installation and maintenance of the equipment necessary for recuperation would absorb all of the gains from the saving of energy which would be obtained.

The discussion showing no signs of abating, the president asked the speakers to be as brief as possible. He added that they were at liberty to submit any further conclusions in writing.

Mr. Cuccoli, in commenting on the remark of Mr. Bacqueyrisse, said that the cost of the supplementary equipment used with recuperation was not great. According to him the rating of the car motors, when recuperation was used, would not exceed that of equipment ordinarily employed with electric braking in which the current is passed through a rheostat. On the other hand, the application of recuperation decreased the power capacity necessary in the substations as well as the size for the outgoing and return feeders.

Mr. Somajni said that the matter ought not to be regarded so much from the standpoint of economy in energy as from that ease of control as regards the operator.

A delegate from the Rome Tramways submitted a communication giving the results from two cars, one of which was equipped with recuperative equipment; the other in the ordinary way. The

latter showed an average current consumption of 116 watts per ton-mile, while the car equipped with recuperative equipment used only 90 watts.

Another delegate spoke of the existence of a line, 9 miles in length, near Lake Maggiore in Italy, possessing a difference of elevation of nearly 2,000 ft. between the termini, on which recuperation permitted the car to go from the higher to the lower terminus without the application of any other brakes.

The conclusion reached as the result of the discussion may be expressed by the statement that the question is not yet settled. The association will receive communications on the subject from those interested.

At the close of the morning session on Tuesday, the president of the asso-

ciation and a large number of delegates visited the tomb of the Unknown Soldier at the Piazza Venezia, where they laid a floral wreath on the tomb in the name of the association.

TRACK CONSTRUCTION

The report on track construction was presented by Mr. Noorbeeck, chief engineer, Société Nationale des Chemins de fer Vicinaux of Belgium. It was published in abstract on page 912 of last week's issue.

Mr. Level, general manager Compagnie des Voies ferrées d'Intérêt local in Paris, said that the purpose of the employment by his company of wooden rail braces on short radius curves in exposed track, mentioned in the report, was to insure the maintenance of the track gage when the cars went around these curves at a fairly high speed. He described the use of reinforced concrete ties for interurban construction. Mr. Garnier, Paris, referred to the increasing use of chrome and nickel alloy for special work. He approved the use of reinforced concrete ties. Mr. Ramy of Brussels described an equipment of clips for attaching rails to any kind of tie; wood, steel or concrete. Mr. Michel, representing a Brussels company interested in electric welding, gave details of methods advocated by his concern, for the electric welding of rail joints.

RAIL CARS

The report on rail cars with internal combustion motors was presented by Mr. Mellini, member of the Upper Council of Public Works, Rome, and Mr. La Valle, chief inspecting engineer of railways, tramways and bus lines in Italy. It contained a great deal of data on equipment used and results obtained. Their conclusions, briefly, were as follows: Gasoline cars are best adapted for light fast service on level track or with light grades and favorable curves. As compared with steam locomotives, they permit a reduction in labor and in the cost of fuel, for they consume no fuel at stops. In general, their performance has been satisfactory. Diesel motors, when applied to this work, are of a different design than those used in stationary service or in ship propulsion. Results up to the present indicate a favorable solution in the near future of the application of the Diesel engine to this class of service. Its great advantage is that it reduces the cost of fuel. At present the type of transmission which seems most advantageous for Diesel equipment is the electric. Internal combustion engine rail cars, either gasoline or Diesel, seem especially well adapted for colonial railways which cover vast territories, which are lacking in water and where the traffic does not justify electrification.

In his oral discussion, Mr. Mellini, besides giving a summary of the conclusions of his report, told about a novel combination of bus and rail car on a mountain line having grades as high as 8.3 per cent. The tracks are in reinforced concrete with a very light T rail, weighing only 6 kg. per meter (12 lb.

COMING MEETINGS OF

Electric Railway and Allied Associations

June 12-13—American Wood Preservers' Association, Chattanooga, Tenn.

June 14-15—New York Electric Railway Association, Half Moon Hotel, Coney Island, N. Y.

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 25-29—American Institute of Electrical Engineers, summer convention, Cosmopolitan Hotel, Denver, Colo.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 12—New York Railroad Club, annual outing, Indian Point, N. Y.

July 13—A.E.R.A. Executive Committee on yacht "Florida," New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

per yard). The wheels of the cars are equipped with rubber tires which roll over the concrete, and are furnished with steel flanges to keep the car on the track. The adhesion thus obtained is in the neighborhood of one-sixth. Operating results are satisfactory. Mr. Mellini declared that the employment of rail cars was warranted on lines of light traffic where trail cars were not needed, and where the grades are not too severe.

Mr. Level thought that the use of rail cars under the conditions mentioned is always justified, whatever the profile of the line.

Many speakers urged the desirability of the use of rail cars on many rural lines, notably in Italy. A good many of these systems could have service only by the employment of this method of traction. The light rail car, in certain cases, is particularly well suited for such work.

The association voted to continue the subject on the next convention program.

ELECTRIC TRACK SWITCHES

Improvement in electric track switches was considered in the report of Mr. Riedel of Essen on Wednesday morning. It will be published in abstract in an early issue. Mr. Riedel enumerated several advantages of such equipment, when operated by electricity, among them the time saved over hand operation, economy in labor and reduction of danger to conductors who with ordinary switches are obliged to operate them by hand on the street. According to statistics compiled by him, the number of troubles in switch and solenoid equipment have amounted to only ten per year on the average. The apparatus which he recommended particularly was that in which the switch movement was made by motor.

Mr. Fischer of Budapest described a track switch of which 60 had been installed in that city and 120 more would soon be put in operation. A delegate from Paris gave particulars of track-switch apparatus employed in France. Normally they were operated by the motorman, but the switch could also be turned by hand.

Mr. Schmidt emphasized the importance of making the track switches conspicuous. In Dortmund, at a congested center, he had built a switch tower for operating the electric switches there. A similar tower exists in Paris at the Place de l'Etoile, according to a delegate from that city.

At the conclusion of the discussion, Mr. Bouton, Paris, suggested the appointment of a permanent committee to take up the subject of the study of track in general.

During the latter part of the session the subject of the employment of high-pressure steam in central power stations was considered.

TRIP TO NAPLES AND POMPEII

The serious side of the convention was pleasantly interrupted from Wednesday noon until Friday morning by an excursion of the delegates to Naples.

On Wednesday afternoon they made a rapid circular tour of Naples and its environs, and on the following day they visited the ruins of Pompeii. This trip was necessarily made hastily, but the delegates will always retain a pleasant memory of it.

CAR SCHEDULES

On Friday morning the meetings were begun anew at the Doria Palace in Rome. The report on methods and apparatus for improving car schedules was presented by Mr. Barquin, engineer Brussels Tramways. An abstract will appear in a later issue.

Mr. Autin, Marseilles Tramways, gave a résumé of the practice in that city. It did not differ greatly from that outlined in the paper.

After an exchange of views, in which a number took part, notably Mr. Thonet and Mr. Noirfalise, the delegates expressed their belief that the authorities as well as private organizations should do what they could in large cities to establish staggered hours for employees in offices and shops, so as to extend the length and reduce the intensity of peak hour loading. Mr. Noirfalise pointed out that such hours were helpful not only for large cities but even in the cases of cities of medium size and of small cities.

TRACK CONSTRUCTION ON RESERVATIONS

The report on "Electric Railway Construction on City Reservations" was presented by Mr. Lenartowicz of Warsaw. An abstract was published on page 858 of the issue of May 26, 1928.

Mr. Gagné, Paris, expressed himself as in accord with the conclusions of the report but declared that the reservation should be in the middle of the street with the highways on each side. That arrangement was by far the most advantageous. Mr. Schmidt of Dortmund, Mr. Kramer of Berlin, Mr. Level of Paris, and Mr. Callot of Nancy indorsed the idea. One German delegate pointed out that the need for the establishment of tracks on right-of-way in reservations was a consequence of the development of automobile traffic. He was of the opinion that the public authorities, to whom the streets belong, should assess on the automobile users a part of the cost of constructing reservations for street railway tracks. The association voted that the construction of track on reservations and its separation from the street were advisable, whenever the circumstances permitted it.

BUS MOTOR DESIGN

The report on bus motor design by Mr. Guiffard, manager Compagnie Générale Française de Tramways, of Paris, divided bus motors into three classes as follows: Motors using liquid fuel; motors using various kinds of gas, such as acetylene, illuminating gas and producer gas; and motors using electrical energy. The latter may further be divided into storage-battery cars and trackless trolleys. The greater part of the replies received from the questionnaire indicates that gasoline buses are

in the great majority. The speaker said that, at least up to the present, they seem the most generally applicable. As to the other methods, numerous trials have been made with various degrees of success. Among the cars other than gasoline, experience shows the following may be used with confidence under conditions for which they are suitable: Cars with internal combustion engines using kerosene, alcohol, or mixtures of these ingredients with gasoline; cars using producer gas; storage battery cars, and trackless trolleys. Where there is a scarcity of gasoline or even under conditions of free competition, these methods offer an alternative to the gasoline motor bus.

In the discussion an Italian delegate said that in view of the high cost of gasoline in his country the question of a substitute fuel was of very great importance. He mentioned tests which had been made with heavy oils, ethyl alcohol and oil gas.

Mr. Castaing, engineer S.T.C.R.P. (Paris Surface Railway and Bus Lines), gave the results of tests made in Paris with different mixtures of gasoline, alcohol and kerosene. Several of these mixtures, with different proportions of the three ingredients mentioned, have given good results. The practical result is that one or another of these mixtures is employed, according to the relative price of the several components at the time. Alcohol and kerosene have the advantage of being non-detonating, which permits, when they are employed, of increasing the compression, and, as a result, a reduction in the consumption of fuel. Contrary to the general belief, the speaker said, alcohol is not a corrosive so far as the motors are concerned and has not caused any damage by its employment. The Paris bus company has also experimented with both ordinary city illuminating gas and charcoal gas for fuel. The latter, when generated on the bus, has at least certain theoretical disadvantages in any vehicle for the transportation of passengers, among them the disposition of the heat radiated. When employed in bus propulsion, the illuminating gas is compressed to 175 kg. per square centimeter. The trials that have been conducted up to date indicate that an illuminating gas which does not contain more than 10 per cent of oxygen can be compressed without danger to 200 kg. pressure. The reservoirs used for the transportation of this compressed gas are light in weight. Interesting trials are being conducted also with methane gas, and even with storage batteries. The field of the latter is for lines that do not have many grades.

The association voted to continue next year a discussion of the same subject of fuels for motor buses as well as the effect of their employment on maintenance, lubrication and first cost.

RADIAL AXLES

The session on May 12 was given up largely to a discussion of the report on "Radial Axles," as presented by Messrs. Castaing and Harmel. Abstracts of

these reports were published in the issue of May 26.

The presiding officer, Mr. Mariage of Paris, asked the speakers to give briefly the conclusions reached by them, and this was done.

Mr. Castaing was clearly an advocate of fixed axles, even with a long wheel-base and cars with a length of 11 m. (36 ft.). He advocated double trucks for cars of still greater length. Mr. Harmel of Liège was not in entire agreement with the conclusions of Mr. Castaing. He quoted the results of some tests that were being conducted in Liège and advocated the use of radial axles under certain circumstances, notably when the system had many curves of short radius.

Mr. Vente, of the Marseilles Tramways, cited several examples of the use of differential axles in America and Europe. Mr. Seiber of Nuremberg was in accord with Mr. Castaing. He praised the experiments which had been conducted on this problem to determine the degree of wheel and rail wear after a certain time with radial and rigid axles. A delegate from Poland, in referring to the differences in view between the speakers, suggested that the subject be put on the program for the next meeting.

The presiding officer, Mr. Mariage, expressed this same view and suggested to the speakers on the subject to make their tests together, so that the results would be comparable.

RAIL CORRUGATION AND STANDARDIZATION OF RAILWAY MOTORS

The report of the sub-committee on rail corrugation of the standing international committee on the standardization of street railway rails and track equipment was then presented by Messrs. Thonet and Bacqueyrisse. It will appear in abstract in a later issue. The speakers explained that at the Barcelona convention the committee had recommended the employment for rails of semi-hard steel. In the meantime, it has been discovered that hard steel which has a high elongation gives better results. Now the committee recommends the use of hard steel. According to Mr. Bacqueyrisse, the principal question which remains to be investigated relates to methods of manufacture and these can best be solved by the makers of rails. These problems did not seem difficult of solution.

Mr. Hallet of the Ougree Marihaye Steel Company, Belgium, was not of this opinion, but Mr. Bacqueyrisse replied that the French steel makers had agreed to furnish steel according to the specifications in the report.

In connection with the conclusion of the committee that for steel destined for the manufacture of rails, the quantity $R + 6A$, (in which R equals resistance and A equals elongation), ought to be higher than 175, an American delegate, Mr. Fleming, requested the elongation be measured on the French standard test piece of 100 mm. of length.

A Polish delegate thought that the conclusions lacked precision in some

places and suggested that the committee issue a series of rail specifications.

Mr. Bouton replied that the international committee on rail standards had already authorized a sub-committee to do this.

Mr. Peridier presented a résumé of a communication relative to the standardization of railway motors. This communication had for its purpose familiarizing the delegates with what had occurred since the Barcelona convention. The subject had been taken up with the International Electrotechnical Commission. Standardization is being studied by this commission and a report will probably be available for consideration at the 1930 convention of the association.

After the meeting on Saturday, as

well as after the meeting on Friday, the delegates made trips to various points of interest near Rome. On Friday they visited Tivoli, and on Saturday they visited Ostia.

CONCLUDING BUSINESS

Sunday morning was devoted to a discussion of the subject raised by the consulting committee on long distance telephonic communication, relative to the protection of telephonic cables against corrosion due to electrolysis and other chemical action. This was the conclusion of the technical sessions.

That evening the delegates left for Turin, and on Tuesday they visited at Milan, where they inspected the new cars and rehabilitated street railway system in that city.

Midwest Association Considers Ways to Improve Service

INTENSE interest in whatever promises improvement to existing railway equipment and operating methods was the tenor of the simultaneous sessions of more than 300 members of the Midwest Electric Railway Association and the Service Betterment Committee of the A.E.R.A., at a three-day meeting held in Kansas City this week.

The word speed was heard frequently with speculation active concerning what new cars and equipment the forthcoming convention in Cleveland would bring to light. Speeding up of street cars, while specifically discussed in only one paper, was touched upon by speaker after speaker, indicating the consideration it is commanding on many properties. The association was welcomed to Kansas City by Mayor Albert I. Beach, who assured the delegates of the city's pleasure at their presence. Powell C. Groner, president of the Kansas City Public Service Company, replying to the Mayor, emphasized the necessity for a "cards on the table" policy of fair dealing with both city officials and the public in general.

DISCUSSION LIVELY AT LUNCHEONS

The two round-table luncheons held on Monday were devoted to the general subjects of transportation and maintenance. J. L. Adams, superintendent of transportation Denver Tramway, acted as chairman of the transportation group. Speakers included C. H. Evenson, Chicago; Del A. Smith, Detroit; Jeff Alexander, Houston; C. W. Wilson, Pittsburgh; D. L. Fennell, Kansas City; and Joe Ong, transportation engineer, Cincinnati. Mr. Evenson outlined the methods used for speeding up Chicago street car service. He declared that there is no panacea for slow operation and attributed the success achieved by his property to a combination of suitable equipment and an organization on the alert by constant pressure for better operating performance. Mr. Smith described the express car and local bus service on Jefferson

Avenue in Detroit and said that a schedule speed of 18 m.p.h. is easily maintained in the 4-mile express area on this line. Houston's progress in the development of a 10-cent express bus service was outlined by Mr. Alexander. Mr. Wilson explained the functions of the Pittsburgh research department, which was organized to provide a group of engineers unburdened with operating routine to make special studies directed toward the improvement of operating methods and the formulation of plans for the future. Mr. Fennell discussed the steps leading to the new bus permit in Kansas City under which a charge of 15 cents is made for trunk-line bus service. Although there was some drop in riding during the first few days following the increase from 10 to 15 cents in the trunk-line fare, he predicted a rapid recovery from this initial reaction. Mr. Ong presented a brief summary of the rehabilitation program being carried out in Cincinnati, where improvements in physical plant and service have produced increased patronage and a favorable outlook for the property.

The maintenance section luncheon was in charge of R. W. Bailey, general superintendent of maintenance Kansas City Public Service Company. Noise reduction, as viewed from the track construction angle, was the subject of a lively interchange of opinions. Contributing to the discussion were N. R. Love, Denver Tramway, who with A. E. Harvey, Kansas City Public Service Company, presented the pros and cons of the much-mooted question of resilient versus rigid track construction. Others who joined in the general discussion were W. J. Martin, Miami, Okla., and D. E. Druen, Kansas City. A summary of the latest operating and cost data on the gas-electric type buses in test operation in a number of cities in this country was presented by Mr. Cox of the General Electric Company.

Pointing out that the first requirement of a street railway is a sound roadway upon which the cars can operate

smoothly, that is paved in a way satisfactory to the public, and that can be maintained at the minimum cost, A. E. Harvey, superintendent of construction Kansas City Public Service Company, described what constituted good track. He urged that there were three important points for consideration, a foundation capable of carrying the heaviest cars and trucks, a track of long life, and finally a pavement of material satisfactory for use in track areas. Concluding his paper, Mr. Harvey gave details of the track construction in progress in Kansas City.

COURAGE AND BRAINS NEEDED

Declaring that there has never been a time when the future of the electric railway was more shrouded with uncertainty than at the present, J. N. Shannahan, president Omaha & Council Bluffs Street Railway, in a paper which in his own unavoidable absence was presented by C. D. Porter, general manager of the Omaha property, called upon electric railway men to combine courage with brains to solve the difficulties confronting the industry.

"The cities of this country must be served by a system of local transportation," said Mr. Shannahan, "and in my judgment the backbone of it will continue to be the car on rails." He continued: "Except in certain outstanding instances it seems to me that we ourselves have not met the fast changing situation with as much courage as we should have, and certainly not with far-sighted vision of our opportunities, to say nothing of our duty."

In a paper on present day conditions and tendencies in the industry, R. P. Woods, president Kansas City, Clay County & St. Joseph Railway, cited statistics compiled by the A.E.R.A. to show the operating experiences of 206 electric railways for 1926 and 1927. Mr. Woods reviewed some of the more pertinent factors showing the trend of last year's business. Outlining what he considers the factors involved in the status of the Midwest Association group of electric lines, he pointed out that the city lines during the four years ending with last year lost by gradual decline an average per line of 14.8 per cent of the number of passengers carried in 1923, and with it suffered a decrease in passenger revenue of 13 per cent. Hard study by the railway operators is needed, said Mr. Wood, to fit their properties into the new scheme of transportation economically and remuneratively. The management and personnel are as good as the best of other organized businesses, he continued, as is attested by the way the railways have survived the competition from private automobiles, buses and trucks, and retained the patronage they now possess.

Treadle operation and its effect on one-man service was discussed by R. L. Frehse, sales engineer National Pneumatic Company, who illustrated his remarks with a moving picture depicting the operation of treadle equipped street cars and buses in a score of United States and Canadian cities. L. E. Gould, president Economy Electric Devices

Company, discussed the possible savings to railway properties where changes in physical equipment will reduce the characteristic energy consumption of individual cars and where opportunities for increasing the individual car operating efficiency of the platform man are watched. Reference was made to the experiments carried on in Baltimore and in Chicago analyzing frictional losses in street cars. This paper will be abstracted in a forthcoming issue of the JOURNAL.

R. L. Hermann, transportation manager, Southwestern District, Westinghouse Electric & Manufacturing Company, discussed the progress being made in the improving of cars and car equipment. Declaring that safety, speed, comfort, and ease of passenger interchange are the primary considerations which will influence design of future street cars, Mr. Hermann outlined some of the accomplishments in new motors, control equipment which can be remotely operated, edgewound type resistors, the use of inductances to smooth the braking cycle, and the development of dynamic braking as a means of securing more rapid retardation rates and utilizing part of the energy ordinarily wasted in braking for car heating.

E. E. Soules, manager publicity department Illinois Traction system, which will be known in the future as the Illinois Terminal Railroad System, presented a number of slides illustrating a variety of advertising which is being carried on by electric railway companies throughout the country, more particularly referring to the material which is being released for local consumption. Mr. Soules stressed the importance of telling the public the story of electric railway facilities and advantages.

Summarizing the progress which has been made by his company in the development of a worm drive truck for street cars, William Bonn, railway representative of the Timken-Detroit Axle Company, pointed out that the problems encountered up to the present have been confined almost entirely to the brakes. He described how the brakes have been redesigned in a few essentials to meet the required conditions. A new shoe using a single brake block has been built and cams and leverages have been changed to use a higher air pressure. A center plate has been constructed which many operators, according to Mr. Bonn, believe has the advantages of a floating bolster and lacks its disadvantages.

The functioning of the safety council as organized in Kansas City and elsewhere was discussed in a paper by F. C. Lynch, director Kansas City Safety Council. Mr. Lynch outlined in some detail specific examples where the character of personnel on an organization so representative of strictly community interests has made it possible to secure co-operation in matters of civic welfare that could not have been obtained by more direct methods of approach on the part of the organizations concerned. Mr. Lynch divided his discussion of safety council work into two general

phases, the application to the organization itself and the participation of the organization in organized safety which has to do with the public safety. This paper will be published in abstracted form in a subsequent issue of the JOURNAL.

G. H. Roosevelt, General Electric Company, Chicago district, analyzed briefly some of the problems confronting the electric railways which must be met in effecting a substantial betterment of service. Airplanes will encourage greater speed in transportation, said Mr. Roosevelt, and the electric railways of the country must be prepared to capitalize on the advantages expected to accrue from co-operative rail and air lines. At the Monday evening banquet W. H. Manss, industrial expert Chamber of Commerce of Kansas City, was the speaker.

Election of the following officers concluded the business of the three-day meeting: President, F. G. Buffe, Kansas City Public Service; first vice-president, R. J. Lockwood, assistant general manager St. Louis Public Service Company; second vice-president, H. S. Robertson, president Denver Tramway; secretary-treasurer, J. A. Weimer, superintendent transportation Kansas City, Clay County & St. Joseph Railway; F. S. Welty, Robert P. Woods, A. R. Koonce and H. B. Cobban were elected to the executive committee, which now consists of eight men. The other four whose terms did not expire are: D. L. Fennell, B. W. Frauenthal, J. L. Adams, and A. E. Reynolds.

The program of entertainment provided by the Kansas City Public Service Company quite eclipsed all previous accomplishments in this respect and was notable for its exceptional caliber, the smoothly functioning efficiency with which it was executed, and the success with which interest and enjoyment was sustained to the very end.

Program for Coney Island Meeting

INTERESTING subjects have been selected for discussion at the annual meeting of the New York Electric Railway Association, to be held at the Half Moon Hotel, Coney Island, N. Y., June 14 and 15. The following program has just been announced:

THURSDAY, JUNE 14
10:30 a.m.

Address of the President.
Report of Executive Committee.
Report of the Treasurer.
Report of Special Committees.
"Increasing the Efficiency of Passenger Transportation in City Streets," by John A. Miller, Jr., editor *Aera*, associate editor, ELECTRIC RAILWAY JOURNAL.
Discussion, by Hawley S. Simpson, traffic engineer Essex County, N. J., and I. C. Fox, secretary A. I. Namm & Son, Brooklyn, N. Y.
"Selection of Men as it Affects Service," by Dr. C. P. Segard, assistant secretary Third Avenue Railway System, New York, N. Y.
Discussion, by A. L. Hodges, assistant

general manager Brooklyn City Railroad, and R. R. Hadsell, general superintendent of transportation New York State Railways, Rochester, N. Y.

AFTERNOON SESSION

"How the International Railway Company is Building Up Good Will," by B. J. Yungbluth, president International Railway, Buffalo, N. Y.

"Lack of Progress in Car Cleaning Methods," by Hugh Savage, superintendent of equipment Brooklyn City Railroad, Brooklyn, N. Y.

Informal discussion.

"Shops and Maintenance of Equipment," by Niles Persons, superintendent surface line shops, Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Informal discussion.

"Shops and Maintenance of Equipment from a Manufacturer's Viewpoint," by E. C. Brandt, assistant works manager, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

Appointment of Committee on Nominations.

Report of Committee on Nominations.

Election of Officers.

Extensive arrangements have been made for entertainment, including special luncheons, bridge, dancing and a beach party for the ladies. There will also be an 18 hole, medal play, golf tournament at the Fox Hills Golf Club, Staten Island, on Friday, June 15. Prizes will be awarded at dinner at the Club House.

Arrangements have been made for inspection of the Coney Island Shops of the Brooklyn-Manhattan Transit Corporation at any time during the day on Friday.

Indiana Utilities Association

Meets

AT THE annual general session of the Indiana Public Utilities Association, held in Indianapolis, Ind., on May 23, John B. Maling of Hammond, Ind., condemned government ownership proposals and attributed most of the agitation in Congress to representatives and senators from Western states. His subject was "Legislating the Government into Business."

Factors tending to increase popular distrust of state regulation were enumerated by Harvey Harmon, a member of the Indiana Public Service Commission, in a talk on "What Is Wrong with Regulation in Indiana?" Some of the declining confidence results, he said, from the practice of certain companies and speculative promoters in the state, the latter being particularly prominent in recent months. As evidence of the continuing attack on the commission, Mr. Harmon told how eight of the seventeen candidates for Governor in the primary campaign of the two major parties this year declared in favor either of abolishing or of radical amendment of the commission's powers. In discussing the abolition of the commission he ventured the opinion that with regulation abandoned, the financial position of interurbans and street railways would be so gravely impaired that every one would be thrown

into receivership. Federal control, for which the demand is increasingly insistent, would make utilities the football of national politics, he said.

Increasing costs of rate hearings which are sustained by consumers and the failure of some companies to allocate their value to the cities they serve were mentioned by Mr. Harmon. Some phases of expert valuation by utility engineers also came under his censure.

STATE REGULATION DISAPPOINTING

Outlining some of the functions of the association, Arthur Brady, receiver and president of the Union Traction Company of Indiana, Anderson, Ind., declared in his address that state regulation had been a disappointment to the consumers from the day of its inception in Indiana, because part of the people had been led to believe that it would result in radical rate reductions. Such a hope could not have been realized even in the normal economic conditions prevailing before the World War, and after the war began reduction was more impossible than ever because of rising price levels, he said.

Mr. Brady called attention to the increasing tax burden of state utilities and said he thought the association should study the subject. Discussing the Fed-

eral Trade Commission's present investigation of the work of public utility information bureaus, he said that he had seen "nothing to indicate that such inquiry has developed facts not entirely creditable to these bureaus."

"Training of Supervisory Forces" was the subject of an address by Morse Dell Plain, vice-president of the Northern Indiana Public Service Company, Hammond, Ind. The value of organized instruction in the management of personnel was emphasized by him. "It is the object of supervisory training courses today to show executives how to be leaders rather than drivers," he said. "Every employee has the right to be well managed, and unless he is, the company and the employee both are sufferers."

At the annual banquet those at the speakers' table were Mr. Brady; W. H. Onken, Jr., editor of *Electrical World*; Charles W. Chase, president Gary Railways; Robert I. Todd, president Indianapolis Street Railway; S. E. Mulholland, vice-president Northern Indiana Public Service Company; E. Van Arsdel, president Interstate Public Service Company; C. H. Rottger, president Indiana Bell Telephone Company, and Emmett G. Ralston, vice-president Indianapolis Power & Light Company.

American Association News

Rolling Stock

THE presentation of preliminary reports by the various special committees of the rolling stock division and suggestions for additions or changes occupied the attention of the general rolling stock committee at a meeting held at association headquarters New York City, on May 4 and 5. Those present were: A. T. Clark, chairman; W. S. Adams, V. W. Berry, C. Bethel, R. S. Bull, R. W. Cost, R. A. Hutchins, J. S. McWhirter, A. D. McWhorter, H. Savage, C. W. Squier and W. T. Vivian.

To promote a broader discussion of topics of interest to rolling stock men and also perhaps to interchange maintenance and operating data the committee favored having a general meeting of the rolling stock division at least once each year. Recommendations will be made regarding this so that some plan for a proper arrangement of the meeting may be provided. The question of giving further study to paint practice, methods of painting and various color combinations was discussed. The general opinion was that this might prove a desirable subject for assignment to a special committee next year, particularly regarding methods of spray painting.

Under revision of Manual sections the question of introducing a limit for carbon content in the specifications for quenched and tempered gears was discussed. Also there appears to be a demand for an axle larger than present association standards. The design of a

thicker type of brakeshoe and some questions regarding doors and end connections of freight cars were further subjects that are being considered in the revision.

Special committee No. 2 on motor coaches outlined the work being done by the committee in co-operation with other associations and committees. Special committee No. 3 on car design expects to have some information of interest on the tests of various drives for presentation in its report of progress.

A very complete report on lighting was presented by Special committee No. 4. The various subjects assigned for study were reported on and various comments and suggestions for additions and corrections were made. In discussing the use of twenty in series lamps it developed that some difficulty had been experienced from shopmen trying to interchange these lamps with standard five in series type. Those present suggested that manufacturers should contribute some means of making the new type of lamp so that it would not be interchangeable with the standard five in series type. Special committee No. 5 on bearings is obtaining information from a questionnaire. This will be analyzed for the progress report this committee will make. Committee No. 6 on lubrication will also present a progress report. Special committee No. 7 on automatic couplers has a meeting scheduled at which various points to be decided will be taken up and a preliminary report made.

Data are being collected by special committee No. 8 on motor brushes and tests are being conducted. Special committee No. 9 on noise reduction has also been conducting tests on wheel noise and a report of the investigation will be made. Wheel welding, assigned to special committee No. 10, is receiving much attention. A large amount of data have been collected and the work is progressing but it is too soon to make definite recommendations. Special committee No. 11 on current-collecting devices presented a report and analysis of information obtained from a questionnaire, together with recommendations for trolley bases and poles. The analysis also includes information on trolley wheels. Special committee No. 13 on limits of wear is collecting information for analysis.

Education

CONVENTION activities proposed by the committee on education, as well as the final draft of the annual report, were submitted and approved at a well attended meeting of the committee in New York on June 5. This year two series of training meetings for conference leaders will be held. One will be for non-transportation men, and will be under the leadership of Frank Cushman, of the Federal Board of Vocational Training. This series of meetings will be an amplification of a similar set of meetings held during the 1927 convention under Mr. Cushman.

The second series of meetings will be conducted to develop leaders for groups in the transportation departments. William A. Durgin, Director of Public Relations of the Commonwealth Edison Company, has agreed to conduct this series of meetings. This is the first attempt to develop conference leaders of transportation men conducted on a national basis by the association.

The conference periods will be shortened and will be held only from Monday to Friday, inclusive, and will not attempt to cover the extra day, as last year.

A. J. Rowland will act as sponsor for the non-transportation group, and J. S. Hyatt in a similar capacity for the transportation men. Outlines of the two programs submitted to the committee were approved subject to such modifications as might be suggested by the conference leader.

There will be an educational luncheon conference similar to that held last year, which is being organized by C. D. Smith, of the Cleveland Railway. This luncheon conference will be open to company executives who are interested in the general question of employee education.

H. H. Fenton has written and developed a two-act playlet that dramatizes the old and the new method of dealing with accidents. An actual demonstration was given the committee during the afternoon of the meeting by employees of the Public Service Co-ordinated Transport. This dramatized so clearly the advantage of reinstruction and the different attitude of the men with the two different meth-

ods of handling serious accidents that the committee voted to have this playlet presented before the T. & T. Association. It is expected that arrangements will be made so that the same group of Public Service employees will go to Cleveland to give this demonstration.

Starting only three years ago, the progress that has taken place in developing interest in employee education has been remarkable. The committee on education, under the leadership of Edward Dana and H. H. Norris, of the Boston Elevated has been largely responsible for this accelerated progress.

An attractive series of exhibits are being arranged by several companies, actively engaged in educational work and will be displayed at the convention in an appropriate booth. The only exhibit of this kind heretofore was made in 1926. The exhibit of 1928 will contrast the work and the expansion of educational activities in the past two years.

Those in attendance at the meeting were Edward Dana, chairman; H. H. Norris, H. H. Fenton, A. J. Rowland, J. S. Hyatt, J. A. Dewhurst, A. B. Gibson, C. D. Smith, L. P. Baurhenn, Guy H. Hecker, and H. B. Potter. Managing Director L. S. Storrs attended the sessions for a short time.

Rolling Stock Committee No. 4

PRESENTATION of preliminary reports and outlining material to go into the final report constituted the business at a meeting of rolling stock committee No. 4 on lighting, held at association headquarters, New York City, May 21. Those present were: R. W. Cost, chairman, A. L. Broe, W. W. Brown, H. S. Deininger, E. E. Dorting, and H. G. Lewis.

The special committee appointed to investigate the subject of head and tail lighting requirements presented a preliminary report covering a discussion of double headlights, illumination of front dashers of cars, and a list of standard headlight lamps for electric railway service. A brief treatise on the application of stoplights to cars will be included.

A revised report on the subject of tail lights, classification lights and illuminated signs was presented. Marker lights, where operated from rail or trolley voltage, are to be included in this report. A report will be prepared on signal and emergency lights for cars and those present considered the use of signal lights desirable for one-man car operation to indicate when rear doors have been closed properly, and also for heavy traction where cars are used in train service.

Investigation as to the illumination of electric railway properties from trolley voltage has been made. Additional material is to be presented in the study of car lighting with a view to presenting improvements and economies due principally to standardization of uniform practices. A recommended practice is being developed in lamp inspection and

specifications for lamps for different systems will be given. The committee is considering the advisability of having certain features on lighting exhibited at the Cleveland Convention.

Publications

MATTERS of policy pertaining to *Aera* were the principal subjects of discussion at a meeting of the committee on publications held at association headquarters on June 1. J. W. Welsh, general secretary, presented a financial statement showing that the paper is at present well within its budget allowance and may be expected to finish the current year in the same condition. Mr. Welsh also gave figures concerning circulation showing that the number of subscribers is now substantially the same as at the beginning of the year.

Careful consideration was given to a suggestion that *Aera* be mailed flat in envelopes rather than folded in wrappers as at present. It was brought out that the additional cost of mailing in envelopes would be considerable, and it was therefore decided to continue the present method.

J. H. Hanna, chairman, stated that the progress made thus far in shaping the publication to the policy decided upon by the executive committee last year had exceeded his expectations. He spoke also of the dual functions of discussing the activities of the association and of presenting material of interest and value to the rank and file of the electric railway industry. Mr. Sawyer expressed the opinion that each issue was coming nearer to the accomplishment of this purpose.

Consideration was then given to a number of specific suggestions from readers. Some of these were considered to be impracticable and were disapproved by the committee. It was decided, however, to endeavor to publish a series of inspirational articles telling about noteworthy achievements of individuals in the industry.

The possibility of making a substantial increase in the circulation of the publication was then discussed. It was the consensus of opinion that particular attention should be paid to company section activities with a view to increasing the number of company section members of the association.

The remainder of the meeting was taken up by discussion of matters pertaining to the collection and publication of statistics by the association. Generous praise was given by all the members of the committee to E. J. Murphy, chief statistician, for his work.

Those present at the meeting were: J. H. Hanna, chairman; H. V. Bozell, vice-chairman on *Aera*; F. W. Doolittle, vice-chairman on statistics; T. R. Langan, H. H. Norris, A. S. Richey, W. H. Sawyer, R. S. Tompkins, E. P. Waller, L. F. Stoll, representing Charles Gordon, L. S. Storrs, J. W. Welsh, G. C. Hecker, E. J. Murphy and J. A. Miller, Jr.

News of the Industry

No Referendum on Eastern Massachusetts Public Control

An attempt to obtain a referendum on the bill signed by Governor Fuller of Massachusetts a short time ago to extend for five years the public control of the Eastern Massachusetts Street Railway has resulted in failure as a consequence of a ruling by Acting Attorney General F. Delano Putnam that it is an excluded matter under the initiative and referendum amendment to the Constitution. An original referendum petition, signed by ten citizens, was filed with Secretary of State Frederic W. Cook, who referred it to the attorney general's department for a ruling. In his opinion, Mr. Putnam states, it is not a proper matter for referendum, in that section 12 of the act deals with the powers of the courts, matters which are specifically excluded from the operation of the initiative and referendum.

More Moves in New York City Fare Case

Permission to bring before it additional papers and records in the New York subway fare appeal was granted by the Supreme Court of the United States on June 4. The decision was in connection with New York City's application to file further documents.

The court also definitely set Oct. 1 as the date for hearing on the appeal. The court announced that originally the case had been set tentatively for hearing on Oct. 1, ahead of seventeen other cases advanced for hearing at the beginning of the fall term.

The court's action grants the writ of certiorari filed by New York City agents to compel the Federal Statutory Court of New York to send up to the Supreme Court all the papers, documents and records in the case involving the city and the Interborough Rapid Transit Company.

Good Safety on Chicago Rapid Transit Lines

New records for safety of employees were established by the Chicago Rapid Transit Company in 1927, according to Melvin W. Bridges, safety engineer.

Employees of the Loop division led the transportation department of the "L" lines with an almost perfect record of 99.51 per cent as their safety operation average for the twelve months. During this time there was only one disabling injury to an employee and only nine days of lost time due to employee accidents. The Metropolitan division employees of this department came second with a record of 97.31 per cent safe,

and the South Side division was third with a percentage of 97.30.

Mr. Bridges said that in carrying on safety work during 1927 a total of 358 meetings were held among the employees; that suggestions for raising the standard of safety on the "L" are offered and discussed by the employees, and those found worth while are used.

Wage Contract Still Under Negotiation in Toronto

After negotiations extending over a period of two weeks the Toronto Transportation Commission, Toronto, Ont., has offered to continue the contract with union platform men which expired on March 31 after being in existence for two years. The feature of the agreement presented by the union was a demand for two weeks' vacation with pay. The union took the stand that its members were civic employees and should receive a vacation without loss of wages. The offer of the commission was rejected and the union committee instructed to continue its negotiations.

Fare Question Up in Columbus

When the Council of Columbus, Ohio, considers the proposed 25-year franchise of the Columbus Railway, Power & Light Company, the fare problem may be complicated by the fact that the power franchise is held by the company as assignee of the Indianola Heating & Light Company. That grant was made on Aug. 14, 1903, and expires on Aug. 14 this year.

Hints of the need for an increase in fare first came during the franchise negotiations of the summer of 1926. An attempt was made by members of the Council at that time to combine the power rate with the railway rate in the proposed franchise. C. C. Slater, president of the company, declared at that time that if the power rate question were injected into the franchise, and the price of power lowered, it would certainly be necessary to increase fares and hinted at a 7-cent car fare. The franchise intended to apply to the railway, passed by the City Council on Sept 25, 1926, but rejected by the company, contained a provision for a 5-cent fare.

Parade of Progress in Baltimore

400 members of local Chamber of Commerce inspect railway plant and witness progress in car design, with horse car in vanguard of interesting procession

A HORSE CAR, the only relic of early transportation days now in the company's possession, trundled its way through a few Baltimore streets on April 25 in connection with a display made at Carroll Park shops for the edification of about 400 members of the Baltimore Association of Commerce, guests for the afternoon of President C. D. Emmons and the United Railways & Electric Company.

First there was a luncheon to the visiting group, members of which were carried to the shops in buses. Then came a thorough inspection of the shops and storeroom. As a finale there was a parade of street cars of various types, from the first crude conveyances to the finished products of today. The horse car served as the vanguard of this interesting procession. One of the first electric cars followed the horse-drawn vehicle after which came a series of cars showing gradual development to the day and generation of the articulated car.

When the guests reached Carroll Park they were individually greeted by A. T. Clark, superintendent of rolling stock and shops, who was aided in the reception by his assistant, H. A. Leonhauser, and other members of the shops'

staff. As they entered the buildings they were welcomed by President Emmons and General Manager Potter.

A tempting luncheon was served in the carpenter shop and the inspection was then started. Special points of interest to which attention was called were all numbered, and were explained in a brochure handed to each visitor. The parade of the street cars consisted of:

- Horse-drawn car, built about 1860.
- Single-truck 15-ft. closed car (early electric car), built about 1890.
- Single-truck 18-ft. closed car (early electric car), built about 1895.
- Single-truck nine-bench open car, built about 1895.
- Single-truck 20 ft. 9 in. closed car, built about 1898.
- Single-truck 23 ft. closed car, built in year 1904.
- Double-truck convertible car, built in year 1900.
- Double-truck 28-ft. closed car, built in year 1902.
- Double-truck twelve-bench open car, built in 1902.
- Double-truck semi-convertible car, built in 1915.
- Three car train, built in 1919.
- Motor car and trailer, built in 1920.
- Single-truck safety car, built in year 1920.
- Single-truck safety car, reconstructed in company's shop in 1923.

Double-truck Peter Witt car, built in 1919.

Three-truck articulated car, built in 1924.

This exhibit of car types from the beginning of railway transportation in Baltimore to the present day was presented as a climax to the inspection. In a description of the parade which he read Robert B. Varnum said there was a great deal of difficulty in getting the first car line started. The applicants for railway franchises encountered legislative opposition and opposition from merchants who contended that street cars would drive business away from their doors. Finally the needed authority was obtained. The first Baltimore horse car ran on Broadway and Baltimore Street.

The horse car in the exhibit, almost identically as it was 69 years ago, ran on Pennsylvania Avenue, from North Avenue to Baltimore Street, and thence to old President Street Station of the Pennsylvania Railroad. At hills it was met by a "hill-boy"

in 1893. It was more commodious than its predecessor, about 3 ft. longer, and with correspondingly more generous space. This car was built by the Brownell Car Company, St. Louis, and operated on lines of the Baltimore Traction Company. In the same year this company began operation of a Brownell open car—a nine-bench conveyance designed for summer comfort, and one of a type that proved highly popular with riders.

Still another progressive step in car

Our little extemporaneous "parade of the electric pony," as a newspaper man has chosen to call it, has passed. We trust it has been interesting to you. The miniature pageant has gone by with its lesson of development of car service, but the development of the car is not complete. The very best thought of the ablest engineers obtainable by this company is constantly directed toward improvements—improvements to meet traffic conditions; improvements to keep pace with the times; improvements to effect economies; but first and foremost, improvements to afford the people who ride the cars greater comfort, greater convenience, greater safety, greater satisfaction, and an altogether better service.

Parking in Downtown Philadelphia

The Philadelphia Rapid Transit Company, Philadelphia, Pa., has opened its public parking area on the south side of Locust Street, east of Fifteenth, to enable the clearing of Locust Street in the vicinity of the Mitten Building and the Mitten



There was no lack of contrast in the things shown members of the Chamber of Commerce at the Baltimore inspection



who attached an extra horse to the vehicle to help draw it up the grade.

Before the horse car was a dozen years old many experiments had been made to find a means of quicker propulsion of the cars. A steam dummy was tied on an East Baltimore line, but it made a great deal of noise and a great deal of smoke and it was found to have operating defects that doomed it to abandonment within a short time.

An experiment was made on the Hampden line with a third-rail electric car in 1885. The cable cars came on the scene soon after this. A dozen cable lines were built, and work was still proceeding on other lines when the overhead trolley began to demonstrate its usefulness. So at this point Mr. Varnum referred to the very earliest electric car run on a line of the Baltimore City Passenger Railway in 1891. Immediately the overhead trolley was recognized and established as practical, the attention of the railway world was concentrated upon the development of the car, the track, the overhead lines and all the accessories of service. The next car appeared on the streets of Baltimore

development was the introduction of the 23 ft. Brill car in 1904. In discussing this model Mr. Varnum emphasized the fact that much of the improvement in car models has been in the mechanism of the vehicles. He said it was not always possible to distinguish models by outward appearance except through the most careful scrutiny, but that motors had been constantly the object of improvement, and all else of the car that makes for smoother and more comfortable running, for speed, for acceleration, for braking, for safety, has undergone a transformation for the better.

In 1900 the Baltimore company put in operation a double-truck convertible car, possessing features which represented a great advance over previously operated cars, and destined to become the basis of a standard car that was to thrive for some time. So Mr. Varnum went down the line of cars explaining each one briefly and adding a touch of local color here and there, until finally he came to the three-truck articulated car, pronounced by many as superior to any other style car in its fundamental features. In conclusion he said:

tours intercity terminal. Later a combined bus terminal and garage will be erected on the site.

An announcement issued by the company said:

The parking plan will not be operated for profit, since a parking fee of only 25 cents a day will be charged. Rather it will be another link in the chain of parking fields, including those at the Sixty-ninth Street and Bridge Street elevated terminals which are operated by Philadelphia Rapid Transit, as an inducement to the motorists to leave their cars outside the congested downtown areas.

R. T. Senter, president of the Philadelphia Rapid Transit Company, in discussing the parking evil, is quoted as follows:

Just as Philadelphia Rapid Transit is pointing a way to the proper method of handling the problem of bus parking by maintaining terminals on private property for its intercity buses, so we are now establishing the parking space at our expense in an effort to show the way by which the motorist who now occupies very valuable street space can be accommodated at small cost to the city as compared with the frequently suggested alternative of widening or double-decking the streets.

Wage Agreement in Cincinnati to Go Unchanged

The wage agreement between the Cincinnati Street Railway, Cincinnati, Ohio, and its employees will not be changed this year. There is provision in the basic agreement for an adjustment every two years, to be made on July 1. In 1926 the men won a small pay increase, but this year, it is said, they do not intend to ask for any advance. The only changes to be sought will be in split runs. It is said that the men desire that when working split runs, the entire days work be completed within twelve hours. It is said that at present this spread is sometimes exceeded.

Tram Home Rule Proposed in Kansas City, Kan.

An ordinance giving Kansas City, Kan., home rule over cars operated within its limits was placed on first reading on June 4 at a meeting of the City Commissioners of Kansas City, Kan. The proposed new ordinance provides that no changes shall be made in connection with the operation of street cars without the permission and authorization of the City Commissioners. Penalty for violation of the ordinance will be a fine of not less than \$5 and not more than \$500.

Agreement Unchanged in East St. Louis

The wage scale and working agreement of the East St. Louis & Suburban Railway, East St. Louis, Ill., have been extended for one year. Under the contract motormen and conductors of two-man cars are paid a maximum of 59 cents and one-man car operators 64 cents an hour. The former contract with the Amalgamated expired on May 1. The men at first sought increases ranging from 11 to 21 cents an hour. Approximately 485 motormen, conductors and shopmen are employed by the company.

Survey Under Way in Louisville

J. W. Burke, traffic expert of New York formerly with J. G. White & Company, will aid the Louisville Railway and the Public Utilities Bureau, Louisville, Ky., in a survey intended to furnish suggestions for improving car and bus service. New bus routes, changes in car line routing and other matters intended to improve service will all be incorporated by Mr. Burke in his report along with the recommendations to be made by him at the conclusion of his investigations.

Among Recent Moves in Suburban New York

Supreme Court Justice Morschauer on June 1 denied the Merchants' Community Bus Transportation Company's application for an injunction against the

North Street Transportation Company, a subsidiary of the Third Avenue Railway, restraining it from operating buses between Yonkers and White Plains. The Merchants' Company alleged the North Street line was infringing on an exclusive franchise.

The purchase of the Sound View Bus Transportation Company by the New

York, Westchester & Boston Railway has been announced. The Sound View Company had operated 18 miles of line in Westchester. The railway, a subsidiary of the New York, New Haven & Hartford Railroad, announced it would assume control as soon as the Public Service Commission approves the purchase.

New Jersey Company's Celebration

Dinner to President McCarter one of many events in connection with corporation's 25th anniversary. Loyalty of employees fittingly recognized. Buildings decorated

MEN prominent in the public, civic, professional, business and industrial life joined in celebration of the 25th anniversary of the Public Service Corporation at the dinner at the Robert Treat Hotel, Newark, on June 1 to which reference was made in the JOURNAL for June 2, page 914.

The keynote of the speeches was co-operation between Public Service and the public, a note sounded in particular by Thomas N. McCarter, the organizer of the corporation and its president since formation. Among other things Mr. McCarter said:

Our banner has been public service, and never have the navigators of the ship taken their eyes from that banner. Never has the banner been lowered.

My enjoyment of this occasion is tempered by the mistakes we have made, for which I assume all responsibility. I have no objection to criticism. We are open to it. But our purpose has been, and always will be, to better serve the public.

While it is pleasant to look back over our accomplishments, yet our eyes are fixed upon the future, not on the past. New Jersey is not in the twilight of its life. It is, rather, at its sunrise. New Jersey has just commenced to grow.

We here pledge ourselves to furnish all the power needed in the state for its great future expansion, to furnish gas for all industrial and other purposes.

We are doing the best we can with the local transportation problem. We have been carrying on the business below cost, lower than any place else in the country, with the unfortunate exception of New York, where the city has millions invested in transportation, with no return upon that investment.

He gave it as his belief that the transportation problem will be solved only by unified operation.

BONUS TO EMPLOYEES ANNOUNCED

Early in his address Mr. McCarter announced that the board of directors had authorized the payment of a bonus of 10 per cent of their annual salary to all employees who have been with the corporation and its subsidiary companies 25 years. There are 750 such employees.

Governor Moore, introduced as a "graduate of Public Service," paid high tribute to the genius of Mr. McCarter for his work in organizing and carrying on the corporation, for his vision and his devotion to the task he had set before him. He said:

We in New Jersey are proud of Public

Service. It is more than a corporation. It is an institution. Sometimes I think that Public Service doesn't believe we are proud of it, judging by some of the legislation and the remarks made in Trenton. To that I can only quote the Biblical line. "Whom the Lord loveth, He chasteneth."

THE NEED FOR IMAGINATION

Owen D. Young of the General Electric Company emphasized the vital part played always by imagination in the progress of mankind. "After all," he said, "imagination is the leadership of the world." And he went on to tell how every accomplishment of man, every "line drawn in the map of the world," first lived in imagination, then became reality through the courage and self-sacrifice of man.

Arthur W. Thompson, president of the United Gas Improvement Company, stressed the theme that the 25th anniversary of the company was more than a celebration of a mile post in the life of a corporation. He said:

Behind the corporation are the men and I believe it is to them that we here tonight pay tribute. We are celebrating their accomplishment, not merely a corporation anniversary.

In landing the work of the early builders of the corporation E. W. Wakelee paid particular tribute to Mr. McCarter. Mr. Wakelee said:

I believe Mr. McCarter will go down in history as one of the greatest builders New Jersey has ever had.

He emphasized the need for still greater co-operation between the corporation and the public and officials.

Some interesting sidelights on public utility operation in the early eighties developed during the evening. It was recalled that it was in New Jersey that Thomas A. Edison achieved a great deal of his success and as early as 1880 was operating a commercial electric railway at Menlo Park, though it was not until some few years later that electric cars began to displace the horse and cable cars. On May 9, 1881, the Common Council of Newark authorized the expenditure of "not less than \$300 for the purpose of erecting five suitable posts in Military Park and running a wire upon the same, provided the Weston Electric Lighting Company will burn five lights until midnight without charge for lighting, furnishing attendance, electricity, etc., at their own expense." Since the organization of Public Service the cor-

poration has spent \$162,000,000 for electric properties and improvements, while total expenditure for all properties amounted to \$295,000,000.

Among those who attended the dinner were:

P. S. Arkwright, E. A. Armstrong, Joseph F. Autenrieth.

A. E. Bauhan, Louis P. Baurhenn, H. F. Bell, H. A. Benedict, John Bentley, R. O. Bentley, Frank Bergen, Colonel Charles N. Black, Samuel T. Bodine, William W. Bodine, Newton W. Bolen, M. R. Boylan, Luke C. Bradley, W. J. Brennan, Emmett A. Bristol, H. W. Buck.

N. A. Carle, Ralph S. Child, Paul S. Clapp, Harlow C. Clark, S. H. Cleland, Jr., B. C. Cobb, William I. Cooper.

Richard E. Danforth, Harry V. Drown, Edward H. Earnshaw, Senator Edward I. Edwards, VanHorn Ely.

B. C. Forbes, Harry K. Ford, Carl T. Freggens.

Gen. Frederick Gilkyson, A. S. Grenier, J. Horace Harding, W. B. Hartshorne, William C. Heppenheimer, H. T. Herr, Garret A. Hobart, J. H. Hanna.

T. A. Kenney, Col. Anthony R. Kuser, John L. Kuser.

Horatio G. Lloyd, James P. Logan, F. A. Lydecker, Adrian Lyon.

Thomas N. McCarter, Thomas N. McCarter, Jr., Uzal H. McCarter, Uzal H. McCarter II, James H. McGraw, William H. Meadowcroft, A. C. Middleton, J. F. Mitchell, Governor A. Harry Moore, Clinton E. Morgan, John F. Murray, Jr.

Arthur E. Newbold.

Matthew L. O'Brien, W. H. Onken, Jr., F. S. Osborne, Farley Osgood, J. L. O'Toole.

John H. Pardee, Arthur N. Pierson, P. W. Pierson.

J. S. Rippel, David B. Robb, Dwight P. Robinson.

W. H. Sawyer, Martin Schreiber, George S. Silzer, George T. Smith, William R. Smith, Frank H. Sommer, Thomas Sproule, L. S. Storrs, Edward T. Stotesbury.

William H. Taylor, Arthur W. Thompson, Paul Thompson, C. L. S. Tingley, R. S. Tomkins.

T. W. VanMiddlesworth.

Edmund W. Wakelee, John I. Waterbury, E. F. Weston, Arthur Williams.

Owen D. Young, Percy S. Young.

John E. Zimmerman.

The dinner was, of course, the culminating feature of the celebration. But it was, after all, only one event in a series which marked the anniversary. A new motion picture entitled, "The Public Servant of a Great State," setting forth the activities of Public Service companies, is being shown in several cities in Public Service territory.

The growth and development of the Public Service transportation system, especially in the field of the bus, has been graphically illustrated by pictures of deluxe bus operation, as well as the plant and equipment necessary to maintain and operate the fleet of more than 1,200 buses.

In honor of the anniversary many of the Public Service buildings will be decorated, for the entire month. The commercial office windows will contain appropriate displays for about two weeks. The decorations will include flags and bunting, and six of the commercial office buildings will have an electric sign reading "1903-1928." Floodlights will be used to illuminate

the exteriors of some of the buildings at night.

The story of the growth of the company is told in the 60-page illustrated booklet "Public Service Review 1928—25 Years of Public Service."

N.E.L.A. Meeting

Industry moving forward rapidly. Market development effort bearing fruit. Puget Sound wins Coffin award

WITH customary enthusiasm and purpose the 51st convention of the National Electric Light Association was held at Atlantic City, N. J., June 4 to June 8 with 8,000 utility representatives at the meetings. From the speeches and papers it was generally conceded that the electric light and power industry was moving forward rapidly; that market development efforts were bearing fruit; that closer co-operation was evident between the national associations in the industry; that public understanding was a big problem and that undivided executive attention was necessary for successful public relations. An announcement that the industry had contributed \$3,000,000 to the National Research Council program was evidence of the co-operation given for the public benefit.

P. S. Arkwright succeeds H. T. Sands as president and J. F. Owens and A. W. Thompson were elected vice-presidents. M. S. Sloan and W. A. Jones continue as vice-presidents and P. S. Young continues as treasurer.

An address by James H. McGraw entitled "The Power Industry in the Marketplace" referred to the new competition which is teaching the public to discriminate, not necessarily as to what may be best in the absolute sense, but as to what is most desirable. He stressed the need of direct appeal and of advertising messages that would arouse the general public.

An enlightening message on "Railroad Electrification" was given by Britton I. Budd, chairman of the committee on electrification of steam railroads. He summarized conditions in Europe and America, referring to the accomplishments and plans of such properties as the Chicago, Milwaukee & St. Paul, the Illinois Central, the Virginian Railway, the Pennsylvania Railroad, the Great Northern, the Philadelphia & Reading and the Delaware, Lackawanna & Western. These plans were all projected to increase capacity, to improve service and to promote general economy.

A high spot in the speech of J. F. Owens, chairman of the public relations committee, National Section, was touched when he said that rendering a service was only half the job; that it was necessary to disseminate information so as to enable the recipient of the service to use that service wisely and well. He stressed the necessity for the use of paid advertising columns in the press to give to the public "a straightforward, well thought-out and carefully prepared account of stewardship."

The Coffin Award for 1928 went to the Puget Sound Power & Light Company.

Would Prepare Sound Program for Chicago

Expressing impatience with the long delays and with the obstructions placed in the path of settlement of the Chicago railway problem by various political interests, members of the local transportation committee of the City Council have adopted a resolution which calls for the immediate preparation of a sound railway program regardless of the attitude or opinions of the transportation companies or of interested political factions. Alderman D. S. McKinlay, author of the resolution, held that the prospect of obtaining the legislation necessary to put in effect the five recent railway bills seemed indefinitely lost as a result of the failure of the special legislative session held last month to take action, and urged that a definite plan be formulated by the committee and submitted to the voters without further appeal to the Legislature. The following program is suggested:

That the committee take up with the Chicago Surface Lines the matter of renewing the 1907 ordinance with such changes, including unification of service with the Chicago Rapid Transit Lines, and if possible, an amortization provision, as may be deemed desirable.

That the committee negotiate with the Rapid Transit Company for the granting of a definite term franchise, not to exceed 40 years, such franchise also to include unification of service with the surface lines, and if possible, an amortization provision. Finally, in the event the companies fail to agree on terms for unification of service, then the attorneys for the committee shall be directed to proceed before such regulatory commission, local or state, as then shall have jurisdiction, to compel the transportation utilities to provide unified service to Chicago on such terms as such commission may determine are just.

Should the railways persist in their unwillingness to accept a settlement as devised by the committee, the aldermen intimated that they would turn to the alternative Lisman plan, which has been pending in Council for nearly eighteen months. It is believed that action by the State Legislature would not be required to put this plan into effect.

Skip-Stop Plan in Indianapolis Postponed

Action on the proposed skip-stop system for one of the principal city car lines of the Indianapolis Street Railway has been postponed by the Indianapolis, Ind., Board of Public Works pending completion by the city legal department of a formal opinion that the works board has jurisdiction to regulate the schedule. The proposed schedule, drafted by attorneys for patrons, provides that cars stop at every third intersection. Cars would be marked with a red diamond, a green oblong, and a black circle to indicate stopping corners. It is contended that during the busy hours, a considerable saving of time would result if this plan were followed.

Milwaukee Program Being Expedited

Operation will be begun soon by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., over new tracks from Soldiers' Home to 68th Street, on the west side of Milwaukee. At this point the company is relocating slightly more than a mile of track, moving it from Fairview Avenue to private right-of-way free from grade crossings. Four tracks are to be provided, two for rapid transit trains operating to Watertown, Burlington and East Troy, and the other two for Wells-West Allis suburban cars.

Later in June the company expects to begin operation of its Racine-Kenosha interurban trains over 9 miles of new track immediately south of the city of Milwaukee. The new track is entirely on private right-of-way and is substantially free from grade crossings. It will make high-speed operation possible and insure more satisfactory maintenance of schedules than the present route, which is located almost exclusively along heavily traveled public streets and highways.

The Milwaukee Common Council has acted favorably upon the company's franchise application for a subway and rapid transit outlet toward the west. Some further preliminary steps need to be taken, but the company is hopeful of being able to begin physical work on this improvement this year.

Wage Renewal Suggestion Rejected in Connecticut

Employees of the Connecticut Company have rejected the proposal of the company to renew the present wage schedule, which expired on June 1. It is known that the employees are taking their stand for increased wages on the grounds that Massachusetts companies controlled by the New Haven road pay a higher rate with an eight-hour minimum day. Carhouse hands, shopmen and other workmen, all designated as non-uniform employees, who are members of the Amalgamated Association, also are seeking increases. President John K. Punderford of the Connecticut Company, referring to the result of the voting, said it was probable that officials of the company and representatives of the employees would confer at once with the hope of settling the problem without arbitration.

Free Rides in Michigan City

Free street car and bus rides for everyone was a feature of the city-wide bargain day sponsored on May 22 by the Chamber of Commerce of Michigan City, Ind. Through the efforts of the local retail board of the chamber, all passengers on the cars of the Chicago, South Bend & Northern Indiana Railway and on the buses of the Jahn's Bus Line and Shore Line Motor Coach Company were carried free between

9 a. m. and 4 p. m. Practically every retail store in Michigan City advertised special low values on their goods and urged their patrons to take advantage of the free transportation service on that day.

Car Ordinance Given Columbus Company

A certified copy of legislation passed by the City Council of Columbus, Ohio, making all streets with car tracks main thoroughfares and establishing a speed limit of 25 m. p. h. for street cars, has been forwarded to the Columbus Railway, Power & Light Company by City Clerk Wilkins. Work on the establishment of the skip-stop system will not be started until acceptance of the main thoroughfare ordinance by the railway.

New Fares in Lawrence

A new schedule of railway and bus fares for Lawrence, Kan., was approved recently by the Public Service Commission. The approved schedule is one fare for 10 cents and two for 15 cents with free transfers between the two classes of transportation. The operating company is the Kansas City, Kaw Valley & Western Railway.

Franchise Ordinance for Toledo Approved

By a vote of seventeen to one with two absentees the City Council of Toledo, Ohio, approved the plan of railway settlement presented to it by Mayor William T. Jackson two weeks ago and formulated along the lines of agreement worked out by Commissioner E. L. Graumlich and the Street Railway Board of Control in negotiations covering several months. After considerable study the plan was endorsed unanimously by the railroads and telegraphs committee of City Council. It had unanimous indorsement and support of the Chamber of Commerce, and it was approved by the city commission on publicity and efficiency. The ordinance will become effective in 30 days provided it is not subject to a referendum vote.

Business leaders consider the plan the most forward-looking step in transit development undertaken in Toledo since the Milner plan was launched more than six years ago. The present ordinance appears to have corrected most of the former troubles without committing the city up to a transit monopoly for a long period of years. Extensive repaving of streets and development of new home districts will be undertaken as a result of the passage of the new transit plan, it is believed.

The new plan is a supplementary agreement between the city and Community Traction Company. Details were given in the ELECTRIC RAILWAY JOURNAL issue of May 12. Adequate guarantees to both interests are set up in the ordinance. The entire plan is based on a five-year period.

Recess Appointment for P. J. Farrell

The United States Senate failed to act upon the nomination of Patrick J. Farrell to become a member of the Interstate Commerce Commission to succeed John J. Esch of Wisconsin, but he was given a recess appointment by President Coolidge on June 7. This appointment will fill the gap in the commission's ranks.

Date Set for Hearing on Rome Fare Request

June 12 has been set by the Georgia Public Service Commission as the date for hearing the plea of the Rome Railway & Light Company, owned by the Georgia Power Company, for an 8-cent cash fare instead of the 6-cent fare now in effect; to sell two tickets for 15 cents, and to establish a 4-cent fare for school children instead of the present 3-cent fare.

Hearing in Hamilton on June 12

The application of the Hamilton Street Railway, Hamilton, Ont., to increase its fare and that of the men to win a wage advance will be brought before the Ontario Railway and Municipal Board on June 12. This decision was made on May 21, when the board sat to hear evidence in the application of the railway men for a wage increase. C. R. McKeon, chairman of the board, said that while the board could give no decision until it heard the evidence, any action favorable to the men's application would depend largely upon the company's ability to pay increased wages. Any decision by the board will be retroactive to May 1.

Endeavor to Fix Blame in Illinois Wreck

Three separate investigations are being conducted to fix responsibility for the collision of two trains of the Illinois Traction System near Danville, Ill., on May 31, which resulted in the death of seven persons and serious injuries to 29 others. Both cars were limited of semi-steel construction. The wreck occurred about 700 ft. east of the siding and approximately in the middle of the 2-mile stretch of tangent track. The scene of the wreck is at Fithian, 7 miles west of Danville, Ill.

Would Operate One-Man Cars on Fort Wayne Line

Permission to operate one-man cars on its lines between Fort Wayne and Garrett, Garrett to Kendallville and Garrett to Waterloo was asked in a petition filed recently with the Indiana Public Service Commission by the Indiana Service Corporation, Fort Wayne. The petition sets out that receipts have been steadily decreasing for the past year.

Recent Bus Developments

Business Men Headed by Railway President Buy Cincinnati Taxis

Negotiations for the purchase of the Zumstein and the Town Taxicab Companies by a group of business men represented by Walter A. Draper, president of the Cincinnati Street Railway, have been consummated. The two taxicab properties will be merged and operated as one concern by a new company. Mr. Draper said:

A group of Cincinnati business men has completed an agreement to purchase the Zumstein Taxicab Company and the Town Taxi Company, Inc. A new company will be formed to take over the business of both companies. It is expected the details will be worked out within the next two or three weeks.

Both Frank J. Zumstein and Joseph Erman will be identified with the new company, Mr. Zumstein as a vice-president and Mr. Erman as a vice-president and general manager. The other officers of the company have not as yet been selected.

These two taxicab companies are being brought together as a step toward improving the taxicab situation in Cincinnati. While in some cities taxicabs are operated by companies that run the railway and the motor coaches, it has not been thought wise at this time to include the taxicab business as a part of the Cincinnati Street Railway. The taxis will be operated as a separate and distinct unit, with no connection with railway business.

The company's policy will be to improve the service and as far as possible to help in improving the taxicab situation as a whole. Further announcements will be made later of steps to be taken to accomplish this purpose.

One-Year Consent Granted International

Although it rejected the application of the International Railway, Buffalo, N. Y., for a ten-year consent to operate buses over Bailey and Kensington Avenues at a 10-cent fare the legislative committee of the Common Council has agreed to a consent for a one-year period. Under the proposed consent, the rate of fare will be 10 cents for all passengers who occupy seats, including children, but the transfer restrictions applying to the Delaware and Delevan bus lines, on which only one transfer is issued, do not apply.

Walter C. McCausland, public relations officer of the company, who represented the company at the hearing, said the proposed consent would be taken under advisement. He said the company was desirous of a ten-year consent.

The International now is running a bus over Bailey Avenue from Broadway to the north city line. It has no franchise. The rate of fare is a regular trolley token and unlimited transfer privileges extend to intersecting trolley lines.

In voting this agreement, which was not made unanimously, the committee indicated that while it was not in agreement with all the terms of the proposed franchise, it felt it should heed the petition of residents in the Kensington-Bailey section who are asking for additional transportation facilities.

Modern Bus Station Open at Oklahoma City

A new bus station, in many respects modeled after a modern electric railway depot, was opened at Oklahoma City, Okla., on June 4. It is located near the Santa Fe Railway station and is 100x140 ft. in dimensions. It contains an information bureau, a central ticket window, issuing tickets for all lines operating out of the station, and a spacious waiting room. Ninety buses will arrive at or leave the station daily.

Controversy About Leased Buses

Conflict arises over arrangement by which Detroit Municipal leases equipment. Auditor removed for remarks made without commission's approval

WILLIAM M. HAUSER was removed as auditor of the Department of Street Railways, Detroit, Mich., on May 31 at a special meeting of the Street Railway Commission. His dismissal had the approval of the Mayor. G. Ogdan Ellis, president of the commission, stated that the meeting was called to consider a public statement by Mr. Hauser in which the auditor criticized W. B. Mayo, a former member of the commission and now its consulting engineer. The commission regarded Mr. Hauser's statement an insult to Mr. Mayo.

Mr. Hauser was appointed auditor about three years ago to succeed I. N. Merritt during the time John W. Smith was Mayor and shortly after Col. H. U. Wallace was made general manager of the Detroit municipal system. No action has been taken to fill the position. In the meantime Charles J. Faber, chief assistant auditor, will have charge of the auditor's office.

In the interview Mr. Hauser was quoted as including the statement that Mr. Mayo was "a pensioner of Henry Ford" and "an interested party" in the controversy over the rental of buses by the D.S.R. from the Detroit Motorbus Company, of which Mr. Mayo is an officer. Mr. Hauser was quoted as saying that Mr. Mayo's name is printed on the railway department's letter head and that it also appears on that of the Detroit Motor Bus Company, but does not appear on the Ford stationery.

When the matter of the purchase of

Extensions in Washington

Permission has been granted to the Washington Railway & Electric Company to extend its Rhode Island Avenue bus line from Fourth and Franklin Streets, N.E., to the intersection of Queens Chapel Road, Washington, D. C. The commission ruled that the extension would provide additional service to residents along the proposed route. No changes were made in either the rate of fare or transfer privileges now in effect. The company was also authorized to extend its Park Road bus line by changing the route of this line and dividing it into two branches.

New Service in Iowa Awaited

Bus service will be started by the Waterloo, Cedar Falls & Northern Railway, between Waterloo and Cedar Rapids, Ia., June 15, according to a recent announcement of Maurice Welsh, superintendent. One round trip daily is scheduled for the opening of the service, giving the only morning connection between the two cities.

new buses by the D.S.R. came up several weeks ago, the propriety of purchasing new equipment of that nature was questioned and Mayor Lodge and the commission asked Mr. Mayo to study the department's bus situation and report on the operating costs. Mr. Hauser questioned the matter of considering Mr. Mayo's report "the last word on the subject, particularly when he is first vice-president of the interested company." This refers to the fact that the Department of Street Railways is renting buses from the Detroit Motorbus Company. Mr. Houser and Commissioner Barlum were opposed to renting the equipment from the private company and at a recent meeting Mr. Barlum stated that as Mr. Mayo's report of his bus survey was announced as soon forthcoming, he would withhold a motion to purchase new buses.

About a week previous to his dismissal, the auditor stated that in the 10 months ended April 30, 1928, the D.S.R. had paid \$228,000 for rental of buses. Although Commissioner Barlum and Mr. Hauser agreed in the contention that the rental was inadvisable, the motion to dismiss Mr. Hauser was made by Mr. Barlum. Mayor Lodge stated that the bus rental arrangement was O.K.'d by the Street Railway Commission and approved by the Council and the Mayor last July. The Mayor added that Mr. Hauser was discharged for insubordination. His statement also pointed out that "I do not like these rows; I do not like friction in our City

departments, but I must take action in a case of this kind or we can have no morale in the administration of city affairs."

MR. HAUSER'S EXPLANATION

Following his dismissal, Mr. Hauser issued a written statement in which he is quoted as follows:

I have given my very best in an endeavor to make public ownership of Detroit's street railways a success. My files will show that I have tried to give the chief executives of the Street Railway Commission the facts about the operation of the people's transportation system. I have endeavored to do this honestly without fear or favor, and have been very careful of the trust imposed on me. I feel that a man in public office owes his loyalty first to the entire people, and in this respect my conscience is clear.

There are many ramifications to the relations of the Detroit Motor Bus Company with the Department of Street Railways which undoubtedly will in time come to light and in the end my action will be appreciated.

These are my own personal opinions. Others may have different ones, but I stand on what I think and what I believe to be right.

The story of the success of the Detroit Motor Bus Company in the last few months can in part—in a very large part—be attributed to the contractual relations it has with the Department of Street Railways with respect to rented coaches.

I accept the result of the expression of my honest conviction very cheerfully since I have stood for what is right and not what some other man thinks is right.

Mr. Hauser said that the statement referring to Mr. Mayo as a pensioner of Henry Ford should not have been published, but insisted that he would stand by his contention that it was not proper for Mr. Mayo, an officer of the Detroit Motor Bus Company, to make a report as consulting engineer for the D.S.R. He held to the belief that no man is big enough to sit on both sides of the table at the same time.

BUS INDUSTRY IN TRANSITORY STATE

Del A. Smith, general manager of the Detroit Municipal Railway, was quoted in part as follows:

The bus industry is in a highly transitory state. It is only within the past year that a satisfactory bus carrying 35 to 60 passengers has been developed. The efficient 40-passenger bus has come only in the last 10 months, and the day of the double-deck bus is distinctly done. We could not foresee the development of one type and the obsolescence of the other a year ago.

Had we purchased buses then, we would have acquired a fleet which by now would be antiquated and rendering service unsatisfactory in comparison with machines we can buy now. As to Mr. Hauser's statement that the Detroit Motor Bus Company is making 10 cents a mile, the idea is ridiculous. We rent the buses for 31 cents and it is impossible to operate buses such as the motor bus company leased to us for anything like 21 cents.

They make a small margin of profit, but that small margin is all the city is losing—and it certainly is not 10 cents for every mile the rented buses travel. Further, we were justified in renting new buses to avoid delay in opening new territory. Four-

teenth Street was promised service for two years before it got it. Now we are hauling slightly less than 3,000 passengers a day over that route and could haul more if we had bigger buses.

Rented buses now run about 20,000 miles a month compared with 30,000 when rented buses were run by the Municipal on Fourteenth Street.

Bus Patronage Satisfactory in Kansas City

Buses operated by the Kansas City Public Service Company, with a new grant of 15-cent bus fares on trunk lines, apparently are holding the patronage enjoyed when a 10-cent fare was asked, according to a check made by the company during the rush periods. The patronage is about as usual, according to D. L. Fennell, superintendent of transportation of the company. The double-deck buses did a light business the first few days, says Mr. Fennell, because the weather was not suitable for outside riding, but on the whole there was no indication the patrons considered the 15-cent fare too high. Of the new routes the South Oak line seemed popular. The trunk line passengers, beginning with the new six months' temporary franchise, can obtain free transfers to certain intersecting street car lines. Feeder line fares remain 10 cents.

Complaint Against Gary Railway Operation

The Midwest Motor Coach Company, Gary, Ind., in a petition filed recently with the Indiana Public Service Commission asked that the Shore Line Motor Coach Company and the Gary Railway be ordered to cease operating motor coach routes in competition with its own coaches between Gary and 63rd Street, Chicago. It was the complainant's contention that it had been authorized by the commission in October, 1925, to operate a motor coach route between these two points and that the other two companies held certificates permitting them to operate only over that part of the route between Indiana Harbor and Whiting, but that both companies were now carrying passengers over the entire route. The petition asks that the certificates granted them by the commission be withdrawn and that they be ordered to desist.

An injunction sought by the Midwest Motor Coach Company to restrain the Shore Line Motor Coach Company from operating buses over this route was denied last February by the Porter County Superior Court at Valparaiso, Ind.

Service Sought in Indiana City

In a petition filed recently with the Indiana Public Service Commission, it was requested by residents of Fairmount, Ind., that the Union Traction Company of Indiana be compelled to provide bus service for that city, as required in the certificate of convenience and necessity granted by the commission.

Petitions for Westchester Heard

An attempt to induce the City Council of New Rochelle, N. Y., to reconsider the proposal of the Third Avenue Railway, New York, to substitute buses for trolley cars over the East Main Street line under the conditions requested by the railway failed recently, when the Councilmen refused to put the suggestion for reconsideration into the form of a motion.

The Public Service Commission has approved the tariff filed by the Westchester Street Transportation Company, Inc., a subsidiary of the Third Avenue Railway, for bus operation in place of cars upon its Silver Lake line in White Plains and Harrison. Sub-route or short line buses are operated over carrying portions of the route to meet requirements of traffic. Fare on this line is 10 cents. Free transfers are given from this line to other bus lines or street car lines entitling the passenger to ride to any point in the city of White Plains.

Eight Motor Coach Routes in Pasadena

The California Railroad Commission has granted a certificate to the Pacific Electric Railway for the operation of coaches in the city of Pasadena over eight routes, covering its present operations. These routes are to be considered as experimental, however, and subject to any further order by the commission in case corrections or alterations may be required.

Municipal Bus Lines Do Well. Pass Popular in St. Petersburg

According to the *Times*, St. Petersburg, Fla., that city's municipal bus lines, started on June 5, 1926, have solved the transportation problems of thousands of residents in the outlying sections of the city, particularly in the Haines Road district, north and south Disston Boulevard, along Lakeview Avenue and in the Lakewood Estates section. This same authority says that the lines were operated at a loss for several months, but are slowly becoming self-supporting. Since the lines were started eight city buses have carried 840,048 passengers and collected \$82,519 in passenger fares. The system now covers a wide section of the city not reached by the municipal railway.

Bus transportation is said to have been made more popular by the public utilities department through the sales of two classes of tickets, one form interchangeable with the street cars and the other a straight weekly pass good only on the street cars. The combination weekly pass good on both the car and bus sells for \$1.75. The straight weekly pass selling for \$1 entitles the holder to ride only the street cars. Since the weekly pass system was put into effect the railway has shown an increase in sales from about \$500 the first week to more than \$1,100 a week at the present time.

Financial and Corporate

Reorganization of Michigan Electric Railway

Formation of a plan and agreement for the reorganization of the Michigan Electric Railway, Jackson, Mich., and its properties has been adopted by the bondholders' committee. Any depositor who may dissent to the plan, should it be approved, will receive bonds and coupons represented by his certificate of deposit upon payment of an amount to cover pro rata share of cost and expenses fixed by the committee, not exceeding \$15 for each \$1,000 bond.

The plan provides for the organization of a new company and the necessary subsidiaries to acquire the present company's property and operate such additions, extensions and betterments as it may find necessary. No stock or securities will be issued for or on account of the outstanding stock of the company. The new company will not issue or sell any notes, bonds, or other obligations except for money necessary to pay expenses.

Holders of first and refunding mortgage bonds will receive for each \$100 principal amount of bonds one share of stock in the new company. Holders of Jackson & Battle Creek Traction Company bonds will receive a like amount for each \$100 principal amount of bonds, and holders of Jackson Consolidated Traction Company bonds will receive a similar distribution.

St. Louis Formally Discharges Receiver

Rolla Wells was formally dismissed from his duties as receiver for the United Railways by United States District Judge Faris on May 28. The ending of his tenure of office was on his own application and after his final reports had been approved by the court. He entered on his task in April, 1919. The St. Louis Public Service Company took over the railway on Dec. 1, 1927, following the sale of the property under foreclosure.

German Issue Offered in American Market

An \$8,000,000 ten-year 5½ per cent gold loan for the Hamburg Elevated, Underground & Street Railway, Hamburg, Germany, is being offered by Brown Brothers & Company, the International Acceptance Bank, Inc., and the Illinois Merchants Trust Company at 92½, to yield 6.33 per cent. Proceeds will be used to refund a \$6,000,000 short-term loan and to provide for improvements and extensions to the property. The company owns and operates all elevated, underground and railway systems, as well as ferry and bus services,

in Hamburg, serving a population of about 1,500,000. Net earnings of the company in 1927 and for the past four years, after all charges and depreciation, were about 3¼ times annual interest requirements on this loan.

Suit to Prevent Washington Merger Dismissed

Justice Peyton Gordon in Equity Division 2 on June 1 sustained the motion of the Washington Railway & Electric Company, Washington, D. C., to dismiss the suit for injunction brought by John J. Noonan, minority stockholder of the company, against the North American Company and the local company to prevent the suggested merger of the railway

lines of the company with the Capital Traction Company and the Washington Rapid Transit Company. Attorneys William G. Johnson and Joseph D. Sullivan, counsel for Mr. Noonan, gave notice of intention to appeal when the formal order of dismissal has been signed.

Smaller Milwaukee Property Merged

The Milwaukee Northern Railway, operating a city car line in Milwaukee, Wis., and an interurban railway between Milwaukee and Sheboygan, was merged with the Milwaukee Electric Railway & Light Company on April 30, 1928. This merger is primarily a consolidation of the properties, with the smaller losing its corporate identity. The Milwaukee Northern, with assets of \$4,450,000, had been controlled and operated by the Milwaukee Electric Railway & Light Company for several years as a subsidiary.

Analysis of Operating Statements

Railway association statistician comments on returns of companies 1927 as shown in detailed compilation for *Aera*. Figures summarized for presentation by Journal

In *Aera* for May there was given a summary of the operations in 1927 of a group of 206 electric railways divided among city lines, interurban lines and combination city and interurban lines. In the June issue of that paper the companies in each of the three groups, comprising city, interurban and combination city and interurban lines, are each further subdivided into three smaller groups, the first consisting of so-called Class A companies whose annual revenues exceed \$1,000,000 a year, the second consisting of companies whose annual revenues amount to more than \$250,000 and less than \$1,000,000, and the third consisting of companies earning less than \$250,000 a year. In addition there is also given a combined comparative balance sheet and income statement of 161 companies. This group is then subdivided into city, interurban and combination city and interurban companies and a combined comparative balance sheet and income statement is given for each group.

Edmund J. Murphy, chief statistician of the American Electric Railway Association and author of the article, says that when the companies are segregated into classes according to their size it at once becomes apparent that the large companies are in the strongest position and make much the best showing. This is true in the case of all three classes of companies, but in the case of the city lines the companies in the medium sized group, that is, those companies earning between \$250,000 and \$1,000,000 a year, make almost as good a showing as the larger

companies earning more than \$1,000,000 a year. This is due largely to the fact that the medium sized companies succeeded in making a very material deduction—13.24 per cent—in their deductions or fixed charges, consisting principally of rentals and interest on bonded indebtedness.

The traffic on the large city lines was practically the same in 1927 as in 1926, there being a decrease of only 0.01 per cent. Traffic on the medium sized lines, on the other hand, decreased 1.32 per cent. The operating revenues of the two groups followed practically the same trend, there being a decrease of 0.83 per cent in the case of the Class A companies and a decrease of 1.07 per cent in the case of the Class B companies.

When the interurban lines are considered it is found that the difference in the showing made by the small companies and the large companies is more sharply drawn than in the city group. Among the interurban companies apparently the smaller the company the more difficult it finds it to operate successfully, and this is not unnatural, for as was pointed out in *ELECTRIC RAILWAY JOURNAL* for May 5, in which Mr. Murphy's previous article was reviewed, in the smaller communities and outlying districts the private automobile has become a family necessity and is used more universally and more intensively than in the larger centers of population.

Further evidence that the large interurbans were developing their freight business is shown by the car-mile figures. While the number of passenger

Statistics Compiled by American Electric Railway Association

ANALYSIS OF INCOME STATEMENT, SHOWING PER CENT OF INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	42 Cos. with Revenues of More than \$1,000,000 a Year Each	23 City Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	14 Cos. with Revenues of \$250,000 a Year Each	3 Interurban Cos. with Revenues of More than \$1,000,000 a Year Each	21 Interurban Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	26 Interurban Cos. with Revenues Less than \$250,000 a Year Each	34 Cos. with Revenues of More than \$1,000,000 a Year Each	23 Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	20 Cos. with Revenues Less than \$250,000 a Year Each
Railway operating revenue.....	(D) 0.83	(D) 1.07	(D) 2.64	0.14	(D) 4.40	(D) 3.63	(D) 3.51	(D) 4.48	(D) 10.76
Railway operating expense.....	(D) 1.66	(D) 0.83	(D) 1.84	1.21	(D) 1.89	(D) 0.49	(D) 2.10	(D) 2.58	(D) 5.01
Net operating revenue.....	1.22	(D) 1.84	(D) 5.31	(D) 5.32	(D) 17.90	(D) 21.49	(D) 8.40	(D) 13.05	(D) 59.59
Net revenue: Auxiliary operations.....	33.10	.....	39.82	11.47	(D) 19.50	(D) 90.18	7.41	(D) 7.53	(D) 9.52
Taxes.....	(D) 0.35	4.20	(D) 10.90	3.31	(D) 5.71	(D) 14.51	(D) 5.90	(D) 6.58	(D) 1.25
Operating income.....	1.87	(D) 4.00	(D) 3.66	(D) 5.36	(D) 24.94	(D) 29.07	(D) 8.24	(D) 16.39	(D) 76.49
Non-operating income.....	10.57	(D) 3.03	(D) 16.15	(D) 2.90	12.36	(D) 8.71	(D) 3.52	41.77	(D) 6.80
Gross income.....	2.40	(D) 3.97	(D) 4.75	(D) 4.94	(D) 17.28	(D) 27.47	(D) 7.76	1.93	(D) 71.67
Deductions from gross income.....	1.07	(D) 13.24	(D) 11.93	(D) 4.05	2.38	(D) 13.83	(D) 1.41	(D) 12.16	(D) 2.52
Net income.....	7.37	9.53	.....	.....	.....	.....	(D) 74.06	.....	.....
Dividends.....	(D) 0.48	30.23	.....	.....	(D) 4.34	.....	(D) 2.38	154.63	(D) 2.29
Operating ratio (per cent).....	0.83	0.25	0.83	1.06	2.62	3.25	1.45	1.97	6.43
Ratio: Net income to operating revenue..	8.33	10.61	.....	.....	.....	.....	(D) 73.08	.....	.....

OPERATING EXPENSES BY PRIMARY ACCOUNTS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	42 Cos. with Revenues of More than \$1,000,000 a Year Each	23 City Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	14 Cos. with Revenues of \$250,000 a Year Each	3 Interurban Cos. with Revenues of More than \$1,000,000 a Year Each	21 Interurban Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	26 Interurban Cos. with Revenues Less than \$250,000 a Year Each	34 Cos. with Revenues of More than \$1,000,000 a Year Each	23 Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	20 Cos. with Revenues Less than \$250,000 a Year Each
Way and structures.....	(D) 5.25	3.53	7.54	6.25	(D) 0.19	7.60	(D) 2.43	5.52	(D) 3.31
Equipment.....	(D) 1.53	1.78	(D) 6.64	(D) 1.61	0.48	1.71	2.75	(D) 7.09	(D) 6.89
Power.....	(D) 1.73	(D) 4.93	(D) 2.03	0.57	(D) 8.96	(D) 5.19	(D) 4.40	(D) 2.89	(D) 8.76
Conducting transportation.....	(D) 1.90	0.02	(D) 5.66	(D) 2.08	(D) 0.34	(D) 2.49	(D) 3.82	(D) 4.07	(D) 6.29
Traffic.....	(D) 25.86	23.58	(D) 5.06	21.60	(D) 7.93	(D) 23.68	3.09	17.54	(D) 22.11
General and miscellaneous.....	3.29	(D) 4.55	3.74	3.49	(D) 2.01	(D) 2.02	(D) 1.25	(D) 5.44	(D) 17.02
Transportation for investment—Credit...	20.51	57.67	.....	.....	(D) 75.59	(D) 100.00	(D) 67.15	(D) 71.17	(D) 46.37
Total operating expense.....	(D) 1.66	(D) 0.83	(D) 1.84	1.21	(D) 1.89	(D) 0.49	(D) 2.10	(D) 2.58	(D) 5.01

OPERATING STATISTICS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	42 Cos. with Revenues of More than \$1,000,000 a Year Each	23 City Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	14 Cos. with Revenues of \$250,000 a Year Each	3 Interurban Cos. with Revenues of More than \$1,000,000 a Year Each	21 Interurban Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	26 Interurban Cos. with Revenues Less than \$250,000 a Year Each	34 Cos. with Revenues of More than \$1,000,000 a Year Each	23 Cos. with Revenues of \$250,000 to \$1,000,000 a Year Each	20 Cos. with Revenues Less than \$250,000 a Year Each
Passenger car-miles.....	(D) 0.68	1.99	(D) 3.04	(D) 2.77	(D) 3.55	(D) 1.42	(D) 2.78	(D) 3.85	(D) 4.80
Total revenue car-miles.....	(D) 0.70	(D) 0.91	(D) 2.53	(D) 0.32	(D) 0.42	(D) 1.43	(D) 2.27	(D) 3.13	(D) 5.19
Revenue passengers.....	(D) 0.011	(D) 1.32	0.44 ⁷	(D) 3.96 ¹¹	(D) 8.96 ¹²	(D) 0.76 ¹⁵	(D) 7.13 ¹⁸	(D) 8.25	(D) 10.95 ²⁴
Transfer passengers.....	(D) 2.68 ²	(D) 1.96 ⁵	(D) 39.94 ⁸	(D) 3.37 ¹¹	(D) 3.00 ¹²	(D) 6.57 ¹⁵	(D) 6.39 ¹⁸	(D) 7.57 ²²	0.52 ²⁵
Total passengers.....	(D) 1.57 ¹	(D) 0.82	(D) 6.39 ⁷	(D) 3.40 ¹¹	(D) 8.63 ¹²	(D) 0.88 ¹⁵	(D) 7.02 ¹⁸	(D) 8.26	(D) 10.81 ²⁴
Passenger revenue.....	(D) 0.92	(D) 0.01	(D) 4.87	(D) 3.75	(D) 7.86	(D) 5.58	(D) 4.21	(D) 8.28 ²²	(D) 10.03
Revenue car-hours.....	(D) 2.02 ³	(D) 0.78 ⁶	(D) 1.15 ⁹	.....	(D) 3.30 ¹⁴	(D) 0.35 ¹⁶	(D) 3.33 ²⁰	(D) 3.89 ²²	(D) 9.74 ²⁸
Passenger car-hours.....	(D) 2.02 ³	(D) 0.78 ⁶	(D) 2.20 ¹⁰	.....	(D) 3.90 ¹⁴	0.29 ¹⁵	(D) 3.22 ²⁰	(D) 3.90	(D) 9.34 ²⁵
Miles of single track.....	0.08	(D) 1.18	(D) 3.04	.....	0.33	0.61	(D) 0.23	(D) 1.68	(D) 2.12
Passenger cars operated (a).....	(D) 1.11 ⁴	0.20	2.61	7.61 ¹¹	(D) 0.31 ¹⁴	(D) 1.02 ¹⁷	(D) 5.45 ²¹	(D) 4.77 ²³	(D) 9.71 ²⁷

a Average maximum number of passenger cars in service daily.
¹ Reported by 41 companies. ⁷ Reported by 13 companies. ¹³ Reported by 5 companies. ¹⁹ Reported by 29 companies. ²⁴ Reported by 18 companies.
² Reported by 39 companies. ⁸ Reported by 9 companies. ¹⁴ Reported by 15 companies. ²⁰ Reported by 30 companies. ²⁵ Reported by 9 companies.
³ Reported by 40 companies. ⁹ Reported by 12 companies. ¹⁵ Reported by 24 companies. ²¹ Reported by 27 companies. ²⁶ Reported by 19 companies.
⁴ Reported by 36 companies. ¹⁰ Reported by 11 companies. ¹⁶ Reported by 5 companies. ²² Reported by 22 companies. ²⁷ Reported by 15 companies.
⁵ Reported by 18 companies. ¹¹ Reported by 2 companies. ¹⁷ Reported by 23 companies. ²³ Reported by 20 companies.

car-miles of these companies decreased 2.77 per cent the total car-miles increased 0.32 per cent. The companies in the Class B group were attempting to do the same thing, as is shown by the fact that their passenger car-miles fell off 3.53 per cent, while their total car-miles dropped only 0.42 per cent.

It would naturally be expected that companies operating both city and interurban service would show results somewhere between those shown by the city lines, on the one hand, and by the interurban on the other. In other words, the combination lines ought to present approximately an average of the results of the other two classes of companies. According to reports of these companies, however, they seem to have suffered much more heavily from the adverse conditions prevailing in 1927 than either of the other groups. Probably the explanation is that, in general, they serve and

connect up comparatively small cities and rural communities. They are, therefore, more directly susceptible to the competition of private automobiles and intercity bus lines. All of the companies in this group were affected adversely by conditions in 1927 but, as usual, the small companies seem to have been affected more than the others.

This year for the first time Mr. Murphy has been able to present comparative balance sheets of a large group of companies. The last eight tables in his series are devoted to comparative balance sheets and income statements of a group of 161 companies and separate balance sheets and income statements are shown for the 58 city companies, 44 interurban companies and 59 combination city and interurban companies that comprise the group of 161 companies.

The balance sheet of the whole group

shows an investment of \$1,778,335,435 in road and equipment in 1927 compared with \$1,749,764,866 in 1926—an increase of \$28,570,569. The total investment in road and equipment of these 161 companies represents approximately 35 per cent of the total investment of the entire electric railway industry in the United States. As against the investment in road and equipment there was outstanding \$749,858,830 in stock and \$924,731,265 in long-term debt, a total capitalization in 1927 of \$1,674,590,095, or \$103,745,340 less than the value at which the physical property was carried on the books.

The total corporate surplus of the group of companies increased from \$76,731,095 for 1926 to \$79,546,234 in 1927. Most of this increase was in the appropriated surplus which arose from \$24,758,845 in 1926 to \$27,108,668 in 1927—an increase of \$2,349,823.

The profit and loss surplus increased \$432,552, or from \$51,790,088 in 1926 to \$52,222,640 on 1927. The total current assets amounted to \$105,398,316 in 1927, compared with a total current liability of \$116,455,404—a ratio of 0.90. In 1926 current assets amounted to \$104,081,399 and current liabilities to \$114,132,465—a ratio of 0.91.

It is interesting to note, says the author, that in these balance sheets all of the groups materially increased their reserves for depreciation. In the case of the city companies the reserve was increased from \$70,648,998 in 1926 to \$75,597,252 in 1927, or an increase of

7 per cent. Interurban lines increased their reserve from \$7,405,358 in 1926 to \$8,089,032 in 1927, or 9.23 per cent, while the combination city and interurban group increased their reserve from \$35,439,553 to \$40,726,296, or an increase of 14.91 per cent.

In all of the groups the reserve for depreciation is approximately 7 per cent of the investment in road and equipment. For the 161 city, interurban and combination city and interurban companies, the depreciation reserve amounted to \$124,412,580 or about 6.45 per cent of the investment in road and equipment.

TRAFFIC STATISTICS OF THE UNION TRACTION COMPANY

Dec. 31, 1927

Passengers carried, interurban lines.....	4,234,896
Passengers carried, city lines.....	6,688,653
Passengers carried, interurban buses.....	119,529
Passengers carried, city buses.....	2,055,822
Total passengers carried.....	13,098,900
Mileage of cars, interurban lines, miles.....	7,017,752
Mileage of cars, city lines, miles.....	1,434,577
Total mileage of cars, miles.....	8,452,329

the year in that amount. No new equipment notes were issued.

During the year the \$12,000 of Broad Ripple Traction Company bonds were retired and \$6,000 of additional bonds of the issue were purchased out of the proceeds of the property. The interest on the purchased bonds was paid to the receiver. Unexpired proceeds remain in the hands of the trustees for application to the purchase of additional bonds. Interest at 6 per cent was paid as heretofore on the \$328,000 Marion City Railway bonds secured by first mortgage on city lines at Marion and the interurban line between Marion and Summitville and on the \$36,000 of Citizens Street Railway bonds secured by first mortgage on city lines at Muncie. These bonds matured on Dec. 1, 1927. No

Revenues on Union Traction Lower

Anderson, Ind., company reports a decrease of \$109,258. Passengers carried show large increase. Liberal allowance made for maintenance

ARTHUR W. BRADY, receiver for the Union Traction Company of Indiana, has filed the 1927 report in the Circuit Court at Anderson, Ind. It shows that the railway operating revenue for 1927 was \$2,951,206, a decrease of \$109,258 compared with 1926, and that operating expenses were \$2,708,360, an increase of \$141,619 compared with the previous year. Of the increased expenses \$96,689 more than in 1926 was expended for maintenance of way and structures. Gross income for 1927, or the income after operating expenses and taxes but before charges for bond interest and other fixed charges, was \$169,439, compared with \$408,624 in 1926.

of way and structures and \$349,837 for maintenance of equipment. This makes the total sum charged for maintenance of the property \$1,018,150, equal to 34.5 per cent of the gross railway operating revenue for the year.

The 1927 account for additions and

	Total Operating Revenue	Total Operating Expenses	Taxes	Other Income	Gross Income
Union traction.....	\$1,368,596	\$1,188,926	\$38,563	\$16,096	\$157,203
Indianapolis Northern.....	759,696	713,652	22,010	5,101	29,135
Muncie, Hartford & Fort Wayne.....	268,085	247,641	10,054	907	11,296
Muncie-Portland.....	94,348	96,607	5,752	398	*7,613
Indianapolis, New Castle and Eastern.....	296,720	280,174	9,172	1,307	8,680
Muncie-Union City.....	86,136	105,508	7,183	537	*26,017
Marion-Wabash.....	46,775	51,060	3,880	151	*8,013
Anderson-Middletown.....	30,846	24,788	1,381	93	4,769
Total.....	\$2,951,206	\$2,708,360	\$98,000	\$24,593	\$169,439

*Deficit.

While this statement is based on allocations of revenues and expenses differing in some respects from those used in 1925 and 1926, it is still tentative. The revision of the segregated earnings and expenses for the three years of the receivership, with a view to securing more accurate results, has continued to receive active attention, and a report on the subject will be made to the court later.

INCOME ACCOUNT OF THE UNION TRACTION COMPANY

REVENUE FROM TRANSPORTATION	
1927	
Passenger.....	\$1,935,256
Baggage.....	5,197
Parlor, chair and special car.....	10,827
Mail.....	6,048
Express.....	133,212
Milk.....	13,721
Freight and switching.....	676,287
Total.....	\$2,780,552
REVENUE FROM OPERATION OTHER THAN TRANSPORTATION	
Station and car privileges.....	\$14,184
Parcel room receipts.....	55
Car service and storage.....	616
Rent of tracks and terminals.....	3,812
Rent of equipment.....	12,458
Rent of buildings and other property.....	14,320
Power.....	124,247
Miscellaneous.....	960
Total.....	\$170,654
Total operating revenue.....	\$2,951,206
OPERATING EXPENSES	
Way and structures.....	\$668,312
Equipment.....	349,837
Power.....	556,432
Conducting transportation.....	749,497
Traffic.....	52,916
General and miscellaneous.....	331,364
Total operating expenses.....	\$2,708,360
Net operating revenue.....	242,845
Taxes.....	98,000
Net operating revenue less taxes.....	\$144,845
Other income.....	24,593
Gross income.....	\$169,439

In the operating expenses for the year are included \$668,312 for maintenance

of way and structures and \$349,837 for maintenance of equipment. This makes the total sum charged for maintenance of the property \$1,018,150, equal to 34.5 per cent of the gross railway operating revenue for the year. The 1927 account for additions and betterments shows expenditures for the year of \$43,275. There was expended in addition \$8,156 for buses. These amounts are exclusive of charges in 1927 of \$37,159 for extensions of and betterments to the property of the Traction Light & Power Company, wholly owned by the Union Traction Company of Indiana. The operations of the Traction Light & Power Company were extended in 1927 to Honey Creek and Warrington, thus making 50 towns and villages served by the company at the end of the year. The net income of the company in 1927 was \$18,486.

Gross revenues from bus operation in 1927 were \$131,723 and operating expenses, taxes, interest and amortization charges were \$305,559, making the deficit from bus operation \$173,835. This includes \$96,618 for depreciation and amortization.

There were 13,098,900 passengers carried during the year by both interurbans and buses an increase of more than 1,000,000 over 1926.

In 1927, \$172,159 was paid on the principal of notes representing car, bus and power betterment equipment, reducing liabilities shown at the beginning of

arrangement has as yet been made by the railway company for meeting this maturity.

Operation of the Anderson-Middletown interurban line resulted in a surplus of \$4,769. That a surplus instead of a deficit, as in 1925 and 1926, is shown is due to a change in the method of allocating revenues and expenses. Operation of the Muncie-Union City line resulted in a deficit of \$26,017, being \$15,203 greater than that shown for 1926. Operation of the Marion-Wabash interurban line resulted in a deficit of \$8,013, which is \$2,310 more than in 1926. A question under consideration is the action which should be taken with respect to these three interurban lines and certain non-paying street railway lines.

Segregation of earnings and expenses of the respective lines subject to the liens of the principal mortgages and also of the lines leased to the Union Traction Company of Indiana was undertaken, and the earnings and expenses so segregated for the year are shown tentatively and subject to revision.

The Union Traction Company owns 309 miles of line and leases 445½ miles.

Expenses in Honolulu Decreased

Total revenue of the Honolulu Rapid Transit Company, Ltd., Honolulu, I. H. for the year 1927 was \$1,019,245, compared with \$1,023,772 for the year 1926. Total operating expenses for the year were \$626,453, compared to \$662,932 for the year 1926, in addition to which the sum of \$24,238 was charged to operating expenses for replacements during the year compared with \$13,939 for replacements during 1926. These facts were contained in the manager's report for the year ended Dec. 31, 1927.

Traffic revenue and expense figures for 1927 and 1926 are shown in the accompanying tables.

RAILWAY PASSENGER TRAFFIC

	1927	1926
Full fares and half fares.....	16,043,809	16,286,105
Free fares.....	59,593	92,081
Total.....	16,103,402	16,378,186
Transfer passengers carried....	3,550,694	3,357,651

**BUS OPERATIONS
KALIHI**

	1927	1926
Full fares and half fares.....	386,500	347,287
Free fares.....	1,375	1,108
Total.....	387,875	348,395
Transfer passengers carried.....	343,427	315,165
Bus-miles operated.....	126,624	128,441

KAIMUKI

	1927
Full fares and half fares.....	184,506
Free fares.....	36
Total.....	184,542
Bus-miles operated.....	75,008.10

REVENUE

	1927	1926
Passenger revenue.....	\$973,417	\$992,063
Bus revenue.....	30,096	21,536
Special car revenue.....	1,260	1,265
Freight revenue.....		242
Total.....	\$1,004,774	\$1,015,107

OPERATING EXPENSES

	1927	1926
Way and structures.....	\$51,426	\$55,204
Equipment.....	69,865	74,127
Power.....	88,796	94,179
Conducting transportation.....	289,090	322,356
Traffic.....	2,693	2,252
General and miscellaneous.....	124,580	114,811
Total.....	\$626,453	\$662,932

In a consideration of the allowable return in Honolulu President Castle in the report computes a deficiency of \$80,000 in return for 1927. He claims that if the sum of \$70,000 is added for each year for depreciation on track and distribution system which should

REVENUE ACCOUNT OF THE HONOLULU RAPID TRANSIT COMPANY, LTD., FOR YEAR ENDED DEC. 31, 1927

Revenue from transportation.....	\$1,004,774
Operating expenses.....	626,453
Net revenue from transportation.....	\$378,320
Revenue from other railway operations....	14,471
Net revenue from railway operations....	\$392,792
Taxes.....	\$123,801
Property.....	\$87,287
Income.....	8,409
Corporation income.....	25,331
Public utilities.....	2,023
Motor vehicle licenses.....	748
REPLACEMENTS:	
Chargeable to operating expense.....	24,238
Gross revenue, less operating expenses, taxes and replacements.....	\$244,725
Depreciation.....	\$51,766
Profit and loss.....	1,873
Net revenue 1927.....	\$191,111
Interest on bank loans.....	\$6,600
Dividends, 7 per cent.....	175,000
Balance net revenue 1927 to surplus....	\$9,511
SURPLUS:	
Balance as at Jan. 1, 1927....	\$279,914
Less additional corporation income taxes for years 1921, 1922 and 1923.....	11,619
Balance carried to 1928.....	\$277,806

have been charged but was not, the actual deficiency is much greater.

NEED EXISTS FOR FAIR RETURN

Mr. Castle said the street railroad had to run, and the only way it could run was when it returned a fair dividend to its stockholders. Operating expenses could not be cut further, so the only answer was a rate increase. This should be the minimum amount required to operate a decent service and to give to the investors a fair return. He believed that a readjustment of rates would produce more income.

Partial Abandonment in Salt Lake City

Application of the Utah Light & Traction Company to abandon portions of four railway lines in Salt Lake City has been granted by the Public Utilities Commission of Utah. It was shown that the four lines to be abandoned have been operated at a loss for several years. The trackage will total 5 miles.

The company's application to abandon service and tear up tracks on West Temple Street, from Ninth to 21st South Street was denied. The commission ordered this line maintained with "greater comfort and convenience to car-riding patrons."

Traffic, Fare and Wage Figures

The number of revenue passengers, including bus passengers, reported by 215 companies to the American Electric Railway Association for April, 1928, compared with April, 1927, is as follows:

April, 1928.....	800,879,714
April, 1927.....	829,471,710
Decrease, per cent.....	3.45

The decrease for April is the largest which has occurred this year. There were five Sundays in April, 1928, compared with four in 1927, and this fact is largely responsible for the greater decrease.

Average cash fares in cities of 25,000 population and over were:

	Cents
May 1, 1928.....	8.1186
April 1, 1928.....	8.1186
May 1, 1927.....	7.9403

There was no change in the average basic fare in American cities during the month of April.

The average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

Month	Average Hourly Rate Cents	Index Number 1913=100 Per Cent
May 1, 1928.....	57.40	210.64
April 1, 1928.....	57.40	210.64
May 1, 1927.....	57.11	209.58

Hattiesburg Bonds Called

The Hattiesburg Traction Company, Hattiesburg, Miss., has called for redemption or purchase on July 1, 1928, all of its outstanding general lien, sinking fund 6 per cent gold bonds at principal with interest accrued and unpaid to the date set for payment, together with a premium of 5 per cent of the principal of each of the bonds. They are payable at the office of the American Exchange-Irving Trust Company, New York.

Abandonment of Two Lines in New York State Approved

A declaration of abandonment by the Hudson Valley Railway of the Fort Edward Thomson line and the Northumberland-Stillwater line was approved on April 30 by the Public Service Commission. Actual abandonment of the two lines, the first covering a distance of 11 miles, and the second a distance of 14 miles, is effective July 1.

OPERATING STATEMENT OF THE HONOLULU RAPID TRANSIT COMPANY, LTD.

	Gross Operating Revenues			Operating Expenses and Other Charges							Total Operating Expenses and Taxes	Net Revenue Exclusive of Deductions for Depreciation, Interest and Profit & Loss		
	1927	Trans- portation	Other Than Trans- portation	Way and Struc- tures	Equip- ment	Power	Conduct- ing Trans- portation	Traffic	General and Miscel- laneous	Total Operating Expenses			Taxes	
Replacements.....	\$1,004,774		\$14,471	\$51,426	\$69,865	\$88,796	\$289,090	\$2,693	\$124,580	\$626,453	\$123,801	\$750,254	\$268,990	
Total 1927.....	\$1,004,774		\$14,471	\$51,426	\$69,865	\$88,883	\$289,090	\$2,693	\$124,580	\$650,691	\$123,801	\$774,493	\$244,752	
Total 1926.....	\$1,015,107		\$8,664	\$1,023,772	\$65,832	\$77,438	\$94,179	\$322,356	\$2,252	\$114,811	\$676,872	\$122,678	\$799,550	\$224,221

Per cent operating expenses to operating revenues 64.76.
Per cent operating expenses in total operating revenues 63.84.
Per cent operating expenses and other charges to total operating revenues 75.99.

Book Reviews

Universal Directory of Railway Officials, 1928

Published by the Directory Publishing Company, London, 404 pages, price, \$5, postage included.

This is the 34th edition of a very useful book, containing a list of leading railroad officials. The first part of the book lists the railroads alphabetically by countries. Under the name of each are particulars of the length of track, gage and equipment, with a list of the principal officials. The name of the company is given in English, but is repeated in the language of the country if the country is one in which English is not spoken. The second part of the book contains an alphabetical list of the railroads and railroad associations in the different countries, together with names of officials.

Facts and Figures of the Automobile Industry—1928 Edition

Published by National Automobile Chamber of Commerce, New York, N. Y. 96 pages.

Further information and special studies have been made available in the tenth annual edition of this booklet of the National Chamber of Commerce. Here are tabulations of the major automobile market and of methods of taxation in different states; a study of gasoline consumption by states; trans-continental bus routes; a list of highway grade separations and figures on metropolitan traffic. Many charts and diagrams complete this picture of the automobile industry. A valuable index is included. Certain data on common carrier buses were reprinted from *Bus Transportation*.

Financial and Business Forecasting

Dr. Warren F. Hickernell, Alexander Hamilton Institute, New York. 2 volumes. 914 pages. \$10 for both volumes.

To the business man and manufacturing executive who wishes to possess a working knowledge of the basic theories of the business cycle minus the all too familiar perplexing mathematical formulæ; a quick, though vivid, view of the waves of prosperity and of over-speculation, which have characterized the course of business in the United States and Europe for more than a century past; and finally the basic methods now in use in financial analysis and forecasting, these two volumes will prove interesting and enlightening. The cyclic theories of Mills, Jevon, Moore, Juglar and Mitchell are explained in a simple manner, and their strength and weakness pointed out.

The scholar may stop with an analysis of the causes and effects, but for the man in active business the question of how to apply theory to his own affairs assumes paramount importance. Doctor Hickernell accordingly devotes his

second volume to a study of financial analysis and forecasting, bringing out the fact that the four symbols of forecasting are: (1) basic business statistics; (2) a knowledge of economic principles; (3) perspective, based on a study of business history, and (4) good judgment in applying principles to the interpretation of statistics. Before the war industrial fluctuations went to extremes, and individual markets were importantly affected by the general trend. In recent years, however, economic conditions have been well stabilized, and the analysis of individual markets has become increasingly important.

Business, the Civilizer

By Earnest Elmo Calkins, Boston. Little, Brown & Company, 1928. 310 pages. Price, \$3.

On the assumption that the progressive railway operator has at least a passing interest in the contemporary business scene and a very live interest in the subject of advertising, a reading of "Business, the Civilizer" is informative and assuredly entertaining. Mr. Calkins author of "Louder Please!", the autobiography of a deaf man, reviews the history of advertising, not overlooking some of its questionable practices, which he believes are fast disappearing; stresses its value as a force in modern business and predicts its holding an invulnerable position in a thriving business world. Coming some six months after "Your Money's Worth," a dark picture drawn by Messrs. Chase and Schlink of the American gullibility for advertising misrepresentation, this work presents the constructive side of this activity.

Not all of Mr. Calkins's subject has application to the railway industry. However, his comments on living up to advertising and its remarkable effects on business are directly in line with the advice of advertising men connected with railway enterprises. Certainly, "the service you ought to render" has transformed more than one company because of the effort of making a worthwhile appeal to the public. On this point Mr. Calkins says: "He cannot say one thing and do another, and since the things he says, or permits his advertising man to say for him, is that more nearly ideal thing which he always meant his business to be, it is that thing which, under the influence of the advertising urge, his business gradually becomes." Fifty years ago, he says, neither the salesman nor his employer realized the potentialities of future business as a casual purchaser represented. Then came advertising and its prestige known as good will. Good will, in his opinion, is built up by continuous advertising which will ensure continuous buying on the part of a large number of consumers.

And when he discusses beauty as a business force and a factor in selling

his ideas, though the ideas are not new, they provoke more thought on the apparent changes in the economic and social life of today. The railway man has not lagged in this movement for converting purely utilitarian products into things of beauty, nor have his efforts to break with tradition in the matter of car equipment gone unnoticed or unrewarded. Mr. Calkins's work is an argument for business "the best-done job in the world."

Elektrische Vollbahnlokomotiven

Electrical Main Line Locomotives, by Dr. Karl Sachs. Berlin, Julius Springer, 461 pages, 22 insert plates. Price, 84 marks.

This is by far the most extensive book on electric locomotive design with which the author of this review is acquainted. It is divided into four parts: (1) Power and loading, which takes up questions of resistance to movement, traction coefficients, speed on curves, etc.; (2) the mechanical portion of the locomotive equipment; (3) the electrical portion, and (4) accounts of different late types of locomotives. The third part, that relating to the electrical equipment, in turn is divided into four parts to cover direct-current locomotives, single-phase locomotives, three-phase locomotives and transformer locomotives. While the book relates largely to European practice, American design and methods are also represented. A feature is the large number of detailed drawings of portions of the equipment, of connections, and of complete locomotives.

Accident Facts, 1928

National Safety Council, Chicago. 46 pages.

No. 17 of the Council's public safety series gives a great many interesting data on accidents in 1927 and in earlier years. The figures show, for example, between 1911 and 1927 an increase of 20 per cent in all accidental deaths. These include an increase of 1,050 per cent in automobile deaths, a decrease of 37 per cent in railroad deaths and a decrease of 44 per cent in street car deaths. Altogether, there were 1,661 deaths during 1927 due to street car accidents; of these 475 were caused by collisions with automobiles. The total number of accidental deaths from motor vehicle accidents was 25,775 during the same year. Sixty-five per cent of the motor vehicle deaths were caused by motor vehicles striking pedestrians.

Storage Batteries

Morton Arendt, assistant professor of electrical engineering Columbia University, Fellow American Institute of Electrical Engineers. D. Van Nostrand Company, Inc., New York, N. Y. 290 pages. Price, \$4.50.

This is a practical survey of the storage battery covering its production, performance and control. An introduction to the subject and a history of it are covered and a study of factors influencing capacity and efficiency.

Personal Items

A. T. Clark Honored as Head of New Association

A. T. Clark was elected president of the newly formed Association of Electric Railway Equipment Men of the Middle Atlantic States at a meeting in Baltimore on May 16. The association was formed through a desire of outstanding equipment men to improve methods and practices in the shops. Mr. Clark is superintendent of rolling stock and shops of the United Railways & Electric Company, Baltimore. He is also chairman of the rolling stock committee of the American Electric Railway Association and chairman of the



A. T. Clark

judges of the maintenance prize committee for *ELECTRIC RAILWAY JOURNAL*.

Back in 1907 when Mr. Clark was in the employ of the J. G. Brill Company he was asked by the then superintendent of rolling stock and shops, H. H. Adams, to go to Baltimore to assume the duties of assistant superintendent. About a year thereafter Mr. Adams resigned as superintendent and Mr. Clark was appointed acting superintendent, later receiving the full title.

Early in his career he was employed as an apprentice in the erecting shop of the Southwark Foundry & Machine Company, of Philadelphia. Later he resigned from that position to enter the drafting room of the Bethlehem Steel Company, South Bethlehem, Pa. In 1901 he became connected with the Link-Belt Engineering Company, Philadelphia, but two years later resigned to go with the Brill Company. When the Brill Company opened a department for the construction of steel underframes in 1907 Mr. Clark was appointed foreman of the department.

Mr. Clark was born in Oakland, Cal., 49 years ago. He received his elementary education in the public schools of that city and prepared for Yale at the Central High School in Philadelphia. He was graduated from the Sheffield Scientific School with the degree of M.E., and later pursued a special

course in electrical engineering conducted in the evening at Drexel Institute, Philadelphia.

H. S. Johnson Resigns at Honolulu

H. Stewart Johnson has resigned as manager of the Honolulu Rapid Transit Company, Honolulu, Hawaii, after more than 20 years' service, due to ill health. He is planning a round-the-world trip.

Mr. Johnson arrived in Honolulu in May, 1899, and was employed as an assistant engineer in the construction of the road. In 1913 he was appointed chief engineer and in 1918 manager.

During his association with the company he handled several projects for outside organizations. He was connected with the U. S. Army in the installation of the batteries on Diamond Head, with the Territorial Loan Board on highway construction and for a time was assistant city engineer. He also acted as civil engineer for the Honolulu Gas Company.

William Chamberlain Heads Chicago Utility

William Chamberlain, vice-president and general counsel of the United Light & Power Company, Chicago, Ill., since 1914, was elected president at the recent annual meeting of directors. He succeeds Richard Schaddelee, resigned, who was elected chairman of the executive committee. Mr. Schaddelee, who was one of the organizers of the United Light & Railways Company, predecessor of the United Light & Power Company, had been general manager since 1904 and president since 1926.

Changes Announced in Parkersburg Division

William M. Martin, manager of the Parkersburg-Marietta, W. Va., division of the Monongahela-West Penn Public Service Company, resigned on June 1 to accept a position with a large electrical company in New York State. Mr. Martin had been manager of the Parkersburg-Marietta division since October, when he succeeded C. Howard Hardesty, now assistant to Capt. J. M. Alexander, who is assistant to the president.

James H. Trissler, former power distribution superintendent, has been named acting manager of the division. He became an employee of the Parkersburg, Marietta & Interurban Railway, in 1909, having formerly been an employee of the old West Virginia Telephone Company. At one time he was connected with the Kanawha Traction & Electric Company.

Promotion for J. A. Longley With Tennessee Properties

James A. Longley, for the past several years manager of the production and transmission department of the Tennessee Electric Power Company, Chattanooga, Tenn., was recently appointed assistant to J. C. Guild, general manager of the Tennessee Electric Power Company and president of the Nashville Railway & Light Company.

Mr. Longley's first connection with the electrical industry was in 1910 when he went to Portland, Ore., on power plant construction work for the Portland Railway, Light & Power Company. In 1913 he went east to Columbus, Ohio, just after the Dayton flood, to work on a power plant in that city, later going to Nashville on the construction of the Nashville steam plant. In October, 1914, he was transferred to Chattanooga as as-



James A. Longley

stant general superintendent of the Tennessee Power Company and since that time has been identified with the local utility interests in that city. As manager of the production and transmission department of the Tennessee Electric Power Company, Mr. Longley has been responsible for the vast system of transmission lines in middle and eastern Tennessee.

Mr. Longley is a native of Massachusetts and received his engineering education at the Massachusetts Institute of Technology. After leaving college his first work was along steam heating lines. Later he was engaged in mining engineering in Arizona.

Obituary

W. E. FREIR, editor of the *Electric Railway & Tramway Journal*, London, died suddenly in a railway train near Paris when he was on his way back to England from the International Tramway Congress in Rome. Mr. Frier founded the *Electric Railway & Tramway Journal* in 1899. For many years prior to that he had been editor of *Ironmonger*. He was well known as an English journalist. Mr. Freir was 80 years old.

Manufactures and the Markets

Public Opinion Within Industry Will Stop Price Cutting

Industrial associations should call conferences of buyers and sellers to discuss ethics of buying

By EARL WHITEHORNE

EXECUTIVES of American industry realize today that they have made a serious mistake through the last quarter century. They have allowed themselves to become so absorbed in the problems, the achievements and the fascinations of production that they have neglected distribution. Our methods of distributing our goods have grown by main strength and awkwardness. The American business man faces this well-known problem.

Also something else has been happening that has not been generally noticed. This tremendous increase in production has brought with it an intense pressure on sales. American industry has also become so engrossed in selling that it has neglected the efficiencies of purchasing. Yet for every sale there must be a purchase, and the practices and the policies and the principles of the man who buys have as much influence upon the success of the transaction as the methods and the motives of the man who sells.

The time has come, therefore, to turn some thought upon this business of buying that has so much to do with whether sales are profitable or not. We have got to throw the searchlight on the present status of the purchasing function in industry just as we have got to study and reform the process of distribution in this country.

When a manufacturing company enters the market with a line, its officials set a schedule of prices based on their costs, which in turn are regulated by competitive conditions. If the president of that company will permit his sales manager to come in and talk him into permitting a price cut to get some big order and the salesmen find it out, then the salesmen will everlastingly be importuning the sales manager to let them cut to meet another bidder on this job and that.

Price cutting is not the salesman's fault. It is the fault of the executive who can not face the fact that the only relief in a market demoralized by over production and price cutting is reduced production. It is the fault of the executive who lacks the pluck to reduce his output rather than sell at a loss.

Manufacturers will have to ultimately face the economic law that to sell at a loss is waste and an offence against industry. When prices fall below cost they will have to accept their individual responsibility to voluntarily curtail production as their contribution toward restoring the market to a balance.

The purchasing agent has always been the red-headed stepchild of industry. In the beginning the boss did the buying in odd times. Then he detailed a young man to help him. As buying has grown in volume purchasing agents have become more important, until today in many progressive corporations the buying is done by a vice-president with an able staff, and he is a big man with a broad knowledge of markets and men. But in too many cases the purchasing agent still lacks the responsibility and authority he needs to make his job measure up to his titular function. Too often he is just expected to buy what he is told and his performance is measured by his ability to save money on price.

As one large buyer stated, "There are four factors in every purchase that should be given consideration:

1. Suitability to the need
2. Quality of the article
3. Responsibility of the vender
4. Price

Price is only one of the elements that must be weighed in establishing a value and it should not be considered until the other three factors have been established as satisfactory." This man knows what he is talking about.

Therefore, if the purchasing agent is to contribute his share toward overcoming this practice of price cutting that industry is suffering from and stewing about right now, he must face these facts, and facing them he will bring new dignity to his profession and new opportunity to himself. He must recognize that nothing short of this ideal relationship between the seller and the buyer is really efficient and profitable. He must set his entire operation as nearly as possible on that plane and make value, not price, the chief objective. He must study the cost of buying as well as the cost of goods.

There are four things to be done:

1. If the purchaser would demand firm bids, then general price cutting would soon cease. For a firm bid is like a signed order. It's the word of the house. It puts industry on the one price basis just as solidly as the modern department store. It means that a price made is the best and final price and the buyer is expected to place the business by selecting the firm bid that offers the best value—not price alone, but value.

2. While this practice of firm bids is crystallizing into a custom, whenever bidders are called back by a purchasing agent and asked for a better price, let the bidder demand that the other bids be shown to him, so that he will know that he is not being lied to, and that his price is indeed high for equal value.

3. While the trickery of baiting bidders still continues in the world of business let bidders hold *post mortem* comparisons of bids, by submitting their bids on closed business to their trade associations for comparison and report.

4. Let the buyer frankly and publicly proclaim that he will thereafter shun the man who cuts his price, because the first price is supposed to represent the honest value of the goods, and the man who cuts stands self-convicted either of trickery or weakness.

Price cutting is just an economic disease. Immediate relief can only be sought through the building of public opinion among buyers and sellers. But the only way there is to develop public opinion is by discussion that corrects loose thinking and makes clear the moral and economic principles which all men desire to follow once they are generally understood and have gained social standing.

This calls for leadership and I believe that in this kind of a situation this leadership can best come from two sources—the industrial associations and the industrial press. I, therefore, offer these two suggestions, which I believe will bring more immediate influence to the correction of the practice of price cutting than any other action which might now be attempted—

1. That the trade, industrial, and business publications of the country promote the widest possible discussion of the economic inequity of price cutting, drawing out the opinions, principles and practices of the leading men of the field and developing a more common acceptance of the truth of it and a more general adoption of these simple resources of correction.

2. That the trade and industrial associations of each branch of industry support this purpose by calling a conference of the leading purchasing agents of the group to meet with a representative number of their prominent sales executives, for a discussion of the ethics and economics of this business of buying to the end that trade practice in that field may be improved both in selling and in purchasing in so far as price cutting is concerned.

I have asked a good many sales executives this question, when they have been discussing this buyer market—"What is your own purchasing agent doing? Is he buying in the way that you would like to have your own customers buy? Does he foster price cutting?"

To many of them it has been a new

Exhibitograph No. 11

Inquiries for Space

at the

BIG A.E.R.A. SHOW

are coming in continually

Have your

Convention Arrangements

been completed,

Mr. Manufacturer?

slant on the subject. Yet there is no single influence more important to success in sales than the methods and principles of the man who buys. It is worth while, therefore, for the sales minded chief executives of industry to see that their own purchasing methods are right.

Signal System for Pittsburgh

Pittsburgh Railways, Pittsburgh, Pa., has ordered materials from the Union Switch & Signal Company for installation of an absolute permissive block signal system on its single-track line between Mine No. 3 and Tylerdale, a distance of 20 miles. The power for this installation will be supplied from three substations over a 2,200-volt single-phase transmission line. The work involves 58 color light signals, 60 impedance bonds, 180 a.c. relays, 95 transformers, and automatic substation panels by which power is fed from reserve substations in case of failure of the normal source.

Order Exhibit Extras Now

Hardwood and wicker furniture, oriental and domestic rugs, flowers, plants and floral decorations, drinking water, compressed air and current will all be available at the A.E.R.A. Convention. To avoid the last minute rush, Director of Exhibits Fred Dell advises that the order blanks for the above-mentioned service be filled in and returned to the exhibit committee as soon as possible. All exhibitors have been furnished with these blanks. Where a choice in quality is to be had such as in furniture, rugs and flowers, there is a decided advantage in ordering early.

New Track in Worcester

Work will be started soon by the Worcester Consolidated Street Railway, Worcester, Mass., on the reconstruction of 3,154 ft. of track on Grove Street, from Chadwick Square to the Walker Ice House, Worcester, Mass. The following material will be used: 97 tons of rail, 1,600 ties, 105 Thermit joints, 3,154 tie plates, 535 flat tie rods and 21 kegs of spikes at a cost of \$20,284.80.

Work was started about June 1 on the renewal of a switch, mate, frog and lead rails and the reconstruction of 100 ft. of track on Vernon Street at T.O. near St. Vincent's Hospital. The following material will be used: one complete end of a turnout, 130 ties, 3 tons of 7-in. girder rail, 100 tie plates, 18 tie rods, 2 kegs of spikes, 200 yds. of paving and 40 bonds at a cost of \$2,771.42.

Renewal of a switch and mate at T.O. 86 on Franklin Street near the B. & A. freight depot and also the installation of a new solid manganese steel crossing over the tracks of the B. & A. Railroad near the Graton & Knight tannery at a cost of \$2,400, are planned in the near future.

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

	June 5, 1928
Metals—New York	
Copper, electrolytic, cents per lb.	14.525
Copper wire, cents per lb.	16.625
Lead, cents per lb.	6.30
Zinc, cents per lb.	6.475
Tin, Straits, cents per lb.	49.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	4.2
Somerset mine run, f.o.b. mines, net tons.	1.825
Pittsburgh mine run, Pittsburgh, net tons.	1.775
Franklin, Ill., screenings, Chicago, net tons.	1.70
Central, Ill., screenings, Chicago, net tons.	1.55
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.3
Weatherproof wire base, N. Y., cents per lb.	17.125
Cement, Chicago net price, without bags.	2.05
Lined oil (5-bbl. lots) N. Y., cents per lb.	10.8
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.75
Turpentine (bbl. lots), N. Y., per gal.	\$0.61

Chicago "L" Terminal Started

Construction work is now under way on a new \$50,000 terminal station at Logan Square, which is being erected by the Chicago Rapid Transit Company, Chicago, Ill. The exterior of the terminal will be in white terra cotta with old English style mission brick panels. The interior will be finished with art marble wainscoting throughout and the floors will be of terrazzo.

Platform facilities at Adams and Wabash station in the Loop are being increased by widening the south end of the outer platform from 10 to 14 ft. and extending canopies a total of 176 ft. at the north ends.

Track and Terminal for Trenton

Trenton & Mercer County Traction Corporation, Trenton, N. J., will lay a double track on Perry Street, from Broad to Warren Streets and new tracks on North Warren Street. The company also will shortly have plans drawn for a terminal on Perry Street. The total improvements will cost about \$250,000.

ROLLING STOCK

HOUSTON ELECTRIC RAILWAY, Houston, Texas, has ordered four urban type coaches from the Twin Coach Corporation.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, Milwaukee, Wis., has received five urban type Twin Coaches.

ST. LOUIS PUBLIC SERVICE COMPANY, St. Louis, Mo., has purchased four urban Twin Coaches.

UNITED ELECTRIC RAILWAY, Providence, R. I., has ordered one gas-electric Twin Coach from the Twin Coach Company, Kent, Ohio.

TRACK AND LINE

OMAHA & COUNCIL BLUFFS STREET RAILWAY, Omaha, Neb., will spend approximately \$26,000 in track improvement on Twentieth Street. Of this

amount about \$11,000 will be spent on curveouts, switches and other intersection equipment.

PACIFIC GAS & ELECTRIC COMPANY, San Francisco, Cal., is inquiring for poles.

SHOPS AND BUILDINGS

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, New Haven, Conn., plans a power plant at New London, Conn.

ST. LOUIS ELECTRIC TERMINAL RAILWAY, St. Louis, Mo., plans a terminal and freight building to cost about \$1,000,000.

PUGET SOUND POWER & LIGHT COMPANY, Seattle, Wash., has received a permit for a switching station.

HARTFORD ELECTRIC LIGHT COMPANY, Hartford, Conn., plans to purchase and install \$200,000 worth of equipment to supply 5,000 kw. of additional power to the Connecticut Company, New Haven, Conn. The contract was signed on May 28.

TRADE NOTES

GEORGE F. SCHLESINGER, director of highways of the state of Ohio, has resigned his position effective June 15, 1928, and will become chief engineer and managing director of the National Paving Brick Manufacturers' Association on July 1, 1928. The headquarters of the association, which are now in Chicago, will be moved to Washington, D. C.

INGERSOLL-RAND COMPANY, General Electric Company and the American Locomotive Company have received an order to build jointly, three 300-hp. oil-electric locomotives for the Ashland Division of the American Rolling Mill Company.

BAKER & SPENCER, New York, on June 1, moved to 17 Battery Place, New York City.

ADVERTISING LITERATURE

PEREY MANUFACTURING COMPANY, New York, N. Y., has issued a folder entitled "How to Keep Out of Red Ink," descriptive of Perey turnstiles.

HEYWOOD-WAKEFIELD COMPANY, Boston, Mass., has published a bus seat catalog illustrating a number of new ideas in bus seat construction including views of actual installations made.

MITSUBISHI ELECTRIC ENGINEERING COMPANY, Japan, has issued Catalog C-166 on door engines. The descriptive matter is all in Japanese.

SANGAMO ELECTRIC COMPANY, Springfield, Ill., has published Bulletin No. 75 on its Type HB maximum demand register.



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Red and Traffic Stops
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PEACOCK STAFFLESS BRAKE

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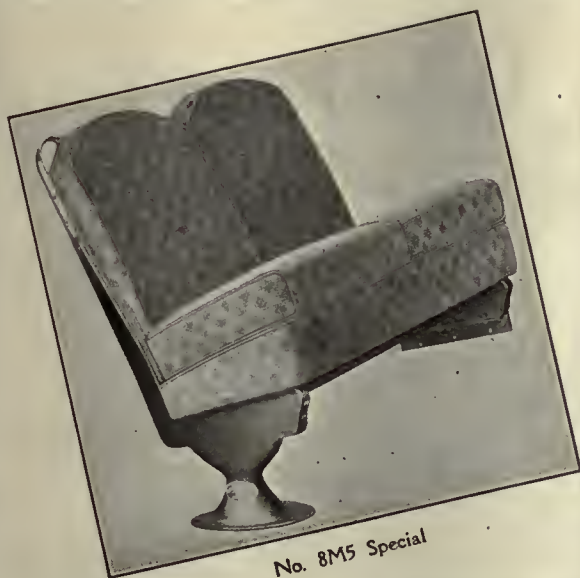


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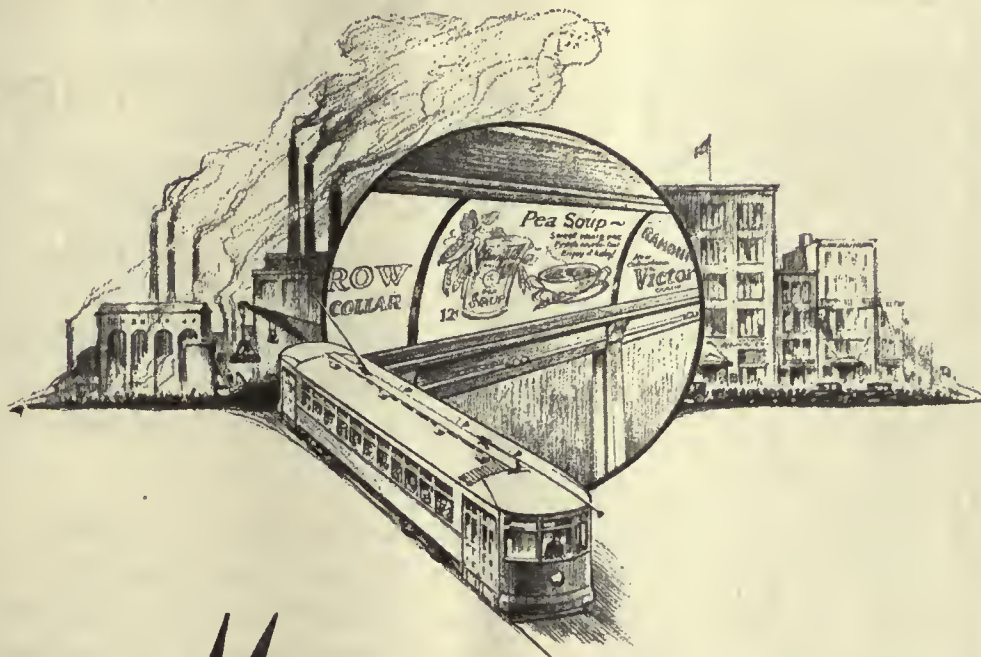
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- Los Angeles*, Electrical Engineering Sales Co., 502 Delta Bldg.
- San Francisco*, Electrical Engineering Sales Co., 222 Underwood Bldg.
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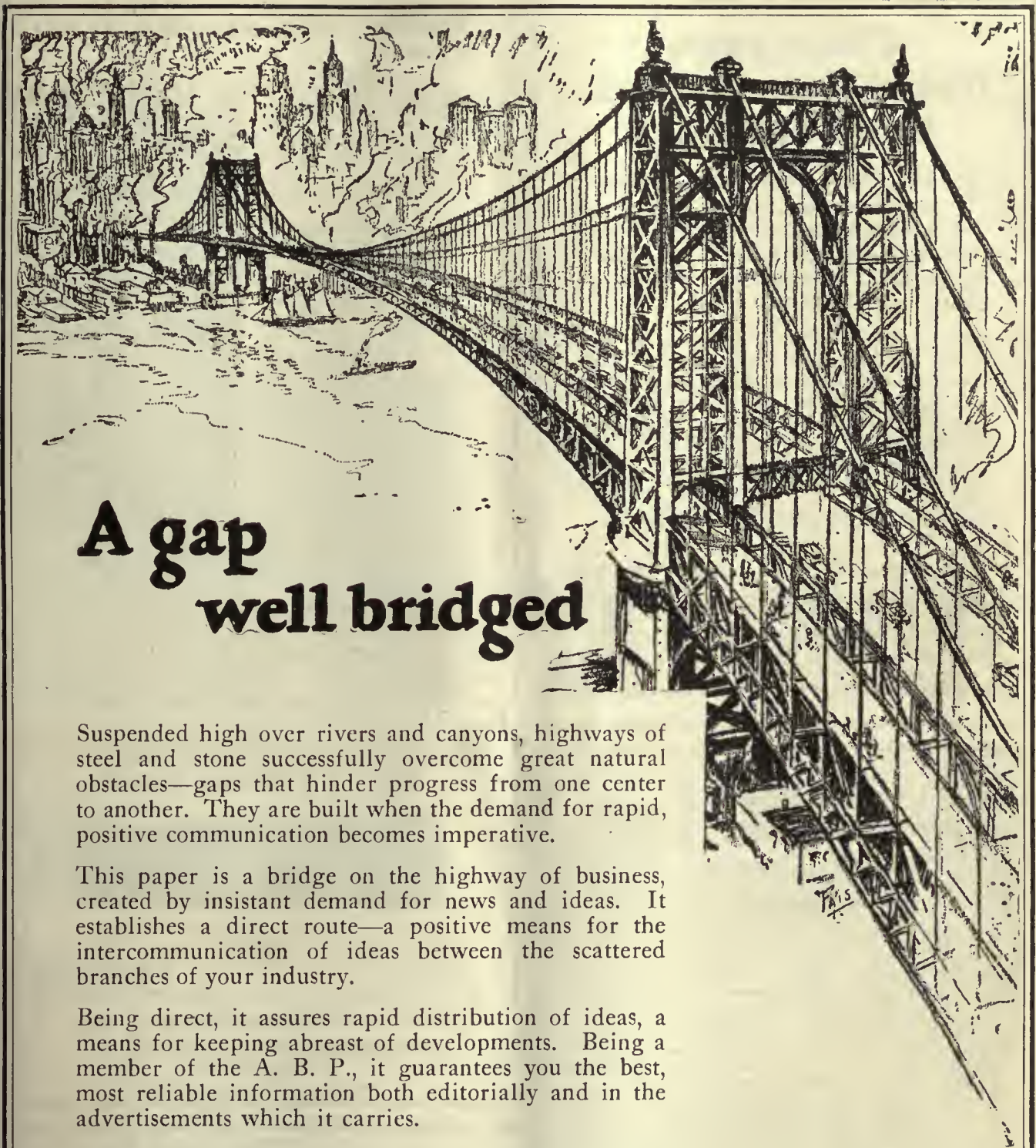
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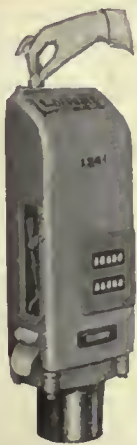
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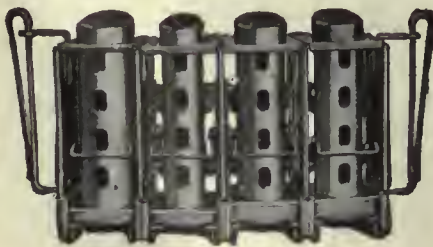
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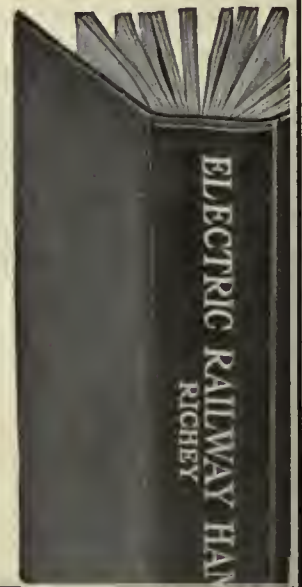
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 PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
 Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
 United States Steel Products Company
 Los Angeles Portland San Francisco Seattle

Export Representative:
 United States Steel Products Company, New York, N. Y.

Let the Passenger Audit



An instantaneous audit by the passenger of NICKELS, DIMES, QUARTERS, METAL TICKETS in various combinations.

PORTABLE—STATIONARY or ELECTRIC—Positive at-the-source protection for your revenue.

Money-Meters, Inc.

(Successor to Rooke Automatic Register Co.)
 3209 Book Tower, Detroit, Mich.

WHARTON

1894 Tisco 1928

SPECIAL TRACKWORK

Manganese Steel in Trackwork, originated by Wharton over thirty-four years ago, is still the metal par excellence for this purpose.

WM. WHARTON JR. & CO., INC.
 EASTON, PA.

GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
 THERMOSTAT CONTROL—VENTILATORS

WRITE FOR NEW CATALOGUE

Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers. Tokens.

The Cleveland Fare Box Co.
 Cleveland, Ohio


Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

Your Name in this space in all issues where larger display space is not used backs up your advertising campaign and keeps your name in the classified section.

ROEBLING


Electrical Wires & Cables

John A. Roebling's Sons Co. Trenton, N. J.



RAIL JOINTS DYNAMOTORS WELDING ROD

UNA Welding & Bonding Co.
 Cleveland, Ohio.



Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
 6209 Hamilton Ave., Detroit, Mich.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 10 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches.....\$4.50 an inch
 4 to 7 inches..... 4.30 an inch
 8 to 14 inches..... 4.10 an inch
 Rates for larger spaces, or yearly rates, on request.
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

Searchlight can help you—

HUNDREDS of miscellaneous business problems pertaining to Electric Railway Operation can be quickly and easily solved through the use of the Searchlight Section of this publication.

The Searchlight Section is the classified advertising section for giving publicity to all kinds of business wants of interest to other men in the field. It is the weekly meeting place of the man with a miscellaneous business need and the men who can fill that need.

When you want additional employees, want to buy or sell used or surplus Railway equipment, seek additional capital or have other miscellaneous business wants—advertise them in the Searchlight Section for quick, profitable results!

Think "SEARCHLIGHT" first

POSITIONS WANTED

SUPERVISOR bureau investigation, broad experience, established successful record street railway and bus transportation; available short notice; best of references. PW-112, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRAFFIC inspector and investigator desires temporary position; can qualify any capacity, transportation department, electric railways and buses; available June 22 to July 23, also Saturdays, Sundays and holidays throughout the year. PW-114, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SALESMAN AVAILABLE

SALES representative with broad association in electric, steam and bus field, open for connection in near future. SA-115, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

- 3—Double truck, pay within, **One-Man Two-Man Cars**, 41 ft. over bumpers, No. 77E-1 motor trucks, 26-in. wheels, Westinghouse 508-A Motors, and G.E. 258-A Motors.
- 2—Single truck, double end, **Closed Birney Type Safety Cars**, length over bumpers 27 ft. 9 1/2 in., Brills special No. 78M-1 trucks, 26-in. wheels, Westinghouse 508 Motors and G.E. 258-A Motors.
- 1—28-ft. single truck **Birney Type Motor Car**, Brills 21-E truck, G.E. 258-A Motors.

The above equipment has recently been withdrawn from service and is in splendid operating condition.

Omaha, Lincoln and Beatrice Railway Co.

235 North 14th St., Lincoln, Neb.

WANTED

WANTED

One Standard Gauge Steel Under Frame Motor Flat Car

Equipped with M.C.B. couplers suitable for switching steam railroad cars around material yard.

The Cincinnati Street Railway Company

Attention General Manager
 Cincinnati, Ohio

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue
This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

- Advertising, Street Car**
Collier, Inc., Barron G.
- Air Brakes**
General Electric Co.
Westinghouse Traction Brake Co.
- Anchors, Guy**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Armature Shop Tools**
Columbia Machine Works
Elec. Service Supplies Co.
- Automatic Return Switch Stands**
Ramapo Ajax Corp.
- Automatic Safety Switch Stands**
Ramapo Ajax Corp.
- Axles**
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Westinghouse E. & M. Co.
- Babbitting Devices**
Columbia Machine Works
- Badges and Buttons**
Elec. Service Supplies Co.
International Cash Register Co., The
- Batteries, Dry**
Nichols-Lintern Co.
- Bearings, Anti-Friction**
Timken Roller Bearing Co.
- Bearings and Bearing Metals**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Westinghouse E. & M. Co.
- Bearings, Center and Roller Side**
Cincinnati Car Co.
Columbia Machine Works
Stuckl Co., A.
- Bearings, Roller**
Timken Roller Bearing Co.
- Bearings, Thrust**
Timken Roller Bearing Co.
- Bells and Buzzers**
Consolidated Car Heating Co.
- Bells and Gongs**
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.
- Benders, Rail**
Railway Trackwork Co.
- Body Material, Haskellite Plymetl**
Haskellite Mfg. Corp.
- Bodies, Bus**
Brill Co. The J. G.
- Bollers**
Babcock & Wilcox Co.
- Bolts, Case Hardened**
Bemis Car Truck Co.
- Band Testers**
American Steel & Wire Co.
Electric Service Supplies Co.
- Bonding Apparatus**
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
- Bands, Rail**
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
- Book Publishers**
McGraw-Hill Book Co.
- Brackets and Cross Arms**
(See also Poles, Ties, Posts, etc.)
Batea Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
- Brake Adjusters**
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Traction Brake Co.
- Brake Shoes**
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
- Brake Testers**
National Ry. Appliance Co.
- Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
General Electric Co.
National Brake Co.
Westinghouse Traction Brake Co.
- Brakes, Magnetic Rail**
Cincinnati Car Co.
- Brick, Paving**
National Paving Brick Mfrs. Assn.
- Brick, Vitrified**
National Paving Brick Mfrs. Assn.
- Brushes, Carbon**
General Electric Co.
Morganite Brush Co.
Westinghouse E. & M. Co.
- Brushes, Graphite**
Morganite Brush Co.
- Brushholders**
Columbia Machine Works
General Electric Co.
- Railheads**
Haskellite Mfg. Corp.
- Buses**
White Co., The
- Buses, Motor**
General Electric Co.
- Bus Lighting**
National Ry. Appliance Co.
- Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
- Cables (See Wires and Cables)**
- Cambric Tapes, Yellow and Black Varnish**
General Electric Co.
Irrington Varnish & Ins. Co.
- Carbon Brushes (See Brushes, Carbon)**
- Car Lighting Fixtures**
Elec. Service Supplies Co.
- Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
- Car Steps, Safety**
Cincinnati Car Co.
- Car Wheels, Rolled Steel**
Bethlehem Steel Co.
- Cars, Dump**
Brill Co., The J. G.
Differential Steel Car Co.
- Cars, Gas-Electric**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
- Cars, Gas, Rail**
Brill Co., The J. G.
- Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.
- Cars, Self-Propelled**
Brill Co., The J. G.
- Castings, Brass Composition or Copper**
Cincinnati Car Co.
Columbia Machine Works
- Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works
Standard Steel Works
- Castings, Malleable**
Timken Roller Bearing Co.
- Castings, Malleable & Brass**
Bemis Car Truck Co.
Columbia Machine Works
- Catchers and Retrievers, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
- Celling Car**
Haskellite Mfg. Corp.
- Ceilings Plywood Panels**
Haskellite Mfg. Corp.
- Chairs, Parlor Car**
Heywood-Wakefield Co.
- Change Carriers**
Cleveland Fare Box Co.
Electric Service Supplies Co.
- Change Trays**
Cincinnati Car Co.
- Circuit-Breakers**
General Electric Co.
Westinghouse E. & M. Co.
- Clamps and Connectors for Wires and Cables**
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Cleaners**
Oakite Products, Inc.
- Cleaners and Scrapers Track**
(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
- Coll Banding and Winding Machines**
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
- Coils, Armature and Field**
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.
- Coils, Coke and Kieking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Coin Changers**
Johnson Fare Box Co.
- Coin Counting Machines**
Cleveland Fare Box Co.
International Cash Register Co., The
Johnson Fare Box Co.
- Coin Sorting Machines**
Cleveland Fare Box Co.
Johnson Fare Box Co.
- Coin Wrappers**
Cleveland Fare Box Co.
- Commutator Slotters**
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
- Commutators or Parts**
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.
- Compressors, Air**
General Electric Co.
Westinghouse Traction Brake Co.
- Condensers**
General Electric Co.
Westinghouse E. & M. Co.
- Condenser Papers**
Irrington Varnish & Ins. Co.
- Connectors, Solderless**
Westinghouse E. & M. Co.
- Connectors, Trailer Car**
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
- Controllers or Parts**
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.
- Controller Regulators**
Elec. Service Supplies Co.
- Controlling Systems**
General Electric Co.
Westinghouse E. & M. Co.
- Converters, Rotary**
General Electric Co.
Westinghouse E. & M. Co.
- Copper Wire**
American Brass Co.
Anaconda Copper Mining Co.
- Copper Wire Instruments, Measuring, Testing and Recording**
American Brass Co.
Anaconda Copper Mining Co.
- Cord, Bell, Trolley, Register**
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Cash Register Co., The
Roebling's Sons Co., John A.
- Cord Connectors and Couplers**
Elec. Service Supplies Co.
- Couplers Car**
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.
- Cowl Ventilators**
Nichols-Lintern Co.
- Cranes, Hoists & Lifts**
Electric Service Supplies Co.
- Cross Arms (See Brackets)**
- Crossing Foundations**
International Steel Tie Co.
- Crossings**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Crossings, Frogs & Switches**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Crossings, Manganese**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Crossings, Track (See Track Special Work)**
- Crossings, Trolley**
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Curtains & Curtain Fixtures**
Brill Co., The J. G.
- Cutting Apparatus**
General Electric Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electric & Mfg. Co.
- Dealer's Machinery & Second Hand Equipment**
Cincinnati Street Railway Co.
Omaha, Lincoln & Beatrice Rlwy. Co.
- Derailing Devices (See also Track Work)**
- Derailing Switches**
Ramapo Ajax Corp.
- Destination Signs**
Columbia Machine Works
Elec. Service Supplies Co.
- Detective Service**
Wish-Service, P. Edward
- Door Operating Devices**
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
- Doors & Door Fixtures**
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
- Doors, Folding Vestibule**
National Pneumatic Co.
- Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
- Dryers, Sand**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Ears**
Columbia Machine Works
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Electric Grinders**
Railway Trackwork Co.
- Electrical Wires and Cables**
American Steel & Wire Co.
John A. Roebling's Sons Co.
- Electrodes, Carbon**
Railway Trackwork Co.
Una Welding & Bonding Co.
- Electrodes, Steel**
Railway Trackwork Co.
Una Welding & Bonding Co.
- Engineers, Consulting, Consulting and Operating**
Beeler, John A.
H. M. Byllesby Co.
Day & Zimmermann, Inc.
Falle & Co., E. H.
Ford, Bacon & Davis
Hampill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLuw
McClelland & Junkerfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G.
- Engines, Gas, Oil or Steam**
Westinghouse E. & M. Co.
- Exterior Side Panels**
Haskellite Mfg. Corp.
- Fare Boxes**
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
- Fare Registers**
Electric Service Supplies Co.
Johnson Fare Box Co.
- Fences, Woven Wire & Fence Posts**
American Steel & Wire Co.
- Fenders and Wheel Guards**
Brill Co., The J. G.
Cincinnati Car Co.
Star Brass Works
- Fibre and Fibre Tubing**
Westinghouse E. & M. Co.
- Field Coils (See Coils)**
- Floodlights**
Electric Service Supplies Co.
General Electric Co.
- Floor, Sub**
Haskellite Mfg. Corp.

(Continued on page 34)



FORGED
then **ROLLED**
 for
**Safe,
 Smooth
 Service**

BETHLEHEM Rolled Steel Wheels for electric railway service are safe, smooth-running and economical.

A combined forging and rolling process imparts toughness and gives the metal a grained, dense structure, insuring against breakage and crystallization. Flats are practically unknown.

Maximum service with minimum cost of maintenance is realized, with every investment in Bethlehem Rolled Steel Wheels for Electric railway service.

Bethlehem forged steel axles possess the same high quality found in all Bethlehem forged products. They can be furnished heat treated, annealed, untreated or rough-turned all over.

BETHLEHEM STEEL COMPANY

General Offices: Bethlehem Pa.

District Offices in: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, St. Louis, San Francisco, Los Angeles, Seattle, and Portland

*Bethlehem Steel Export Corporation, 25 Broadway, New York City.
 Sole Exporter of our Commercial Products.*

BETHLEHEM
ROLLED STEEL WHEELS

- Floors**
Haskelite Mfg. Corp.
- Forgings**
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works
- Frogs & Crossings, Tee Ball**
Bethlehem Steel Co.
Lorain Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Frogs, Track (See Track Work)**
- Frogs, Trolley**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Fuses and Fuse Boxes**
Columbia Machine Works
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.
- Gas Electric Drive for Buses**
General Electric Co.
- Gasoline**
Texas Co., The
- Gas Producers**
Westinghouse E. & M. Co.
- Gates, Car**
Brill Co., The J. G.
Cincinnati Car Co.
- Gear Blanks**
Brill Co., The J. G.
Standard Steel Works Co.
- Gear Cases**
Chillingworth Mfg. Co.
Columbia Machine Works
Electric Service Supplies Co.
Westinghouse E. & M. Co.
- Gears and Pinions**
Bemis Car Truck Co.
Columbia Machine Works
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall & Co., R. D.
- Generators**
General Electric Co.
Westinghouse E. & M. Co.
- Grider Rails**
Bethlehem Steel Co.
Lorain Steel Co.
- Gongs (See Bells and Gongs)**
- Grease**
Texas Co., The
- Grinders, Portable**
Railway Trackwork Co.
- Grinders, Portable Electric**
Railway Trackwork Co.
- Grinding Bricks and Wheels**
Railway Trackwork Co.
- Guard Rail Clamps**
Lorain Steel Co.
Ramapo Ajax Corp.
- Guard Rails, Tee Rail & Manganese**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Guards, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
- Harps, Trolley**
Columbia Machine Works
Elec. Service Supplies Co.
Nuttall & Co., R. D.
Ohio Brass Co.
Star Brass Works
- Headlights**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
- Headlining**
Columbia Machine Works
Haskelite Mfg. Corp.
- Heaters, Bus**
Nichols-Lintern Co.
- Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter
- Heaters, Car, Hot Air and Water**
Smith Heater Co., Peter
- Heaters, Car Stove**
Smith Heater Co., Peter
- Helmets, Welding**
Railway Trackwork Co.
Una Welding & Bonding Co.
- Hoists & Lifts**
Columbia Machine Works
- Hose, Bridges**
Ohio Brass Co.
- Hose, Pneumatic**
Westinghouse Traction Brake Co.
- Instruments, Measuring, Testing and Recording**
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.
- Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.
- Insulating Silk**
Irvington Varnish & Ins. Co.
- Insulating Varnishes**
Irvington Varnish & Ins. Co.
- Insulation (See also Paints)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.
- Insulation Slots**
Irvington Varnish & Ins. Co.
- Insulator Pins**
Elec. Service Supplies Co.
Ohio Brass Co.
- Insulators (See also Line Materials)**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Interior Side Linings**
Haskelite Mfg. Corp.
- Jacks (See also Cranes, Hoists and Lifts)**
Columbia Machine Works
Elec. Service Supplies Co.
- Joints, Rail (See Rail Joints)**
- Journal Boxes**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
- Lamp Guards and Fixtures**
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
- Lamps, Arc and Incandescent (See also Headlights)**
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
Elec. Service Supplies Co.
Nichols-Lintern Co.
- Lanterns, Classification**
Nichols-Lintern Co.
- Letter Boards**
Cincinnati Car Co.
Haskelite Mfg. Corp.
- Lighting Fixtures, Interior**
Electric Service Supplies Co.
- Lightning Protection**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Line Material (See also Brackets, Insulators, Wires, etc.)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Loading Spring Boxes**
Lorain Steel Co.
Wm. Wharton, Jr. & Co.
- Locomotives, Electric**
Cincinnati Car Co.
General Electric Co.
Westinghouse E. & M. Co.
- Lubricants**
Texas Co., The
- Manganese Steel Guard Rails**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Manganese Steel Castings**
Bemis Car Truck Co.
Lorain Steel Co.
- Manganese, Steel, Special Track Work**
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.
- Manganese Steel Switches**
Frogs and Crossings
Bethlehem Steel Co.
Lorain Ajax Corp.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Mirrors, Inside & Outside**
Cincinnati Car Co.
- Motor Buses, (See Buses)**
- Motors, Electric**
General Electric Co.
Westinghouse E. & M. Co.
- Motor, Generators & Controls for Electric Buses**
General Electric Co.
- Motorman's Seats**
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood-Wakefield Co.
- Nuts and Bolts**
Bemis Car Truck Co.
Cincinnati Car Co.
- Oil**
Texas Co., The
- Omnibuses (See Buses)**
- Oxy-Acetylene (See Cutting Apparatus)**
- Parking**
Westinghouse Traction Brake Co.
- Paints and Varnishes (Insulating)**
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
- Paints & Varnishes, Railway**
National Ry. Appliance Co.
- Panels, Outside, Inside**
Haskelite Mfg. Corp.
- Paving Materials, Vitrified Brick**
National Paving Brick Mfrs. Assn.
- Pickup, Trolley Wire**
Elec. Service Supplies Co.
Ohio Brass Co.
- Pinion Pullers**
Elec. Service Supplies Co.
- Pinions (See Gears)**
- Plns, Case Hardened, Wood and Iron**
Ohio Brass Co.
Westinghouse Traction Brake Co.
- Pipe Fittings**
Standard Steel Works
Westinghouse Tr. Brake Co.
- Planers (See Machine Tools)**
- Plates for Tee Rail Switches**
Ramapo Ajax Corp.
- Pliers, Rubber Insulated**
Elec. Service Supplies Co.
- Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks**
Haskelite Mfg. Corp.
- Pole Line Hardware**
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
- Poles, Metal Street**
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
- Poles, Ties, Posts, Piling & Lumber**
Bell Lumber Co.
J. F. Prettyman & Son
- Poles and Ties, Treated**
Bell Lumber Co.
J. F. Prettyman & Son
- Poles, Trolley**
Elec. Service Supplies Co.
Nuttall Co., R. D.
- Poles, Tubular Steel**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
- Portable Grinders**
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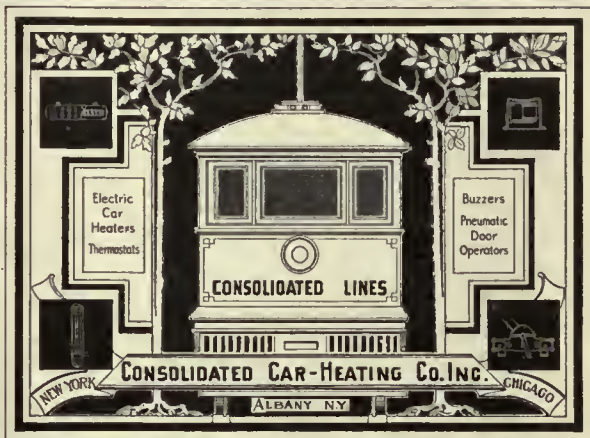
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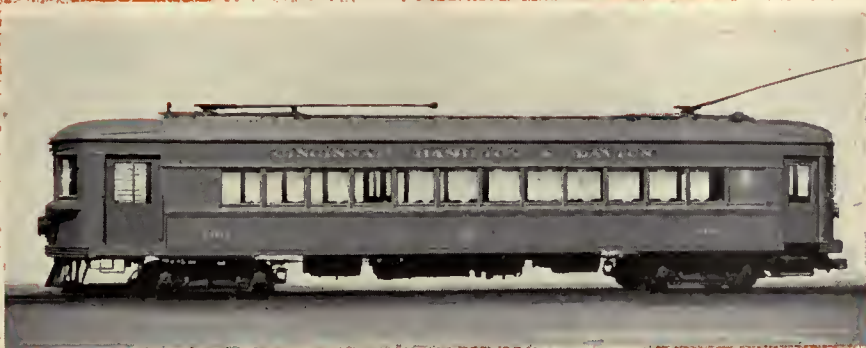
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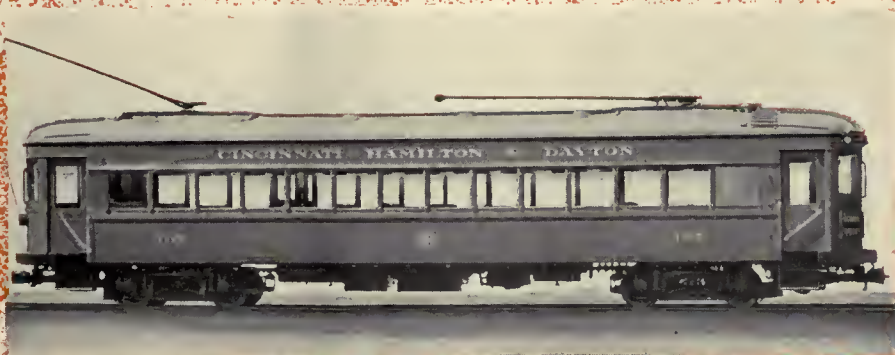
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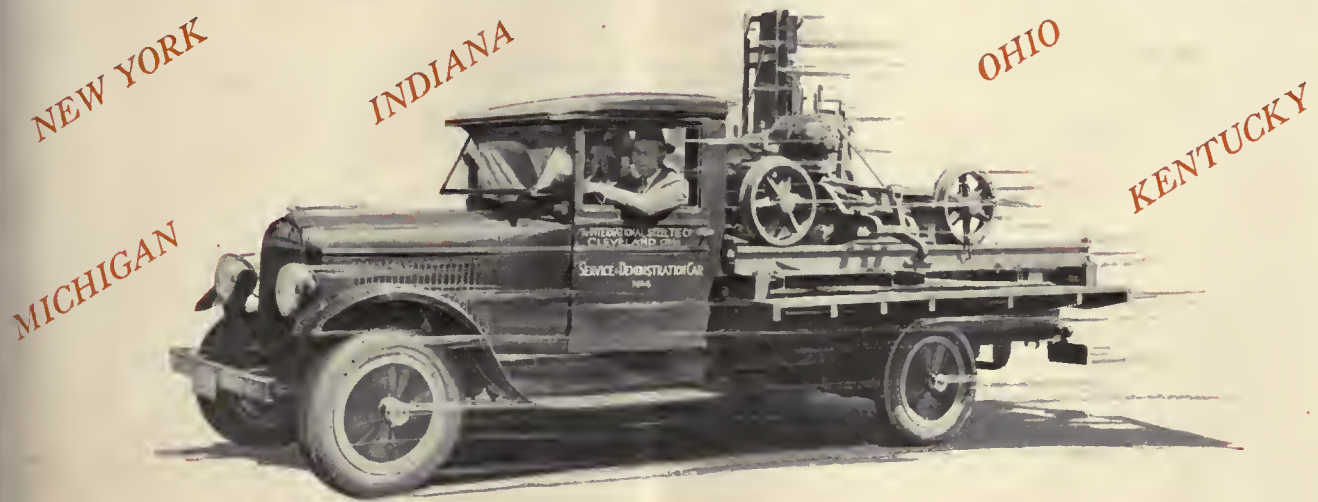
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June 16, 1928

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By W. H. AUSTRY

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ELECTRIC RAILWAY JOURNAL is official correspondent in the United States of Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles.

 BETTER RAIL, BETTER TRANSPORTATION

A challenge

“The industry meets a new challenge. This public of which we speak so much has changed. Its habits have changed. Its demands have changed. Particularly is this true as regards transportation. Speed, convenience, comfort, luxury! That is what today's public wants, and there are 20,000,000 automobiles in the country to prove it!”

Electric Railway Journal

And only on good track can you supply what today's public rightly insists on getting.

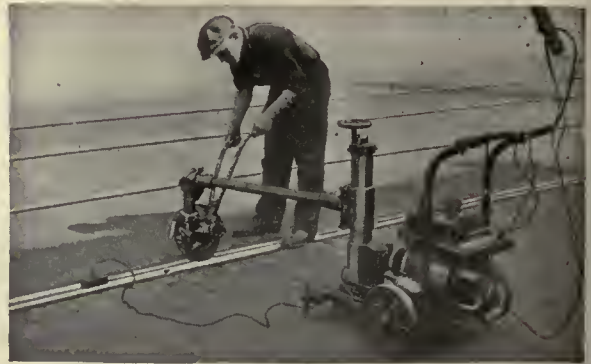
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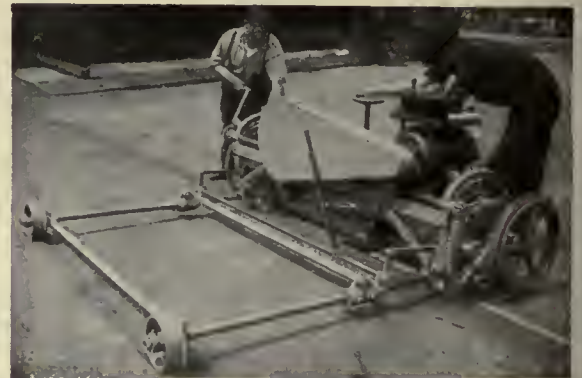
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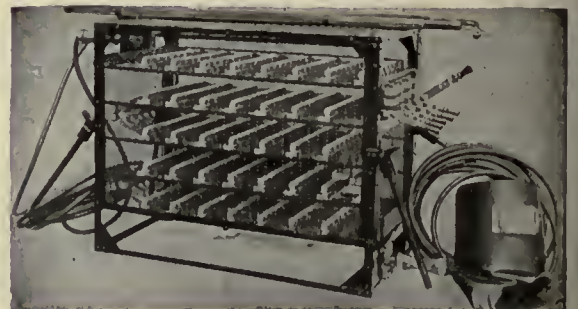
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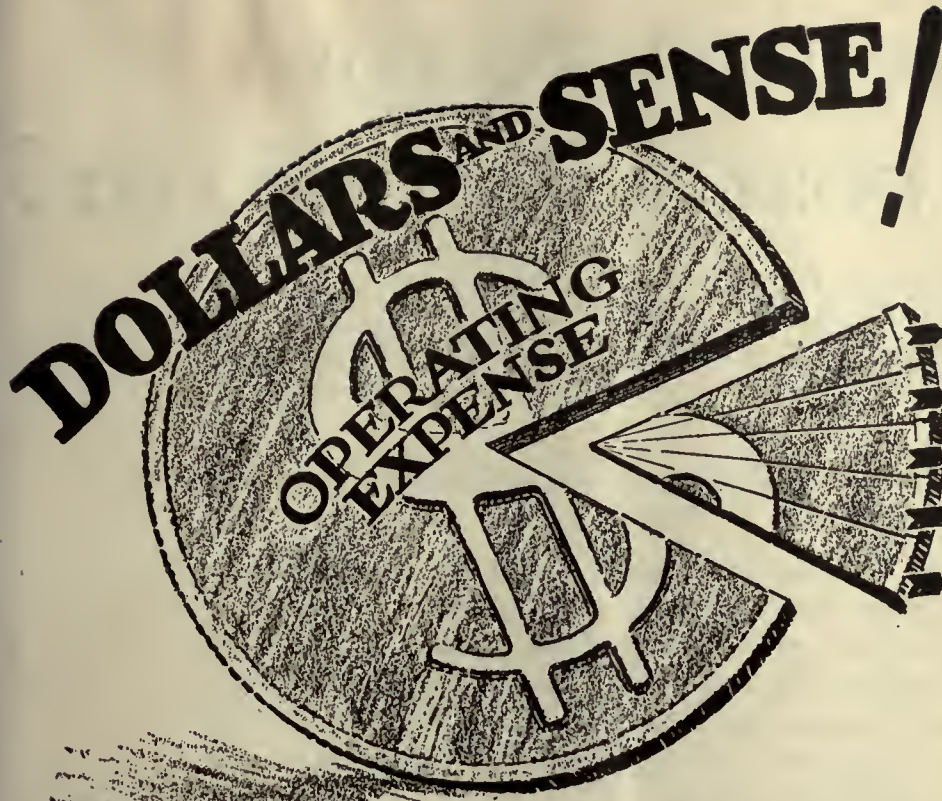


Reciprocating Track Grinder



"Ajax" Electric Arc Welder

 BETTER RAIL, BETTER TRANSPORTATION



- **Less Power**
- **Lower Maintenance**
- **Quicker Welding**
- **Longer Life**
- **Better and Faster Car Operation**

Cut a Slice from Each Expense Dollar with O-B Copper Arc-weld Bonds



Titon Bond

Large contact area of terminals, and extreme flexibility of this type afford an exceptionally durable bond. Adapted to standard T-rail joints.



UNA Bond

The O-B UNA Bond, type CUA, has the strands of the cable encased in a pressed copper terminal, which fits into the UNA carbon mould. Thus, when the welding rod is applied, the cable, terminal and copper weld become a single unit with the ball of the rail.

AW-12 Bond

Here is a bond that can be made to grip the rail base before welding, just by a tap of the hammer. Heavy terminals protect the deposited metal.

THE importance of an efficient track circuit is readily recognized. The use then, of materials to best produce this efficiency is essential.

By bonding with O-B Copper Arc-Weld Bonds, using O-B Silicon-copper welding rod, a distinct saving in operating expense is effected. This saving cuts quite a slice out of each operating dollar, by eliminating certain expense factors both in the application of the O-B Bonds as well as in the operation of cars.

The improved designs of O-B Copper Arc-Weld Bonds permit easier and quicker installation. The methods of copper welding employed unites the rail, terminal and cable strands into a homogeneous mass, thus assuring a permanent, low track resistance. All make O-B Bonds a sound "Dollars and Sense" selection. O-B Copper Arc-Weld Bonds are supplied in the self-contained mold type (Titon) bond, or for application by the UNA carbon mold process.

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co., Limited
Niagara Falls, Canada
8698

Ohio Brass Co.

NEW YORK CHICAGO PHILADELPHIA PITTSBURGH ATLANTA CLEVELAND ST. LOUIS SAN FRANCISCO LOS ANGELES

PORCELAIN
INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING
MATERIALS
VALVES

Would you try to row a boat with one oar?



It can be done, but the inefficiency of steering against the turning effect of the one-sided force is obvious.

Similarly, balanced braking (the double shoe clasp type) is vastly superior to the single brake shoe rigging. The heavy braking load is equally balanced on opposite sides of the wheel. There is no shifting of the journal box bearing; no unbalanced load on truck frames and truck springs; less brake shoe wear; less journal box wear; fewer hot boxes; fewer slid-flat wheels; smoother and shorter stops; less train resistance in starting.

In other words, dozens of advantages—all making for economy and better transportation service.



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS

Shelby Seamless Steel Trolley Poles

are best in the long run—used universally

Shelby poles are made of No. 13 gauge seamless cold drawn steel tubing. This section is 1 inch outside diameter, reamed inside to $\frac{3}{4}$ inch to receive harp, or 1 inch outside, if specified for socket type harp.

This section in all Shelby poles is 6 inches long and is tapered gradually from 1 inch diameter to a diameter of $1\frac{3}{8}$ inch.

This section is 18 inches long and $1\frac{3}{8}$ inches in diameter, in all poles merging into $1\frac{1}{2}$ inch section in styles A and B poles and $1\frac{5}{8}$ inch in special poles, with fillets of large radii.

In styles A and B poles this section is $1\frac{1}{2}$ inches outside diameter and varies in length according to the total length of the pole; the outside diameter of the butt is $1\frac{1}{2}$ inches, and reinforcement, due to method of insertion, is practically integral with body of the pole. In special 2 inch poles, this section is 2 inches outside diameter.

The length of the reinforcing member in a style A pole is 16 inches and in a style B pole and also in special 2 inch poles it varies according to the total length of the pole.

All Shelby poles are specially tested before leaving the factory. They are uniform in quality and most reliable. Write for complete data.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

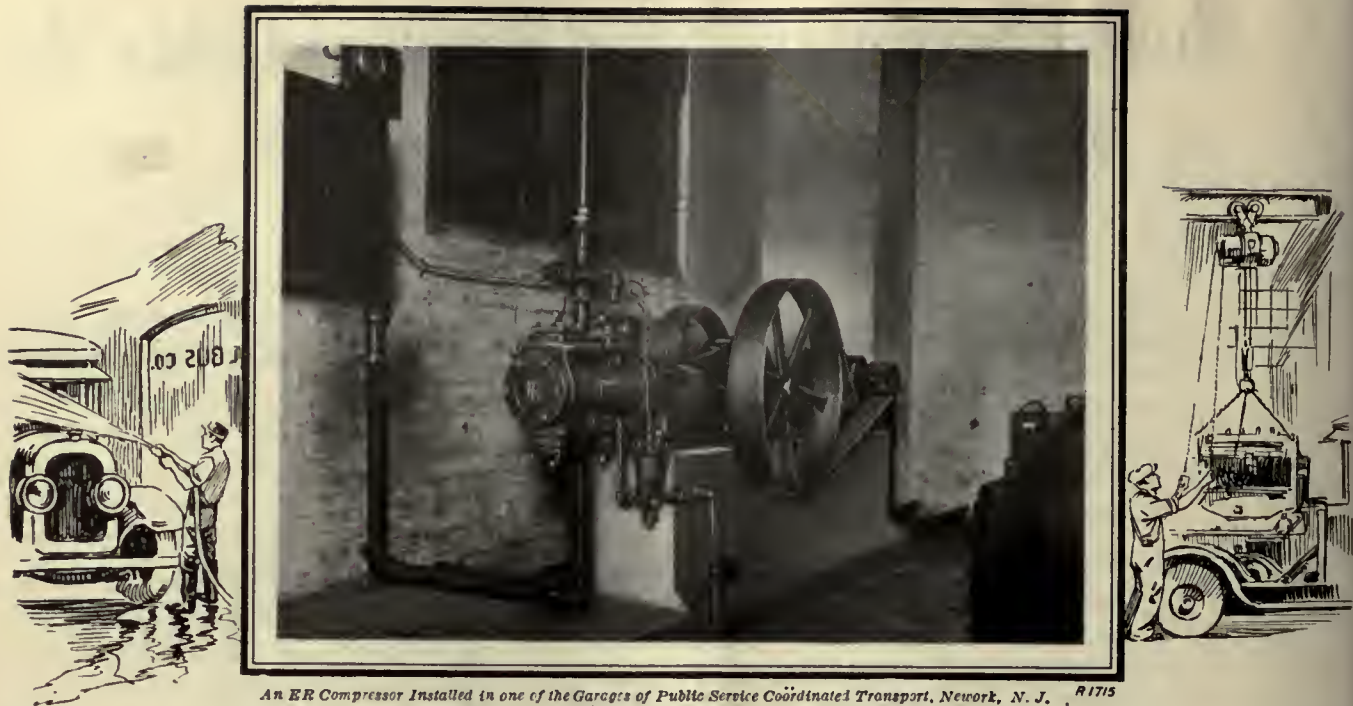
Shelby seamless trolley poles are manufactured in two standard designs known as Style A and Style B, both being $1\frac{1}{2}$ inches in diameter at the butt. To meet unusually severe conditions where high trolley pressures are necessary we manufacture a special extra heavy pole having a two-inch butt.

ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

AND INDUSTRIAL ELECTRICAL MATERIAL





An ER Compressor Installed in one of the Garages of Public Service Coördinated Transport, Newark, N. J. R 1715

Better Air Service for Bus Garages with ONE Reliable Compressor



Have You An Air Problem?

Ingersoll-Rand maintains a world-wide sales-engineering staff composed of trained men. There is a representative near you who can help you determine what sort of compressor your conditions call for.

I-R is a well-known symbol wherever air is used. It designates the world's largest maker of pneumatic machinery. Ingersoll-Rand builds compressors with capacities ranging from 7 to 7,000 cubic feet per minute.

Why multiply air costs by maintaining individual compressors for each of your air-consuming operations? Why have several investments, several power bills, several machines to look after, needless floor space occupied?

Why, especially, when *one* Ingersoll-Rand Compressor of established reliability will supply ample air for *all* your present needs and provide a surplus for future expansion?

One ER Compressor will furnish air for gasoline pumping, tire service, washing and greasing buses, cleaning motors and chassis, spray painting, operating pneumatic tools, hoists, etc. Use more compressed air from a central air plant. It will cut your labor costs and speed up operations.

Ingersoll-Rand Co., 11 Broadway, New York

Please mail me a free copy of Bulletin 3150, which describes the ER compressor.

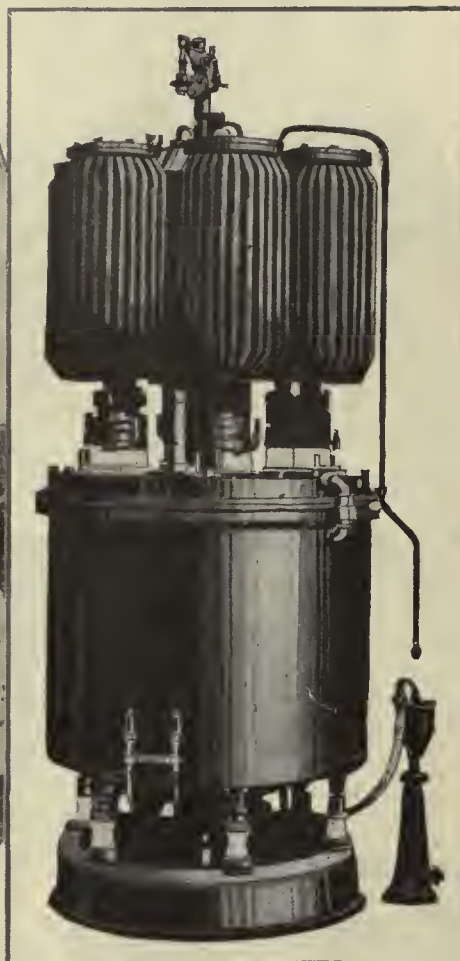
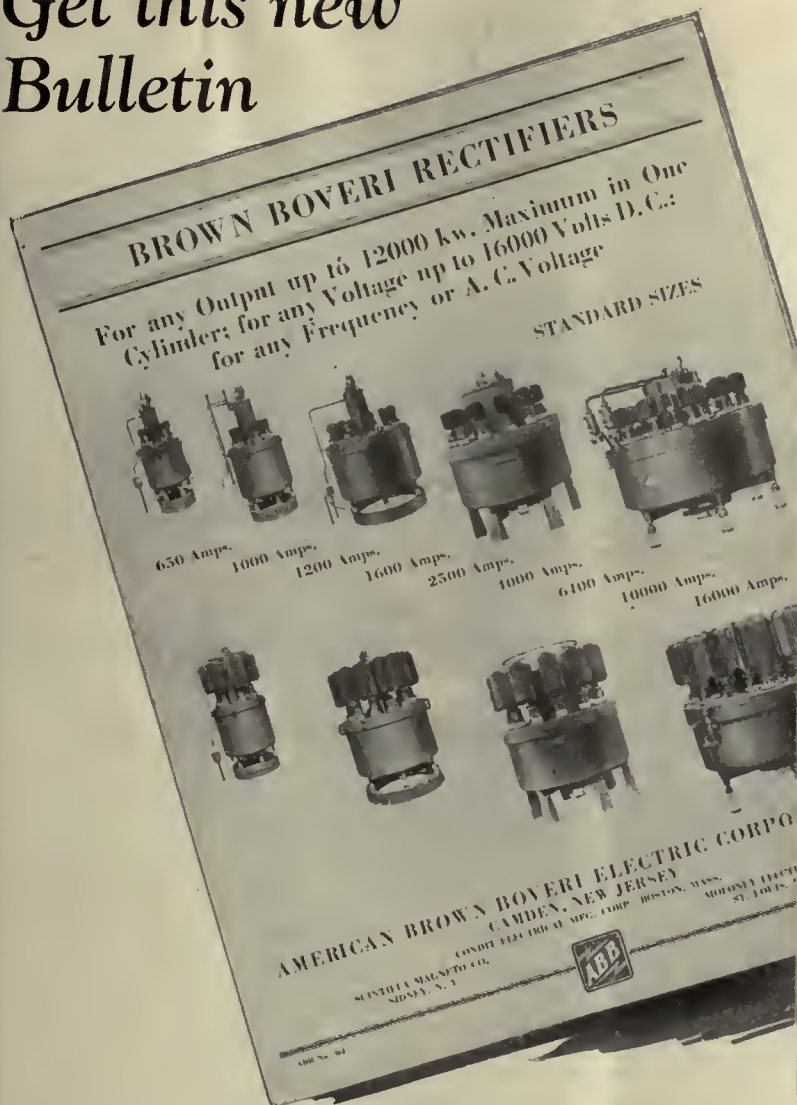
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PRINCIPAL PRODUCTS

- Electric Locomotives**
- Diesel-Electric Locomotives**
- Car Lighting Equipment**
- Mercury-Arc Power Rectifiers**
- Transformers**

- Automatic Voltage Regulators
- Automatic Synchronizers
- High Voltage Oil Circuit Breakers
- Steam Turbo-Generator Sets
- Turbo-Blowers and Compressors
- Turbo-Exhausters and Boosters
- Scavenging and Supercharging Blowers

WE have descriptive literature just off the press showing views of A-B-B Mercury-Arc Power Rectifiers now operating in the United States . . . photographs of the several types and sizes available . . . dimensional drawings of both rectifiers and accompanying transformers . . . floor plans and layouts of typical A-B-B rectifier substations.

A review of this folder will show more clearly why we say:

- (1) Efficiency high over entire range.
- (2) Simple operation and minimum attention.
- (3) No synchronizing.
- (4) No harm from short circuits.
- (5) Negligible maintenance.
- (6) Low weight.
- (7) No special foundations required.
- (8) Noiseless and vibrationless operation.

In these characteristics lies the reason for the thousands of kilowatts capacity of A-B-B Mercury-Arc Power Rectifiers now successfully operating at many points in the United States and Canada.

AMERICAN BROWN BOVERI ELECTRIC CORPORATION
Main Plant: Camden, N. J.

AMERICAN BROWN BOVERI



The Westinghouse Tight-Lock Coupler

..... a modern coupler for modern service

With the adoption of train formation, rather than single car operation, to facilitate modern, quick, economic service, many traction properties have solved their coupling problems by the adoption of the Westinghouse Tight Lock Coupler.

In one operation, this modern coupler effects mechanical, electrical, and air connections . . . it is no longer necessary for crews to go between cars to make a coupling. Another feature of the Westinghouse Tight Lock Coupler is its ability to automatically take up slack caused by natural wear on the latches, thereby preventing relative motion between adjoining couplers. These advantages all contribute to the success of this modern coupler . . . Its adoption assures the ease, safety, and economy of single car control in multiple unit operation.



Westinghouse K-1-A Tight Lock Coupler

Tight Lock Couplers are promoting safety and economy in multiple unit traction service on many properties . . . they are furnished in three distinct types . . . the "H" for heavy, high speed trains; the "K-1-A" for medium and light weight cars; and the "C-3-A" for light cars, where the electric feature is not desired.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



For serving
high class
residential districts

GRAHAM
BROTHERS
COACHES

fit

fit

*because of fine
appearance, speed
comfort, safety*

16-passenger
Parlor Car
Complete \$4,290

12-passenger
Club Car
Complete \$4,045

Prices f.o.b.
Detroit



GRAHAM MOTOR

Graham Brothers Parlor Coaches provide deluxe service at a lower investment and operating cost

With a Graham Brothers 16-passenger Parlor Coach or 12-passenger Club Car you can give your patrons a service so like private, individual transportation that they pay more for it willingly. Notable among many profitable uses for the coach is deluxe city service, a rapidly broadening field.

The dependability, the smooth and abundant power, the ability to stand up and the unequalled economy of Dodge Brothers 6-cylinder engine can only be had in Graham Brothers coaches.

Check just a few of the additional features that contribute to the passengers' satisfaction, to the operator's profit and the prospective buyer's wonderment when he learns of their low initial cost —

Four speed transmission . . . internal expanding 4-wheel brakes (Lockheed hydraulic), . . . 3 stage progressive type springs . . . roomy, comfortable bodies designed for proper light, ventilation and temperature . . . a complete, fine-looking vehicle that is entirely a Dodge Brothers product.

Then let your local dealer show you some of the other reasons so many operators are purchasing these coaches.



BROTHERS COACHES

— Sold by Dodge Brothers Dealers Everywhere



- - and Street Car Type Sales Continue to Grow

Sales of Graham Brothers 21-passenger street car type motor coaches go on increasing.

Attribute the increase to what you will —

To the mechanical excellence of the coaches, modern in every feature and built complete —

To their enviable performance in the hands of satisfied owners —

To the ready accessibility of service everywhere —

To their exact fitness to the majority of coach uses or their economy in operation and maintenance —

Credit what you will — isn't the steady increase in their use reason for your further investigation of them?

Street Car Type Coach, complete f.o.b. Detroit, \$4060.

GRAHAM BROTHERS

EVANSVILLE — DETROIT — STOCKTON

A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED. TORONTO. ONTARIO



TREADLE-IZE!

The street car is the back-bone of mass transportation. It is a safe, economical and dependable carrier. A car that has been treadle-ized meets with the approval of your riders. Have you treadle-ized?

NP

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NATIONAL PNEUMATIC COMPANY

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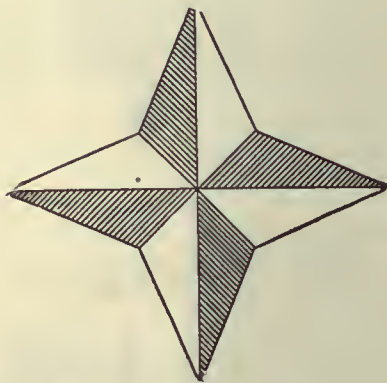
General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

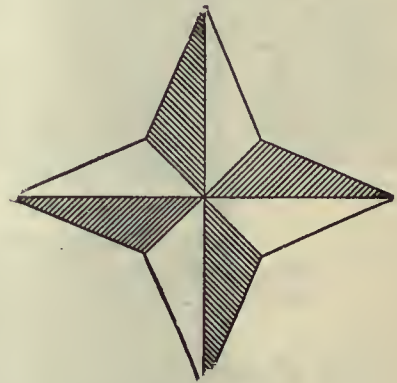
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Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
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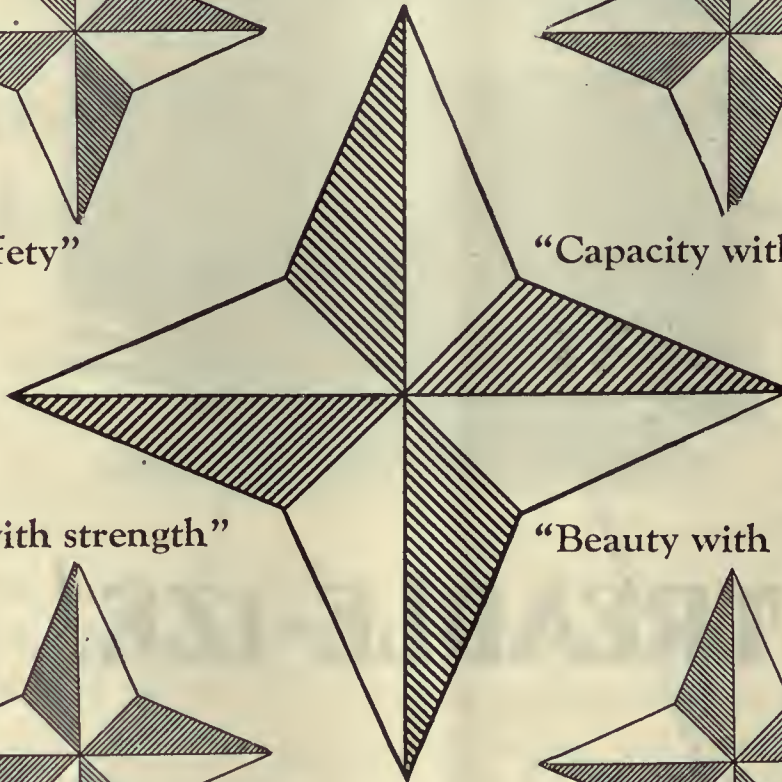
Do you know the Stars that



"Speed with safety"



"Capacity with comfort"



"Lightweight with strength"

"Beauty with low cost"



The stars mark the Four Features of Balanced Design which are brought to their highest development in Cincinnati Balanced Lightweight Cars

lead to increased patronage?

With the eventual purchase of new cars in mind, critically analyze your present equipment from the viewpoint of:

Speed with Safety

Do you maintain fast schedules — get away speedily in traffic? Do you receive reports of ACCIDENTS PREVENTED? Operators of Cincinnati BALANCED LIGHTWEIGHT cars have fast schedules and the safety that goes with a 30% to 60% decreased stopping time due to Cincinnati Duplex Air-Magnetic Braking equipment.

Capacity with Comfort

Do you haul a heavy load of good will throughout the day? Does the inevitable rush hour peak load realize that even under such conditions everything that can be done has been done? Operators of Cincinnati BALANCED LIGHTWEIGHT cars are capitalizing "CAPACITY WITH COMFORT."

Lightweight with Strength

Have you the advantages of lowered maintenance and operating costs? We will be glad to give you definite data of Cincinnati BALANCED LIGHTWEIGHT design and show its relation to improved operation.

Beauty with Low Cost

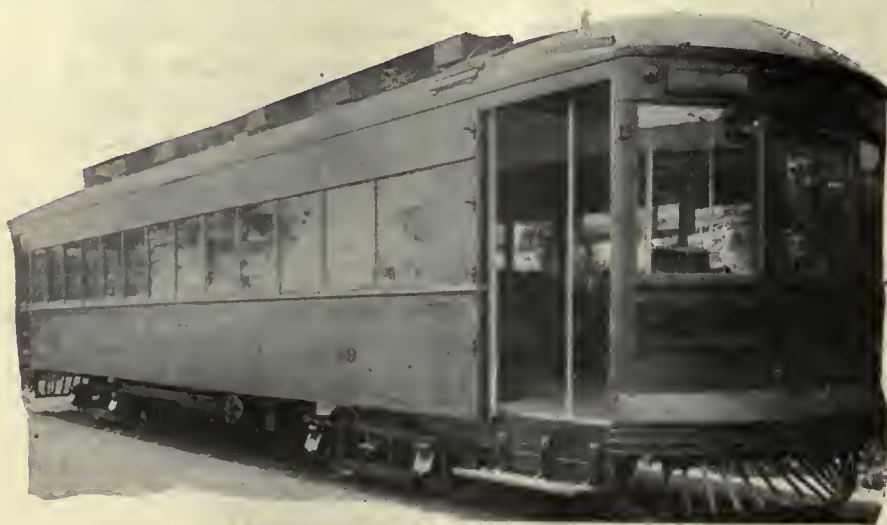
Does your present equipment present the combined advantages of the first three cardinal points in electric car construction under the garb of low cost attractiveness? Operators of Cincinnati BALANCED LIGHTWEIGHT cars know the effect of attractiveness upon their riders. It pays.

CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI
BALANCED
LIGHTWEIGHT **CARS**

— still a step ahead of the modern trend!

Modern Cars PAY in increased revenue



MODERN lightweight cars, with their fast operation, comfortable interiors, and attractive design are bound to appeal to the riding public. They have proven their ability to increase revenue and decrease operating costs on every property we have served.

They will pay you, too.

With all the
Modern Features
the Street Car has become
the preferred method
of transportation

**CUMMINGS CAR
AND COACH CO.**

111 W. Monroe St.
Chicago, Ill.

Economy Meters Help Keep Down Our Power Bill

These Meters, Installed Last Year, Replaced the Old Coaster Clocks and Are Proving a Big Success—Divisions in Spirited Contest to Lead in Power Saving Campaign

Economy Meters were installed last fall on all the passenger cars belonging to this Company. These meters were put on in connection with our campaign to cut down the amount of power used to operate the cars, replacing the old coaster clocks as a device for checking power saving. The clocks, which were in use for several years, had finally reached the point where it was better to replace them rather than to attempt to keep them in repair.



Use of the meters has many points of advantage over the old method, the principal one being their simplicity. Electrical energy, or power, is the thing that goes through the meters on the switch board, and the thing for which the company must pay; and power is the thing we want to save. The Economy Meters show us how much of this power is being used in the motors under the cars. This is the part the motorman controls. By watching the meter readings the motorman can tell how much energy he uses on each trip and which

trips he makes most economically. He can also keep check from day to day of his entire run. In this way the motorman can readily see the effect different ways of feeding the controller, or handling the air, have upon power consumption.

After the meters were on the cars the next big step in putting them into operation was to get normal or standard figures of power consumption, or kilowatt hours per car mile for each line and division as well as for the seven divisions as a whole. These normal figures were obtained before any instructions were given in the use of the meters and any gain that has been made thereafter is attributed to the advantage of having them on the cars, along with the follow-up system in vogue.

The first readings for the normal were taken after the cars were in at the end of the day's run on November 27th and the end readings were taken after the close of December 4th, or one week later. These readings were taken in to the newly organized Car Meter Department and the kilowatt hours used by each car during the week were set up, and the kilowatt hours per car mile determined. This work was done under the guidance of Mr. J. T. Lake,

Following is the report for the first fifteen days of April:

KANSAS CITY PUBLIC SERVICE COMPANY—TRANSPORTATION DEPARTMENT POWER CONSUMPTION REPORT April 1st to 15th, 1928

Division	ACTUAL			NORMAL		PER CENT SAVED	
	KWH	Miles	KWH/CM	KWH/CM	KWH	This Period	Last Period
10th & Minnesota.....	259,960	105,625.7	2.46	2.87	303,640	14.25	12.20
9th & Washington.....	146,924	75,176.9	1.95	2.23	166,284	12.54	11.47
18th & Olive.....	366,976	89,822.0	4.08	4.43	398,314	7.90	9.80
48th & Harrison.....	1,056,203	321,650.4	3.28	3.56	1,143,192	7.86	5.37
9th & Brighton.....	755,494	217,704.3	3.48	3.74	810,740	6.96	8.04
31st & Holmes.....	180,055	45,559.4	3.95	4.24	193,875	6.84	7.75
5th & Virginia.....	321,319	77,404.4	4.15	4.44	344,067	6.54	6.80
SYSTEM—							
THIS PERIOD.....	3,086,931	932,943.1	3.31	3.60	3,360,112	8.05	....
LAST PERIOD.....	3,423,034	1,036,981.8	3.31	3.58	3,710,657	....	7.54

of the Economy Electric Device Company, who was here to help launch the meters.

After the normal readings had been taken, meetings were held to tell how the meters were to be used and to review the ways of saving power. Two of these meetings were held at each car division and three at the general office. Nearly every man in the Transportation Department, including the dispatchers and the school, heard these talks. The meters were then put into operation.

A semi-monthly report is made up by the Car Meter Department, showing the standing of the divisions and the different lines at the divisions, rated according to per cent of power saved under the normal. It also shows the kilowatt hours per car mile for each trainman on the line; the man with the best record at the top and on down to the one with the poorest record at the bottom. Those below the average for the line are shown in red. This report is posted for the trainmen to read.

The follow-up is made from information shown on the report. The road instructor from the Meter Department goes from one division to another, showing the men at the bottom of the lists how to use the car controls more efficiently and how to get their names up higher on the lists.

Following are the savings as shown by the meters since they were installed:

Period	Per Cent Power Saved System	Division In First Place	Per Cent Power Saved
December—1927.....	5.70	5th & Virginia	8.68
Jan. 1 to 15, 1928....	7.03	5th & Virginia	11.35
Jan. 16 to 31, 1928...	6.25	5th & Virginia	10.83
Feb. 1 to 15, 1928....	8.24	5th & Virginia	12.40
Feb. 16 to 29, 1928...	7.10	9th & Washington	11.54
March 1 to 15, 1928....	7.75	9th & Washington	13.62
March 16 to 31, 1928...	7.54	10th & Minnesota	12.20
April 1 to 15, 1928....	8.05	10th & Minnesota	14.25

10th and Minnesota stepped into first place for the first time, in the second half of March. They held this place again for the first half of April. They also have three second places and three third places to their credit, having never been below third place since the meters were put on.

9th and Washington held a close second during both the last half of March and the first half of April, while the Washington division held first for the two preceding periods. After having held first honors for the first four periods of operation, 5th and Virginia has dropped to the bottom of the list.

ECONOMY ELECTRIC DEVICES COMPANY

37 W. VAN BUREN ST., CHICAGO

Distributors or Agents for

Haskelite and Plymet

Woods Fare Boxes
Economy Gasoline Vehicle Meters

Langamo Economy Meters
Peter Smith Heaters

EXCELLENCE

EXCELLENCE IN TIMBER—*International* poles are inspected rigidly by trained timber men. Each pole is turned and inspected singly. If there are any signs of decay the pole is rejected. Only sound poles are selected for manufacture.

EXCELLENCE IN TREATMENT—*International* poles are carefully air or steam seasoned. For treatment, every modern device is provided for the control and accurate measurement of temperature, steam pressure, vacuum and preservative.

EXCELLENCE IN SERVICE—*International* maintains a large stock of poles manufactured under the strictest supervision and in this manner provides for engineers high quality poles whose performance has proved them reliable in service, causing fewer interruptions, greater economy, and a more satisfied public.

Illustration shows section of Beaumont Plant showing how carefully poles are stacked on creosoted skids.

International Creosoting & Construction Co.

General Offices—Galveston, Texas

Plants: Texarkana Beaumont Galveston



International
Creosoted Yellow Pine Poles

A
 sturdy tire,
 reinforced and
 protected for the
 demands of bus
 service



It does not *always* follow that a rugged-looking tire will give long service.

But here is a tire just as sturdy inside as it is outside. The U. S. Royal Heavy Service is built for *severe* transportation duty.

Massive, tough tread. Heavy rut protection on side walls. Multi-ply carcass of strongest cords soaked and

surrounded with pure rubber latex—*no cross-tie threads.*

And of special interest to bus operators—a new compound, *Usconite*, minimizes the effects of internal heat accumulation which is one of the principal causes of tread separation.

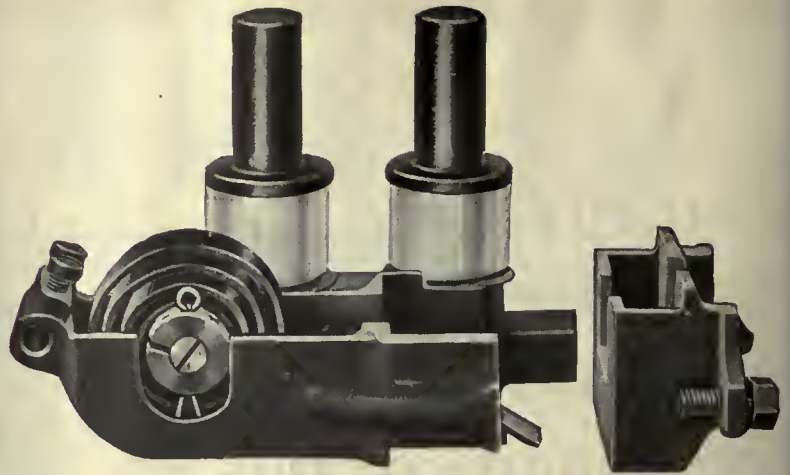
The Royal Heavy Service is the low-mileage-cost bus tire of the day!

United States  Rubber Company
 Trade Mark

U.S. ROYAL CORDS

HEAVY SERVICE

No better tires made today



Why? *scrap the whole thing*
 when only one part is worn

IT isn't necessary, if you use G-E Renewable Carbon-way Brush Holders.

This is the efficient way; it's the modern way, because it's the way which provides for scrapping only what's actually worn, and preserving what's useful for further service. It's the way to improved maintenance at less cost because it enables you to renew the carbon-way of a brush holder more often, and thus avoid the chance of failure on the road.

G-E Renewable Carbon-way Brush Holders are standard on all the modern G-E Motors—and are available for earlier types also.



A General Electric policy of long standing is the development of every maintenance-reducing device that research and engineering skill can produce. Brush holders with the wearing part made renewable are among the results of this policy, by which the electric railways have profited.



For
 Original Equipment Quality

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

LOUIS F. STOLL, General Manager
CHARLES GORDON, Editor

Volume 71 New York, Saturday,

June 16, 1928

Number 24

A Symbol of Achievement

IN THIS issue ELECTRIC RAILWAY JOURNAL has the honor to reproduce for the first time the bronze plaque awarded by the Associated Business Papers, Inc., an association of 142 leading American business papers, for the most definite and outstanding editorial service rendered by an A.B.P. publication. This award was established in 1927 for the advancement of editorial standards.

Announcement of the award to the JOURNAL was made at a combined meeting in Boston of the National Conference of Business Paper Editors and the educational committee of the Associated Business Papers, Inc., and was published in the Feb. 18, 1928, issue. The JOURNAL expressed its gratification at having been the means of directing national attention to the heroic struggle being made by electric railways to fight their way back to prosperity through what many times seemed to be insurmountable obstacles.

The trophy has just been completed. In the finished plaque the artist has caught the romance of industrial achievement and has represented the business publication in its proper role—that of inspiring industry to greater effort and broader vision. But to the men of the electric railway industry itself goes the credit for the actual progress that has been made, and the JOURNAL reproduces this trophy on its pages so that its readers may share with it this signal honor.

Improved Methods and Equipment Will Produce Needed Economies

DESCRIBING the economies that had resulted from a new piece of shop equipment he recently had installed, an equipment superintendent said last week, "Any master mechanic that does not take advantage of such a labor-saving device will certainly have something to explain to the general manager." The machine referred to had cost \$200 and had paid for itself in a week's time. Yet few similar machines will be found in electric railway repair shops. Why is not more equipment of this type used? Why does not the master mechanic inquire about the value of such equipment, and then by figures and by discussion prove to his superiors its installation and intensive use will result in worth-while economies?

The expenditure of money for equipment that will produce economies far beyond the cost of the equipment merits consideration by all general managers of railways.



Bronze plaque established by the Associated Business Papers, Inc., and awarded to the A.B.P. publication contributing the most definite and outstanding editorial service to its industry.

Instead of taking the stand that expenditures must be reduced, that the present shop equipment must do for a few years longer, and that equipment which has served its purpose for many years must continue, the forward-looking general manager of today is of an investigating type. Whenever he reads or hears of a road that is obtaining real economies in maintenance he has his master mechanic investigate the methods employed and make a report as to those that can be adapted to advantage on his property. When a new piece of equipment is being used by another railway to better its work, reduce labor or speed up output, he asks

his staff to determine if such a machine can be used to advantage. He insists on getting lower maintenance costs by the use of improved methods and equipment rather than by insisting that no expenditures be made for new tools.

Prosperity Comes to Canada

DELEGATES to the annual convention of the Canadian Electric Railway Association held at Toronto last week could not fail to be impressed by the feeling that the industry in that country has definitely turned the corner and is forging ahead. Last year at the Winnipeg convention there was an atmosphere of hopefulness. This year, after the progress in 1927, the railway operators are even more confident in the security of their business. The results for last year's operations were given by H. E. Weyman, president of the association, in his opening address, abstracted elsewhere in this issue. The revenues of Canadian electric railways and subsidiaries, as stated by him, were \$48,290,000, an increase of 3.2 per cent from the previous year. Revenue passengers were up 3.75 per cent, while the amount of service was increased 6.5 per cent. These figures show a healthy growth.

It will not, however, be advisable for the managements to rest on their laurels. According to Mr. Weyman, the automobile has not yet reached its peak in Canada. The forward-looking attitude of the managements will do much to counteract any adverse influence from this source. As one of the speakers pointed out, the automobile has created a demand for transportation that must be met by public carriers, so that its use has certain compensating advantages. This is particularly true in a country which has the wonderful opportunity for expansion that exists in Canada.

This is the issue in June that is devoted essentially to maintenance and construction subjects

Thorough Motor Inspection Will Reduce Cost of Intermediate Repairs

DIRT and moisture affect the reliability of motor performance to a greater extent than any other factors. Eliminate them and the maintenance of modern motors is comparatively easy. Maintenance methods should, therefore, be directed to keeping motors clean and dry. For this nothing is more effective than an efficient and regular inspection. A high-class system need not be expensive and its cost will be returned many times over by the reduction in repairs.

Inspection intervals for modern motors depend on the frequency of oiling. Motors with auxiliary oil wells should run at least 1,500 miles between armature bearing oilings. In city service this will bring them into the shop from twice to three times a month, and in heavy inter-urban service possibly once a week.

At these times the most effective way of removing dust is to blow it out with compressed air and wipe off the inside of the shell, the commutator, brush-holder insulators and brush-holders with cheesecloth. On one Southern railway that operates in extremely dusty territory it was found that the length of inspection periods was determined by the side wear of the carbon brushes. This side wear in the ventilated motors was caused by the large amount of dust that was sucked in with the air. The trouble was overcome by changing the method of ventilation and adding baffles to keep dust from the brush-holders. This is one example of the effect that dirt may have.

Use of better grades of insulation, together with dipping and baking of armatures and fields and liberal use of insulating varnish, have proved most effective for combating the effects of moisture. When motors operate in a damp climate painting and shellacking should form a part of the regular inspection. Cleaning, of course, should always precede the painting, and sufficient time for drying should also be allowed.

This may sound like a lot of work to be covered on motor inspection but it has been found to pay. On one system, after a year of this kind of inspection practice, the number of armatures removed and sent to the armature room for repairs had decreased 70 per cent and the repair bills for the entire year following showed a nearly proportionate decrease. The average cost of repairs, including bearing renewals, was reduced in the ratio of 5 to 2 with an increase in motor inspection expense of but one dollar per motor. This certainly is a good return on the investment and shows that the cost of intermediate repairs to motors can be reduced by more careful inspections.

Be There and Speak Up

LACK of representation at meetings of local bodies where their interests to a certain degree are concerned is costing many electric railways the loss of important issues and, if nothing more tangible, the loss of public confidence. Even the failure to attend meetings where transportation is not discussed is costly, for a feeling develops that the electric railway is interested only in problems which affect its own welfare. Participation in as many activities as possible and being a working unit of each community organization, not merely a member, will bear fruit when some issue of importance to the transportation system is decided.

At meetings of civic clubs automobile associations are

always well represented. Their members attend in large numbers and never fail to be there *en masse* when "parking restrictions" or "street paving" are to be discussed. But whether the subjects interest them or not, they are present and their influence in the organization becomes established. Local improvement associations always make transportation a live subject. Nearly every company will find some member of its organization lives in the territory of each association, and should encourage him to be an active member. It behooves the electric railways, then, to be represented at all meetings and to be represented as fully as possible.

In the interests of its patrons, the transport company should make its force felt at these meetings. Mere attendance is not a discharge of the obligation; the representative must make his influence known. To use the words of E. K. Eastham, safety director of the St. Louis Public Service Company, who recently spoke at the Electric Railway and Public Utilities session of the Central States Safety Congress, "By all means be represented at every gathering where matters of public interest are to be discussed or decided, and don't be afraid to stand up and be counted." In many cities civic groups seek the counsel of the electric railway company. They do so because the company has earned respect and secured public confidence at meetings in which it took a really active part.

"Busy at the office" is not an acceptable excuse for the railway executive. Perhaps he is busy, but so are many others who attend. It is a grave and costly mistake to conceive of public interest meetings as a waste of time. Indeed, if the management is too busy, or as Mr. Eastham mentioned, "too pennywise," to attend these meetings and make the force of the electric railway and its patrons felt, it cannot expect to receive its just share of consideration when any subject affecting it is under discussion.

A Hundred Pounds of Sugar at a Time—Or Four Pounds

FROM a maintenance point of view the well-known axiom, "It pays well to build well," holds true. Another axiom not heard so frequently, but nevertheless just as important, is, "It pays well to buy wisely." Certainly careful purchasing, with respect to quantity as well as to quality, cannot be over-emphasized. It is of particular importance in every branch of industry, and electric railways are no exception.

The cost of careless ordering can be sufficient to cause the budgets of several departments to be over-spent. Just as the judicious housewife buys a 100-lb. sack of sugar for \$5.50, instead of 25 four-pound lots at 7 cents per pound, totaling \$7, and a 3-bushel bag of potatoes for \$4.50, instead of 30 six-pound lots at 4 cents per pound, totaling \$7.20, so should the purchasing agent of the railway save by buying in large amounts.

While there are possibilities of saving in purchasing methods in nearly every department, naturally the greatest opportunities are in connection with maintenance materials. Certain bulky materials, such as sand and gravel used in track reconstruction and maintenance work, are costly when purchased in small quantity. Not only is the cost per cubic yard at the pit much higher when sand and gravel are purchased in small amounts, but also the cost per cubic yard for hauling them to the property is greater. Where there is a demand for a material the year round, it is folly to buy in amounts

only sufficient for each individual job. Wherever possible, it should be shipped by carload or barge amounts. A large electric railway system in the East receives all its sand and gravel on barges, and handles the material at the wharf with large cranes. The resulting saving in a year is enormous.

Repair parts must be ordered wisely. It is absurd to think of a large railway ordering, for example, one bolt or even one standard size rail. Yet there are actual cases that are equally ridiculous. Nearly all shop parts are needed in quantity, so there are few instances where the ordering of one or two individual parts is warranted. The cost of shipping individual parts often is much higher than the actual cost of the part itself. Manufacturers, generally speaking, do not accept with open arms the small orders. To them small orders are nothing more than a nuisance.

Of course, the other extreme can be reached. Parts or materials should not be bought in large quantities if they will become obsolete before they are all used, nor if they will deteriorate with age. Materials which occupy much space should not be bought in quantity if the cost of storage is more than the saving realized thereby. Like anything else, quantity purchasing can be overdone and the purchasing agent should be careful to avoid making an error in this respect. Ordinarily, however, the opposite holds true and materials are purchased in too small amounts. Good judgment in ordering materials is necessary if savings are to be effected.

Another Argument for New Equipment Is 30 to 1 Dependability

WHEN the subject of new equipment is being discussed, one of the most important advantages frequently is either overlooked or is not given the emphasis it deserves. That is the saving in maintenance and operating costs made possible when old and wornout parts are replaced by new ones. There is still another advantage in the improvements that are embodied in the more recent designs of parts of various sorts which lead to a reduction in the number of failures.

These points are emphasized by the experience of the Georgia Power Company, as related by W. H. McAloney in an article in this issue. This company has been replacing old cars with new ones ever since 1921. Besides this it has been replacing old motors with new where it was decided the cars were good enough to continue in service. A total of 426 old motors have been retired, while at the same time 848 light-weight modern motors have been placed in service. A part of this increase is on account of the purchase of new cars, but the greater part was because of the replacement of old two-motor equipments with new four-motor equipments.

Statistics kept by the mechanical department show that in the past five years 110 per cent of the armatures of the old motors have been rewound, while only 0.019 per cent of the new motors have required it. In 1927 the miles per rewind for the old motors averaged 307,163 as compared with 10,646,741 for the new ones. In other words the reliability of the new was about 30 times as great as that of the old. Of course as the new motors become old it cannot be hoped that they will continue this remarkable record, but it will be a number of years until they fall to the level of the old ones. Incidentally,

improvements in the methods of overhauling have increased the mileage of the first lots of the new-type motors.

This is concrete evidence of the value of modernization. It covers only one element, but an important one. However, it is almost certain that other items of maintenance have been improved proportionately. Beside all this there is the increased reliability in service and freedom from breakdowns on the street. These are things that cannot be estimated in dollars. They should appeal to the general manager with the greatest force.

Bus Expansion Built on Profits in Pittsburgh

ATTENTION is focused again on the operations of the Pittsburgh Motor Coach Company, Pittsburgh, Pa., by the announcement of the establishment by that company of its fifth de luxe motor coach line. Like its predecessors, the new service is run at a 25-cent cash fare, with 21 tickets for \$5. The route is 7 miles long. It connects a high-class residential district with the downtown business section.

There are, of course, very good reasons why the company confines bus operation to service of this class. T. W. Noonan, general manager, made them plain in his speech before the Central Electric Railway Association in Toledo in February, 1927. Some may or may not agree with the philosophy behind the plan, but it has produced results. This is borne out by the report of the company, abstracted in the JOURNAL for April 21, 1928. Income from buses, before allowing for depreciation, was \$107,805. Out of this \$62,848 was set aside for depreciation, leaving a net of \$44,957. The revenue per passenger coach-mile was 36.82 cents with the average fare 24.70 cents. The gross was \$483,569.

In developing its bus service, the Pittsburgh management deliberately set out to create an entirely different class of service than can possibly be given by a low-fare electric railway service, or for that matter a low-fare bus service. The management recognized that economy is not a primary appeal to the habitual private automobile user. Convenience, speed, exclusiveness, and even luxury, are of far more importance to this class of bus prospect and Pittsburgh has proved it. The vehicles run are of small capacity, three seats wide and operated on short headways. An effort is made to give the passenger the impression of riding in an exclusive limousine rather than in a public transportation vehicle. Early in its experience, the company changed from 29-seat buses to 19-seat vehicles and earnings went up immediately.

The economy of larger seating capacity, particularly in the rush hours, cannot be gainsaid, but the fact remains that the present successful operation seems to be attributable to the use of small vehicles run at frequent intervals in a service that really is de luxe.

The Pittsburgh Railways is running its bus subsidiary intensively. The line of demarcation of responsibility for its operation is sharply drawn. There is no disposition on its part to regard bus service as an orphan for which only occasional concern is expressed. Mr. Noonan's paper of more than a year ago made that plain. The separate report of the operation of the Pittsburgh Motor Coach Company contained in the JOURNAL for April 21 proves the far-sightedness of this policy and points the way toward making buses in city service really profitable.

Careful Overhauling of Motors

Prevents Service Interruptions*

With several cars in a rapid transit train a disabled motor may cause delay and inconvenience to hundreds. Motor overhauling in the Coney Island shops of the Brooklyn-Manhattan Transit Lines is planned to prevent failures on the road. The most modern practices are used

By Clarence W. Squier
Associate Editor *Electric Railway Journal*

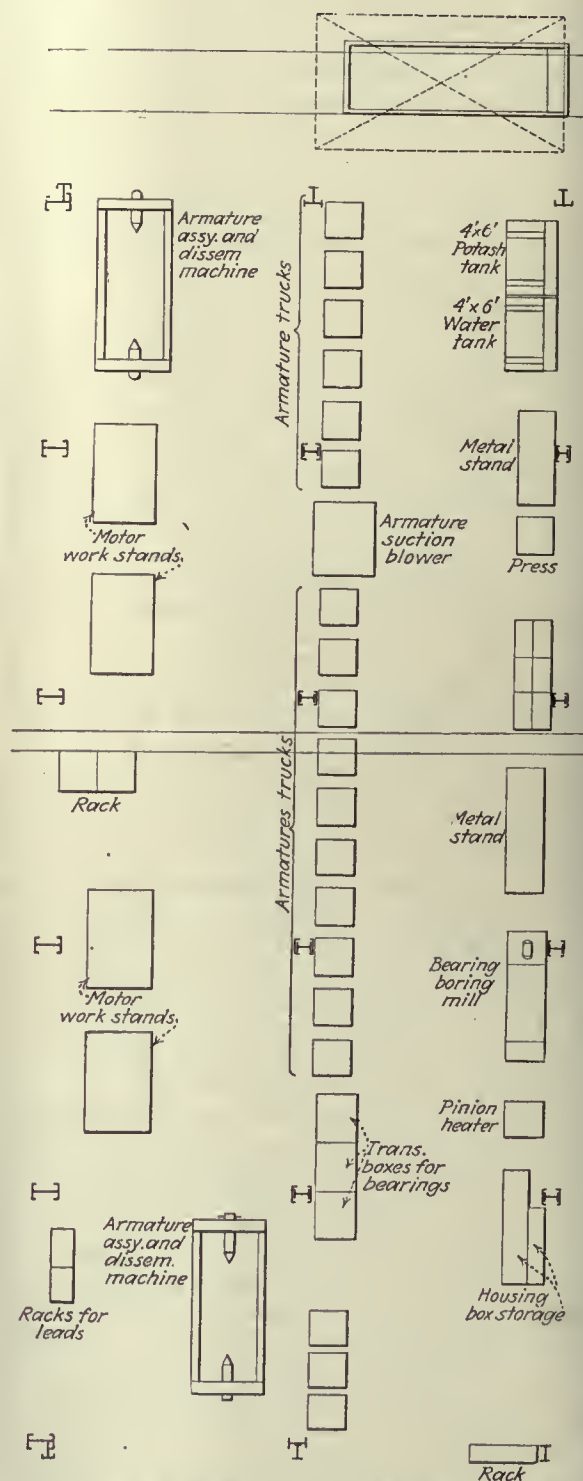
HIGHLY systematized methods are used throughout the motor overhauling department in the Coney Island shops of the Brooklyn-Manhattan Transit Lines. This work is done in two bays each 20 ft. wide by 100 ft. long. Over each bay is a 5-ton overhead traveling crane controlled from the floor. Motors are lifted off trucks at one end of the section when the trucks go through the shops for general overhauling. The department also does intermediate repairs to motors when it is necessary to remove them from trucks. This section is adjacent to the truck overhauling department so that handling is kept to a minimum.

All motors are of a box-frame type. This is of particular value in standardizing the work. The first thing done when a motor is received in this department is to pull waste from axle caps and armature bearing housings and drain off the oil. The oil and waste are placed in steel drums and go to the oil and waste reclaiming department. Next, for removal of armatures, the motors are placed in a dismantling and assembling machine, of which there are two in the section. One is used for taking out armatures and the other, at the opposite end of the section, is used for assembling.

The machines are of a type quite generally used by electric railways for the purpose. The base has two 9-in. channels 12 ft. 3 in. long. These serve as tracks for the carriage which supports the motor shell. End uprights of $\frac{1}{2}$ x4-in. steel support a headstock and a tailstock with spindles with coned ends to fit in the centers of the armature shaft. The carriage has a spindle with collars at one side over which the motor axle bearing suspension fits. At the other side the carriage has a supporting framework with a plate to support the nose of the motor. The motor is thus supported on the carriage, the same as it ordinarily is on the car truck. Accompanying illustrations show the construction.

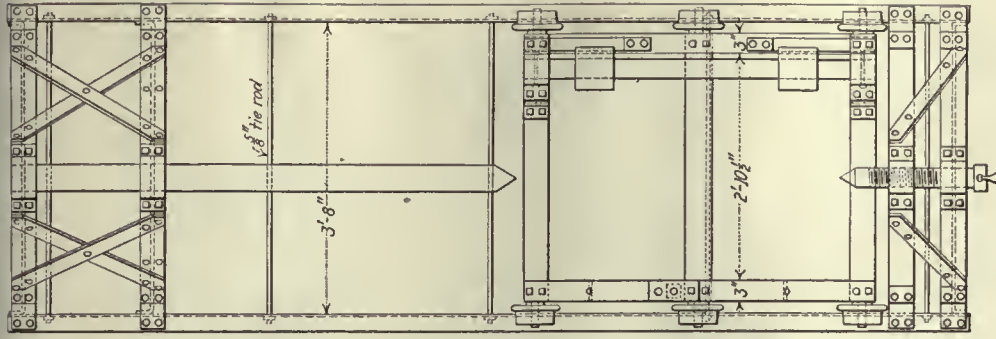
To remove an armature the motor is placed on the carriage, the shaft is centered in the head and tailstocks and locked in position. The pinion end housing is then

*This is the fourth article on methods and equipment used in the Coney Island shops of the B.-M.T. Corporation. Others were "Truck Overhauling," published April 21, 1928; "Intermediate Truck Repairs," published May 5, 1928, and "Wheel, Gear and Axle Maintenance," published May 19, 1928.

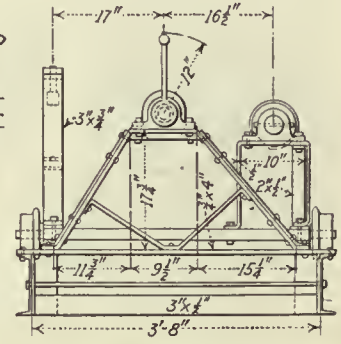
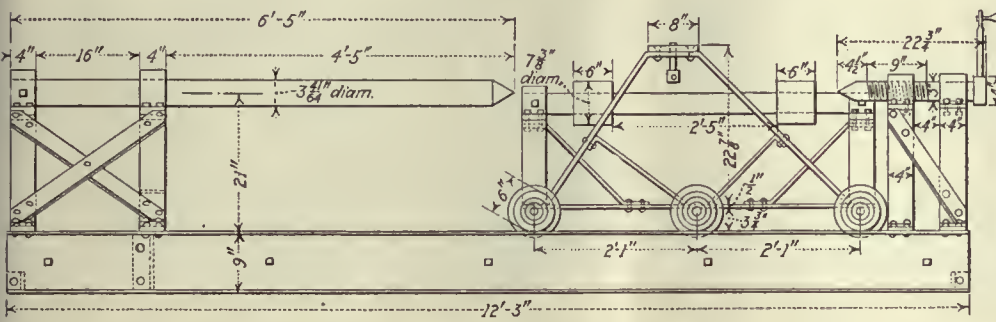


Floor plan of the section in the Coney Island shops devoted to motor overhauling

unbolted and the motor shell as it rests on the carriage is pushed in the direction of the commutator end of the frame. The long spindle passes through the motor shell. The commutator end housing remains with the motor shell, but the pinion-end housing stays on the armature



Details of machine used for removal and installation of armatures in box frame motors



At left—One of the bays in the motor overhauling section. The machine for installing armatures in box-frame motors is shown in the foreground. At right—Installing an armature in a box frame motor

shaft until the pinion is removed. When the motor shell has cleared the armature, the latter is lifted out by the overhead traveling crane and is placed on an armature truck. In handling, a sling with a broad supporting surface is passed around the armature at its center. Pinions are removed by means of a pinion puller, end housings are removed and the armature is sent to the department of electrical repairs for cleaning, testing and repairing if necessary. Several armature trucks are towed together by one of a large fleet of storage battery trucks.

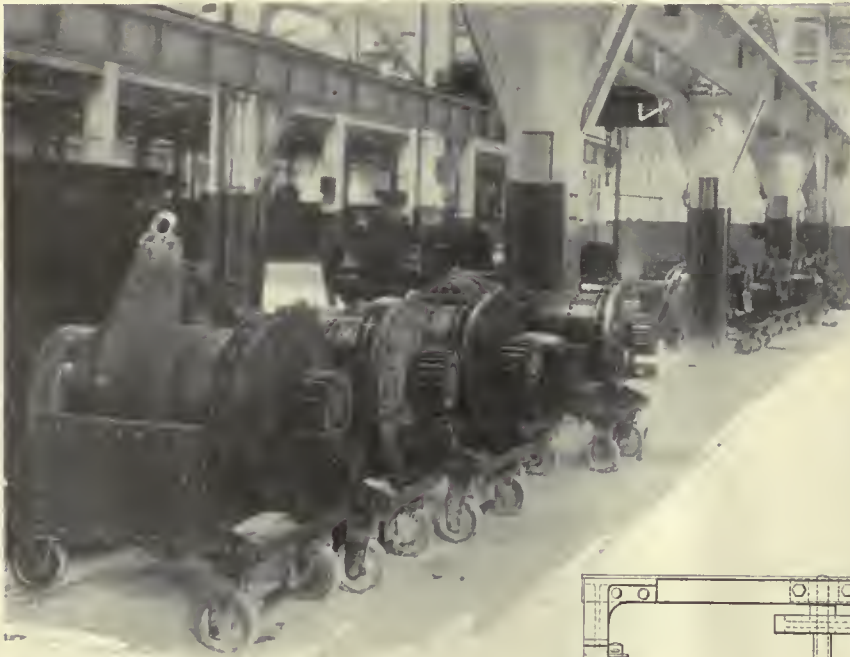
Two general types of armature trucks are used. One is of sheet steel construction with three wheels: The center framework forms a cradle to carry the armature. The second has an angle-iron framework with cast steel ends hollowed out to receive the armature shaft ends. There are four wheels, an 8-in. one on either side at the center and one 4-in. wheel in the center at each end. This latter truck is particularly convenient for handling armatures into and out of the baking ovens.

An armature suction blower is to be installed in the

motor overhauling section for cleaning. When this is ready armatures will be cleaned before they are sent to the department of electrical repairs.

The end housings are taken to a motor-driven hydraulic press where the armature bearings are pressed out. Housings and axle caps are then placed in a chemical cleaning tank where they remain for about 1 1/2 hours. There are two tanks each 4 ft. x 6 ft. x 3 ft. 6 in. high. One has the chemical cleaning solution and the other has water for rinsing. After cleaning, the housings and axle caps are wiped, inspected and gaged for wear, defects or needed repairs. If they pass the test they are then ready for re-use. All bearings are sent to the babbiting department.

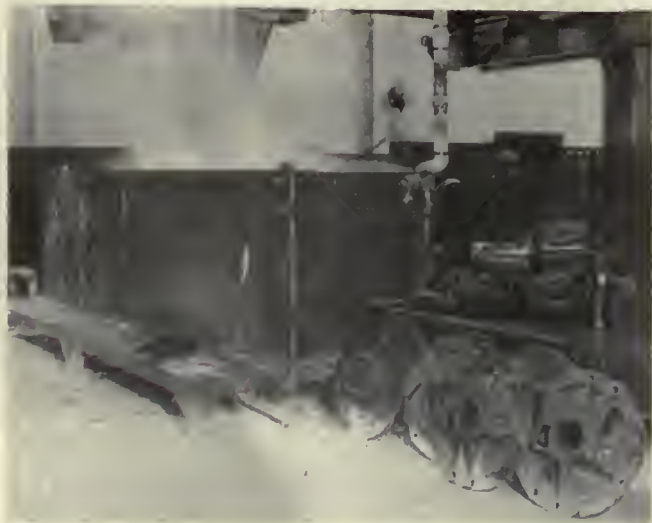
Motor frames are overhauled on work stands. Brush-holders are removed and sent to the department of electrical repairs for general overhauling and adjusting. All connections to and between field coils are broken and a careful inspection is made for loose joints. Fields are tested from the 600-volt shop circuit. Any that show



Armatures are transported between the motor overhauling section and the department of electrical repairs on trucks

signs of short circuits or grounds are removed and sent to the department of electrical repairs. Field coils passing this inspection are not removed from the motor frames. After repair, connections are made again and the entire inside of the frame and the field coils is given a coat of insulating varnish.

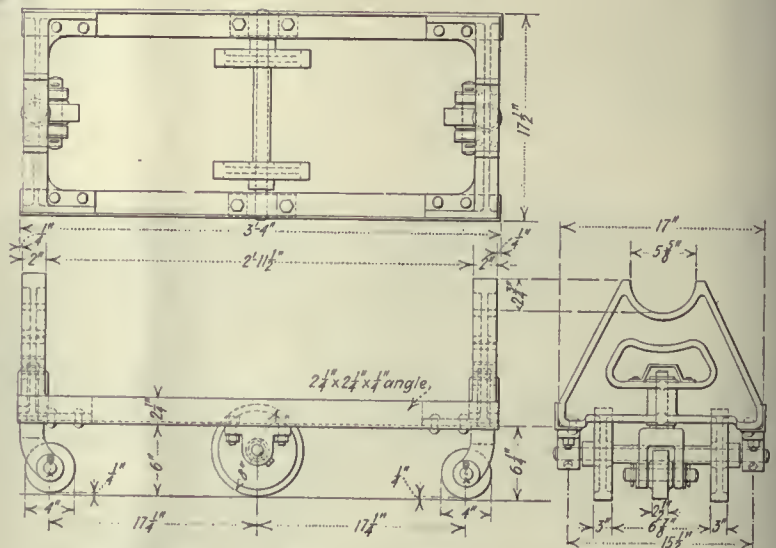
Some of the motor frame overhauling is done on stands to raise the parts to a convenient height for the workmen. The stands are 5x8 ft. with a structural steel framework. Each has space for two motors. Special overhauling stands, shown in one of the illustrations arranged so the motor can be turned to any position desired, are used for most of the overhauling. Two circular end plates are bolted to the motor frame by means of the bolt holes used for fastening the armature housings



Chemical cleaning and rinsing tanks. Housings and axle caps are cleaned here

in position. The end plates rest on bottom supports with rollers, so that the motor frame can be rotated readily. The base is 3 ft. 10 3/4 in. long by 3 ft. 4 in. wide and the center of the motor frame is 3 ft. 7 in. above the base, which rests on the floor.

In general the motors now in use on the B.-M.T. subway cars have not been in service long enough to have excessively worn axle-cap or armature-housing fits. However, these are all gaged carefully to make certain that there is no excessive wear. In some motors a slight warping has occurred in the motor suspension projectors to which the axle caps fit. When this is enough to cause improper alignment or fit of the axle bearing, low spots are built by



Type of armature truck used for running armatures into baking ovens

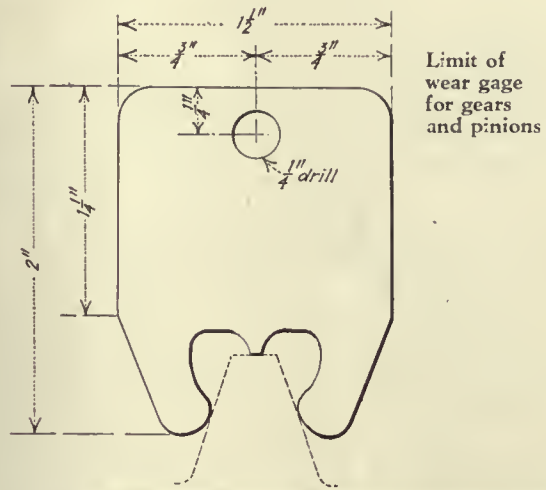
welding, the fit for the axle caps is planed off and the frames are rebored. This work is done in the machine shop section.

An accompanying illustration shows a motor frame set up in a planer for machining off the axle cap fit. Another shows a motor frame in the double spindle boring mill having the axle bearing fits bored out. The large 48-in. planer was furnished by the C. A. Gray Company, Cincinnati, Ohio. It has a 12-ft. table and three heads for holding tools, two on the cross rail and the other on the side of the column for facing and side cutting. All heads have automatic feed in either a horizontal or a vertical direction and they can be turned to any angle required by the work. The cross rail and all heads are raised and lowered mechanically. All bearing surfaces have forced-feed lubrication.

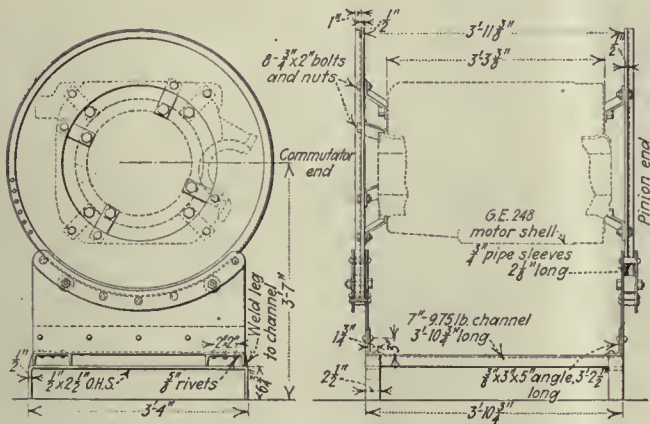
The double-spindle horizontal boring mill, furnished by the Giddings & Lewis Machine Tool Company, Fond du Lac, Wis., has special attachments for boring at one time both the axle-cap and the armature-housing fits for the subway type motors. All adjustments are made mechanically. The machine can be used as a single spindle boring mill by removing the extra plate from the table, which carries two boring bars, and by taking off the double spindle boring attachment at the driving end. The practice of the B.-M. T. Lines is to bore arma-



Removing a pinion from the hot water tank for installation on armature shaft



Working on a motor shell after installation in the rotating work stand

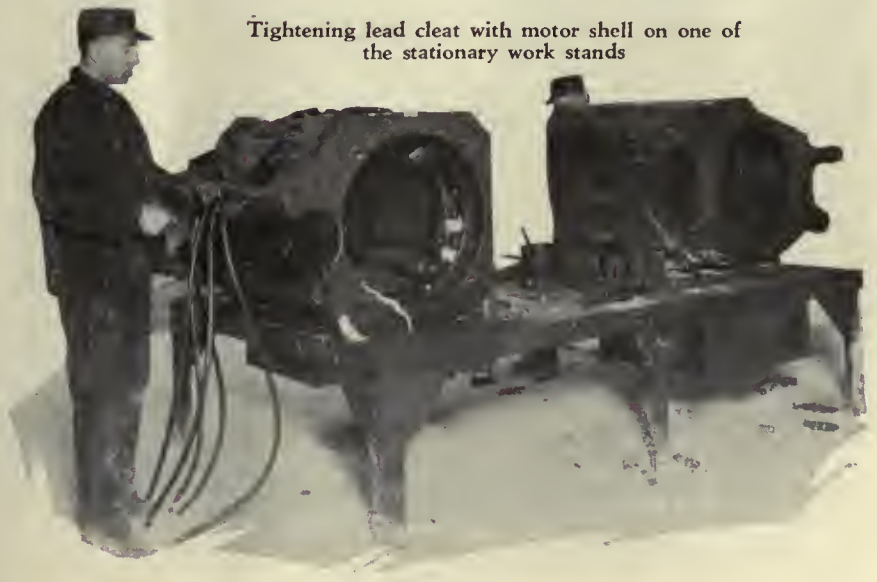


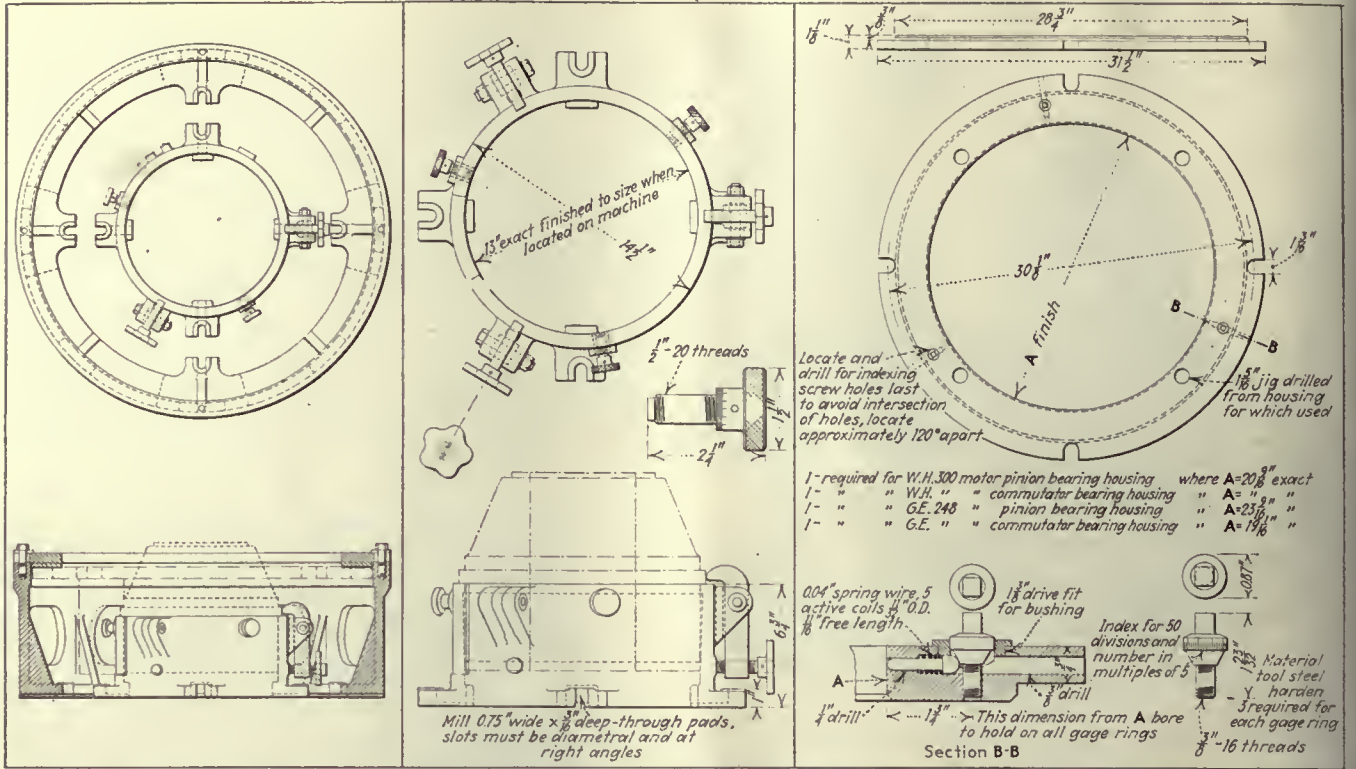
Details of rotating motor shell work stand

ture bearings after they are pressed into housings. The bearings have a thin babbit lining with cast-in oil grooves. This eliminates handling of the large end housings to cut oil grooves after the bearings are bored. Each bearing is fitted to the armature shaft with which it is to be used. Bearings are pressed into housings with a motor-operated hydraulic press. A gage shows the pressure as each bearing is pressed in. An average pressure of 5 tons is used.

Illustrations show the jig used to insure accurate boring of the bearings after they are pressed into housings. This will take both the pinion end and commutator end housings for three different types of motors, Westinghouse types 300 and 50-L and General Electric type GE-248. The jig really consists of

Tightening lead cleat with motor shell on one of the stationary work stands

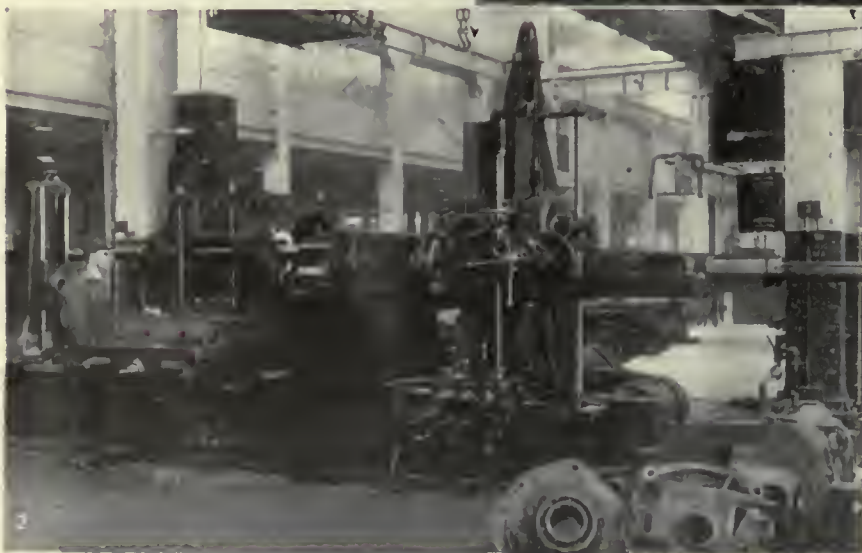
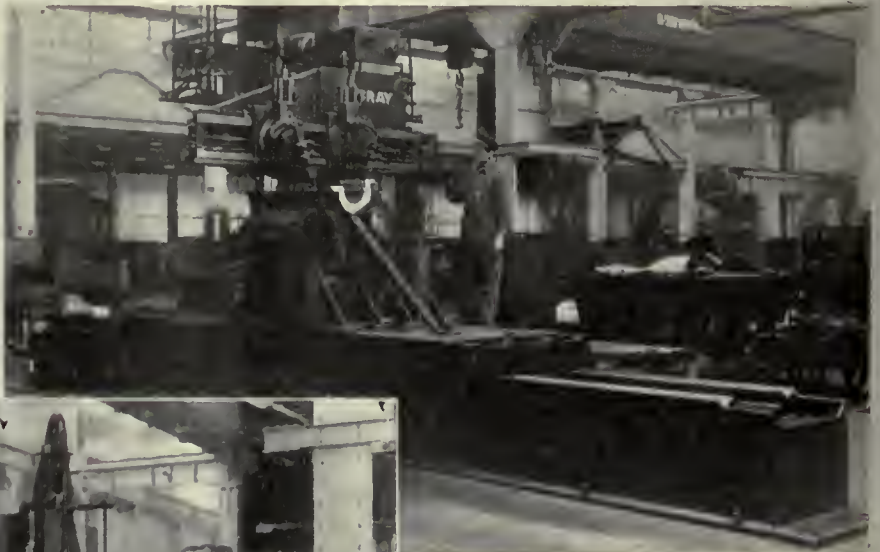




The line drawing on the left shows assembly of the jig used for boring motor bearings after they have been pressed into housing

The center drawing shows the inner fixture of the jig used for boring armature bearings

In the drawing on the right are shown the details of gage rings used with the outside fixture for boring armature bearings after they have been pressed into housing



No. 1. Machining a motor axle suspension bearing fit in the large planer

No. 2. Boring out an axle bearing fit in the double spindle horizontal boring machine

No. 3. Pressing an armature bearing into a motor housing by means of the hydraulic press

two fixtures, an inner and an outer one, the inner one being used for 50-L housings and the outer one for types 248 and 300 housings. Both fixtures are centered accurately on the face plate of the boring mill by slots and keys. The inside fits into which the housings go were bored out on the machine with which they are used. They are $\frac{3}{8}$ in. larger in diameter than the housings.

The inside fixture has three locking arms and three indexed set screws. The locking arms center the housing to be bored and the set screws are then tightened until the index on each is the same. This insures accurate centering of the housing with respect to its fit in the motor shell.

The outside fixture has four gage rings, one for use



Boring out an armature bearing after it has been pressed into housing. A special jig is used for centering the housing accurately

with each of the four different types of housings that are bored in the jig. The gage rings are centered accurately and locked in position by a set of indexed screws which move centering pins into position by the action of beveled surfaces. When a ring is centered accurately all the indices are the same.

Great care is used in the removal and installation of pinions. Pinions are heated in a hot-water tank so that the bores are expanded previous to installation. All teeth are gaged for wear. A discard gage used to determine the scrapping limit is illustrated. When the top projection touches the end of a tooth, the limit of wear has been reached.

A feature of the motor overhauling section is the pro-

vision made for storing parts used in overhauling adjacent to the work. Motor leads are cut to exact dimensions and stored in racks. Locked cabinets contain brush-holders, bearings, connectors and other brass or copper parts. Storage racks are used for housings and axle caps and locked boxes hold the overhauling tools.

New Quarters Occupied by Brooklyn Companies

OFFICIAL transfer of the general offices of the Brooklyn-Manhattan Transit Corporation and the Brooklyn City Railroad to the new Paramount Theater Building at 385 Flatbush Avenue Extension, corner of De Kalb Avenue, Brooklyn, on May 14 was preceded by a moving period of ten days, in which the various departments transferred their office equipment and records to their new quarters and on Tuesday, May 15, the old headquarters at Montague, Clinton and Remsen Streets were turned over to their new owners.

The B.-M. T. system occupies the fifth to the eleventh floors, inclusive, in the new office building. The Brooklyn City Railroad occupies the third and fourth floors. Each company has its own separate telephone exchange in the new building, the new general office telephone number for the B.-M. T. system being Cumberland 6200, while that for the Brooklyn City Railroad is Cumberland 7100.

The transfer marks the passing of 85 Clinton Street and 168 Montague Street as the headquarters for transit activities in Brooklyn. The building at 85 Clinton Street was occupied by the old Brooklyn Rapid Transit organization in August, 1905. It was erected to provide a central building for the various departments of that organization which had gradually absorbed all but one of the various railways in Brooklyn at that time. Prior to that time 168 Montague Street had been the main office building but as the central organization had expanded while the B. R. T. system increased in size the Montague Street building proved inadequate. In fact prior to August, 1905, several departments of the B. R. T. system were located in the old Franklin Trust Company Building, 185 Montague Street, and at various places around the system. When the building at 85 Clinton Street was erected the lower floors were connected with the Montague Street Building so that the two were occupied as a single building.

The building at 168 Montague Street was first occupied by the Brooklyn City Railroad in May, 1892, when the company moved to the Borough Hall section from its old headquarters at 8-10 Fulton Street near Fulton Ferry. The Brooklyn Bridge had already begun to make its importance as a traffic artery felt on the ferries to Manhattan and Fulton Street and the ferry was losing its prestige as the business center of Brooklyn. When the Brooklyn City Railroad first moved to 168 Montague Street, it was on the extreme western edge of the Borough Hall business district as west of Clinton Street there were nothing but private residences along Montague Street. In 1893 the Brooklyn City Railroad turned the building over to the Brooklyn Heights Railroad in connection with the lease of its property to the Brooklyn Heights Railroad and the building was occupied by the B. R. T. system until October, 1919. At that time, the Brooklyn City Railroad resumed independent operation of its surface lines and its executive offices returned to 168 Montague Street.

Solving the Car Painting Problem in Seashore Climate

SALT AIR, bright sun and sand-laden winds create an extremely serious car painting problem for the Atlantic City & Shore Railroad, Atlantic City, N. J. The wind, carrying fine particles of sand in suspension, has almost the same effect on the exterior car paint as a compressed air sand blast would. Evidence of its destructiveness is found on the front dashers of the cars, where the paint first begins to show the effect of the climate. The moist, salty, air quickly causes corrosion of the steel side sheathing of the cars unless it is kept well painted all the time. The bright sun soon fades most kinds and colors of paint. Only by giving continuous attention to the matter of car painting has the company been able to keep its rolling stock good looking.

Cars are repainted about once in twenty months. Last year 87 cars out of a total of 125 on the property were repainted. "Burning bush orange" is a new color recently selected to replace a lighter shade of orange. Window posts are painted cream color. On account of its ability to withstand bright sunshine the new color gives better visibility to the rolling stock and creates a more attractive appearance as well. Lacquers and enamels of various kinds have been tried on the exterior of the cars of this company without much success. The old-fashioned paint and varnish process is now believed by J. W. Gordon, master mechanic, to be the best suited to meet the difficult conditions at Atlantic City.

If the car comes into the paint shop with the paint in poor condition, it is all burned off. If the old paint is in fair condition the exterior of the car is sanded down, puttied and glazed. Twelve hours later a coat of priming paint is applied. This is sanded down and a coat of flat color put on. The next day the car is given a second coat and the following day a third coat of flat color.

The car is then ready for striping and numbering.



Car of the Atlantic City & Shore Railroad in process of being repainted "burning bush orange" with cream window posts

This is done in black by hand. At the same time the pole, trolley base, bumpers and running gear are painted black. After this has been completed three coats of varnish are applied twenty-four hours apart. No rubbing varnish is used. Paints are mixed by hand in the railway shop, ingredients being purchased in bulk. The pigments are ground in Japan. Only the highest quality material and best grade linseed oil are used.

Keeping the interior of the car in good condition is not a serious problem. When the car comes to the shop for painting the interior is sanded and varnished. The seats are scrubbed and the floor is painted. Interior electrical equipment is painted in black.

The paint shop force consists of six men. The capacity of the shop is four cars but ordinarily not more than three jobs are under way at any one time. Each job takes from a week to ten days, depending largely on the condition of the old paint and the amount of puttying and glazing necessary.

It is felt by the management that attractive appearance is an important asset in selling transportation, and no effort is spared by the Atlantic City & Shore Railroad to keep its cars attractive in appearance despite the difficult climatic conditions.



At left—After three coats of flat color have been applied and lettering and striping done, the car is given three coats of varnish. At right—Lettering and striping are done by hand

Cologne Lays Tracks Without Ties

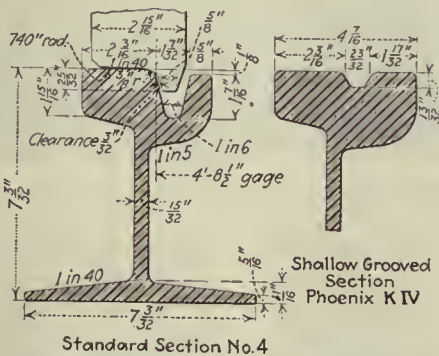
Present standards in Cologne call for the use of concrete beams in paved streets. The rails rest on an elastic filler and are held to gage by tie rods. On reservations and on curves the beams are omitted

By R. Schwanter

Assistant Engineer City Transit Board, Cologne, Germany

FOLLOWING a trip through the principal cities in the Eastern part of the United States, in which I studied transportation methods, I take this means of expressing my appreciation for all the kindnesses shown me by railway officials and others who allowed me to inspect their systems. In part return, I shall describe some features of German street railway track construction, as exemplified in Cologne. As the reader will see, it differs radically from the methods usually followed in America.

Incidentally, I found during my trip in the United States that although American double-truck cars have a much lower axle load than our single-truck cars, our cars run much more smoothly. The principal reason for this



Figs. 1 and 2—Standard rail section No. 4 and shallow groove section for special work, used in Cologne

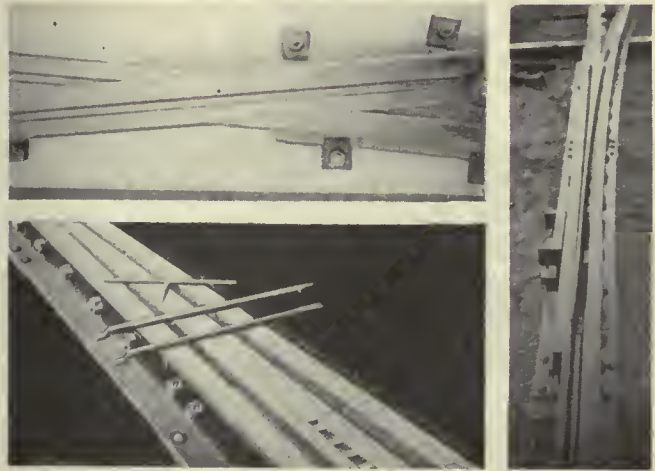


Fig. 3 (top left)—Shallow groove rails, bolted up for special work before being milled
Fig. 4 (bottom left)—Heel of switch tongue of pivot type, with tools to take up the tongue
Fig. 5 (right)—Switch tongue, with transition curve form

is that our rails have a resilient support. Great effort is being made also in Germany to reduce the unsprung weight of the car on the track, as well as the number of rail joints.

The usual method of joining rail ends both in straight track and in special work is by the thermit weld. Often as many as 5 miles of rail is welded in one section.

The most generally used rail and wheel section are shown in Fig. 1. Attention is directed to the very small clearance between the flange of the wheel and the side of the rail head. The purpose of this is to prevent nosing by the cars.

The Cologne Street Railway makes most of the built-up special trackwork used on its system. The rails employed in special work are of the shallow or flange-bearing section, shown in Fig. 2. A piece of special work, such as a frog, is built up of one such through-running, shallow-grooved rail and two adjoining similar rail sections, which are first set up on a common bedplate, where they are held in position by bolts (Fig. 3). Then the groove is cut through by a shaper and it is deepened at all four outer ends for the smooth entrance and exit of the wheels. The rail bases are then electrically welded to the bedplate, and the splice bars to the rail.

Owing to the conical shape of the wheel flange, the gage of the frogs must be narrower than the gage in straight track.

Among the latest switches used in Cologne are those of the Vereinigte Stahlwerke, Hütte Ruhrort-Meiderich (Phoenix) with removable heel-bearing tongues (Fig. 4). All curves and all switch tongues are laid out according to standard transition curves. A typical switch is shown in Fig. 5.

The standard method of track construction for straight track in asphalted pavement on a concrete base in Cologne is shown in Fig. 6. As will be seen, the rails are mounted on concrete beams or stringers, with a special rail filler between the rail base and the stringer to provide resiliency in the track. After the concrete beam is laid,

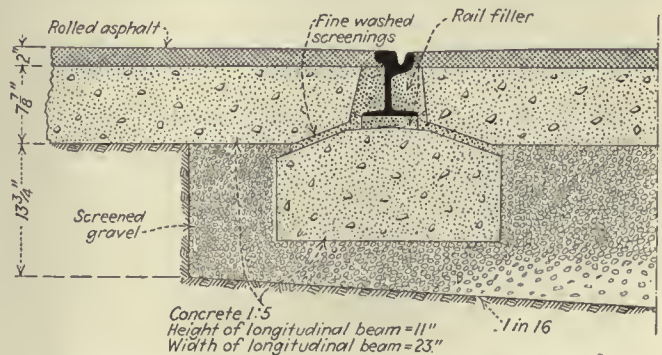


Fig. 6—In standard tangent track construction, the rail is supported by an elastic filler on a longitudinal concrete base

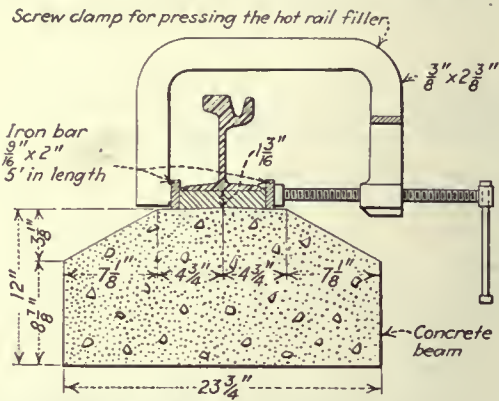


Fig. 7—The elastic filler is tamped under the rail, then molded on the side by long iron bars, pressed in by screw clamps

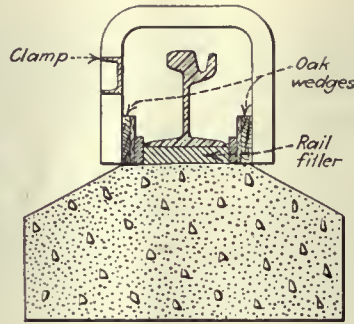


Fig. 9—As the screw clamps are removed, U-shaped clamps with oak wedges are substituted

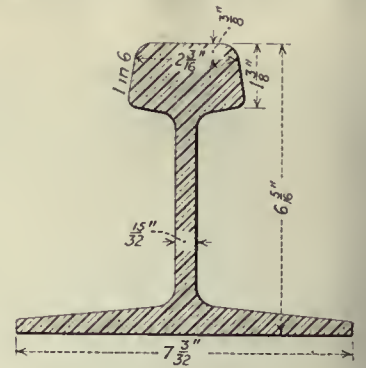


Fig. 13—On reservations, this T rail is used. As will be seen, it has a very wide base



Fig. 8—Appearance of the screw clamps shown in Fig. 7



Fig. 12—Finished curve track construction



Fig. 10—Tangent track on concrete base with resilient filler and tie rods, before the installation of paving

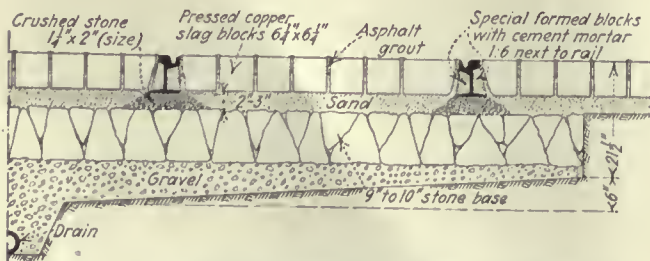
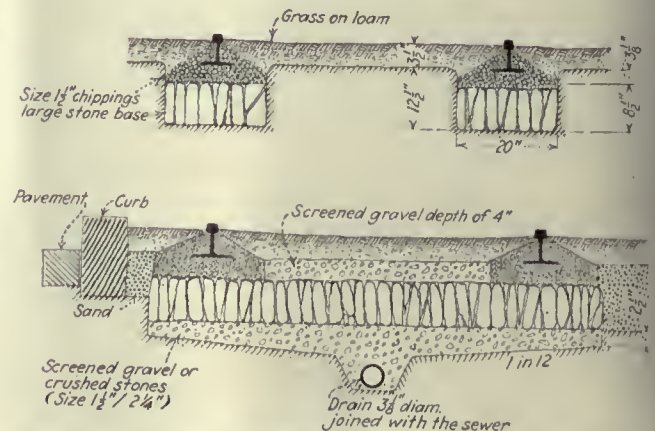


Fig. 11—This form of construction, instead of that with a concrete base, is used on curves



Figs. 14 and 15—On reservations the upper construction is used in porous soil, the lower section in non-porous soil

the rails are placed upon it, resting upon small wooden blocks, the same thickness as the future resilient filler. The rail joints are then thermit welded and a tie rod is inserted every 5 ft. 6 in. to keep the rails to gage. The ends of these tie rods are finished with angles to form a T, and these ends are welded to the rail webs. Then the resilient filler is inserted.

The filler is a mixture of asphalt, coke ashes and furnace slag. It is heated to a temperature of 300 deg. C. and when plastic is tamped into place by hand with iron tampers. It is then made smooth on each side by long flat iron bars 5 ft. in length which are pressed against the filler on each side by heavy screw clamps (Figs. 7 and 8). Later, U-shaped clamps with oak wedges are substituted



Fig. 16—Track under construction according to the design shown in Fig. 15

for the screw clamps, as shown in Fig. 9. After the bitumen has set the wedges are driven out and the clamps removed. Subsequently the filler is packed around the rail web on each side.

Fig. 10 illustrates a section of track with tie rods in place, ready for the side filler and paving. There is no connection other than the resilient material between the base of the rail and the concrete beam, but the tie rods and paving keep the rail in place.

Before this method of inserting the resilient filler was adopted hot asphalt was poured under the rails, but the present plan has proved more satisfactory.

This form of construction has proved not only very durable but very quiet. Of course, when the rail is renewed the tie rods which are buried in the concrete have to be cut off, and this means that later they have to be replaced. But the filler can be heated up and used over again.

The life of this construction is from 25 to 30 years under a service of about 1,100 single-truck cars a day.

In curves the construction is somewhat different. Here it is customary to use square paving blocks of copper slag, the blocks being brought right up to the side filler. The concrete beam is omitted, but the rails are mounted with tie rods, on a crushed-stone base, as shown in Fig. 11. Fig. 12 shows the finished construction.

In all cases the sub-base is drained. The rail grooves are also drained, being connected at intervals to the sewers.

The track on reservations and other right-of-way is of similar construction to that on curves. A T-rail with a very wide base is used (Fig. 13). It is laid on stone ballast or screened gravel, resting on a base of large stones. Tie rods are used, but no concrete beams. The joints of these rails, like those of the grooved rails, are thermit welded. Fig. 14 shows the usual arrangement on porous soil and Figs. 15 and 16 that on firm soil like clay. After the large vertical stones are set in place at the bottom and covered with a thin layer of gravel, the bed is compacted by a steam roller.

Fig. 17 shows a line laid in this way on a reservation between Nuremberg and Fürth, which are neighboring cities about 4 miles apart. In this 4-mile route there are three tracks and in some parts four tracks. The road thus is able to provide both express and local railway service between the two cities. The express service has only three intermediate stops.

After new track is laid and before it is used, it is customary to grind the rail heads smooth with a grinder car, because it has been found that new rails often show traces of corrugation acquired in the rolling mill. On track laid in the way described, corrugations almost never develop in service.

At one time suburban electric railway track was laid like that on steam railroads with cross ties. The service given by the methods just described, however, has been so satisfactory that it is being substituted for crossties in suburban track which has to be reconstructed.



Fig. 17—High-speed railway on a reservation between Nuremberg and Fürth, 4 miles apart. Part of this line has three tracks and part has four tracks. It gives an express and local service

Oil-Sealed Housings for Railway Motors

By *W. H. Austray*

Railway Motor Engineering
Westinghouse Electric & Manufacturing Company

MAINTENANCE of a reasonably constant oil feed for the armature and axle bearings of the railway motor is difficult. To obtain satisfactory bearing life, constant attention must be paid to the oil level, upon which the rate of oil feed depends. In actual service close supervision is lacking, and bearing life is reduced greatly. Oil-sealed housings and axle caps in actual service for four years have demonstrated that an automatically maintained constant oil feed increases bearing life two to three times. This increased life is obtained with a 60 to 90-day lubricating period. In addition this system of lubrication eliminates glazing of waste and provides protection against the entrance of dirt and water. All of these outstanding advantages are secured with a nominal increase in weight and cost.

An accompanying illustration shows an ordinary railway motor and truck as received at the shop for overhaul. The commutator end housing is covered with a deep coating of oil, sand, dirt, and other foreign abrasive material. The cap which should be over the end of the shaft to help exclude dirt from the bearing is missing. In addition, wheel wash enters between the shaft and the bearing, destroying the oil film. The axle cap cover is held partially open by the protruding waste, so that the necessary protection against the entrance of dirt is lacking. The hinged type cover, with its felt lining, must be opened once a week to oil the motors, and the utmost care is necessary to prevent dirt falling in at this time. But most of the dirt enters while the car is on the road, due to covers left partially open with loose or broken springs or missing felt liners. Some dirt is introduced with the oil, since the oiler usually carries his supply in an open pail, using a small can to pour it into the oil chambers.

To limit bearing wear, it is necessary to exclude all abrasive material, and supply an adequate quantity of oil at all times. The amount of oil the bearing receives depends on the kind and quantity of waste used, the grade of oil used and the height of the lift.

Many experiments and tests have been conducted to determine the most suitable packing material for a waste-packed bearing. Felt, cotton, wool, and many combinations of these materials have been used. Where the waste both lifts the oil and feeds it to the journal, felt and cotton have been found unsatisfactory, since they glaze excessively when the oil supply becomes lean. Wool waste glazes less readily, and is sufficiently springy to maintain excellent contact against the journal. The only really satisfactory packing material is long-strand pure wool waste. The quantity of waste carrying oil is determined by the size of the waste chamber in the housing or axle cap and the manner of packing. All waste packed bearings where the oil is fed to the journal by capillary action should be packed so that a continuous wick is



A 40-hp. railway motor as it was received in the shop after one year's operation in city service

formed from the oil chamber to the journal. The window in the bearing should be filled completely with the waste, which should be packed firmly.

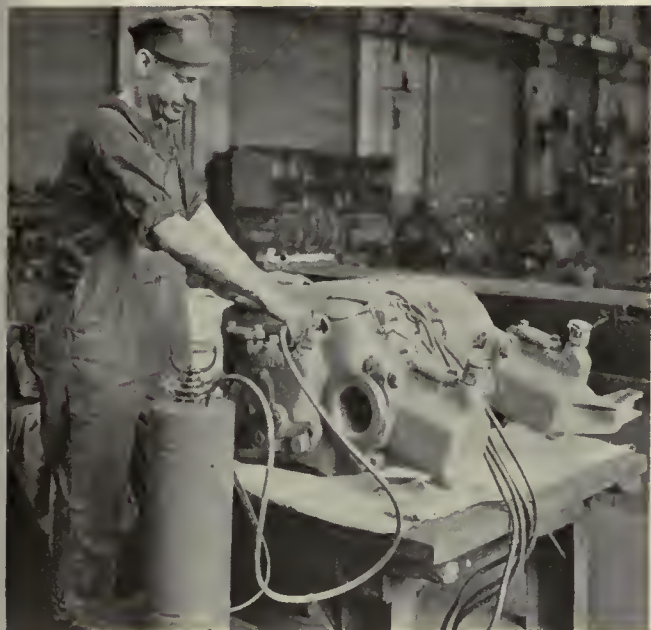
The oil used ordinarily is selected easily, since most of the reputable oil companies have special grades of electric car oil, and an adequate engineering staff to deal with customers' troubles which may arise. In the temperate zone, a comparatively light oil is needed in winter and a heavier grade in summer to compensate for the change in the mean temperature.

The relationship between the flow and the lift for medium car oil at 100 deg. C., using a good grade of wool waste, is shown by the accompanying curve. The rate of flow is seen to increase rapidly for lifts of less than $\frac{1}{2}$ in. The feed with a $2\frac{1}{2}$ -in. to 3-in. lift is only 20 per cent of the feed with a $\frac{1}{2}$ -in. lift. A sectional view of the ordinary housing,



Correctly packed pinion end housing for oil and waste lubrication showing wool waste in place

packed for service, is shown in an accompanying illustration. With this type of housing it is common practice to fill the oil chamber within $\frac{1}{2}$ in. of the bearing window. The level is ordinarily permitted to drop 1 in. to $1\frac{1}{2}$ in. before the next oiling period. Due to the relatively



Filling the commutator end housing of a 35-hp. motor fitted with oil sealed housings and axle caps

ing the outer chamber *B* is the feeding portion, and maintenance of a constant oil level, *C*, keeps constant the waste saturation, and therefore the feed to the journal. Chamber *A* has an extremely large capacity as compared with the ordinary housing. The oil lift is the distance from level *C* to the lower edge of the bearing window. This dimension is fixed by the designer, being based on the actual oil requirements found necessary to secure satisfactory bearing life.

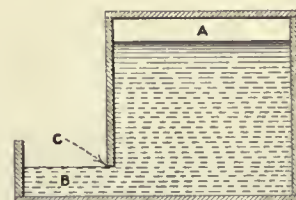


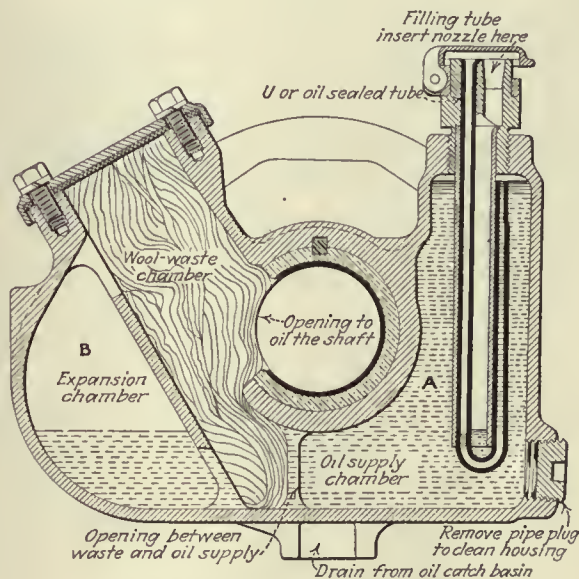
Diagram of principle of old fashioned chicken trough

After properly packing the housing or axle cap, it is filled as illustrated. The tapered nozzle of the pump is inserted in the large hole in the top of the filling tube. The openings in the top of the tube are protected by a hinged cover. The valve in the pump nozzle is opened, and oil is forced into the housing or axle cap. The pres-

small oil capacity of this type housing, the oil feed becomes too low for satisfactory operation after approximately 1,000 car-miles. Too long a time between lubricating periods permits the oil feed to decrease still further, increasing bearing wear and often producing hot bearings.

The principle of the oil-sealed lubrication system is best understood by reference to the illustration of the old-fashioned chicken trough and the cross section of an oil-sealed housing. The trough consisted of a Mason jar filled with water and inverted in a shallow pan. The water in the pan was maintained at the level of the lower edge of the jar.

In the chicken trough chamber *B* is the drinking portion, *A* represents the inverted jar, and the ledge *C* the lower edge of the jar, which determines the water level in the outer container. If some of the water is drained from the outer pan *B*, the level will be momentarily

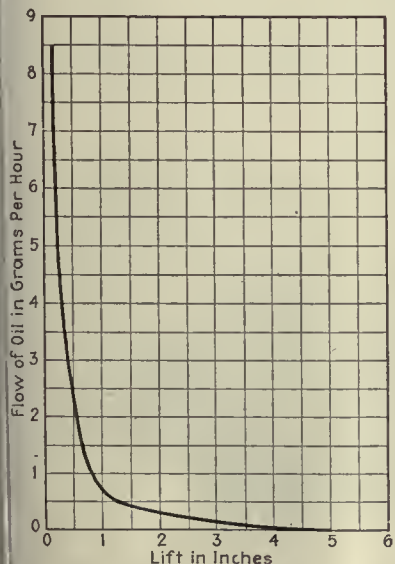


Cross-section of oil sealed housing

lowered below the ledge *C*, and a bubble of air will trickle through into the main reservoir *A*. The main body of the water in *A* drops slightly, which permits the water in the outer pan to rise until a seal is effected at the ledge *C*. If the water is drained continuously from the outer chamber, this bubbling process continues until the water is used completely from reservoir *A*. Referring to the cross-section of the motor hous-

sure required is small, and is obtained by previous operation of the hand-operated air pump. One pumping builds up sufficient pressure to fill several housings and axle caps. The hose is sufficiently long to set the pump either on the pit floor or alongside the car. During the filling process, the entrapped air escapes through the U-tube, one end of which opens to the atmosphere in the small hole at the top of the filling tube. The other end of the U-tube opens near the top of the main oil reservoir. When the oil chamber is filled completely, the oil will be forced out through the U-tube, providing a seal by the difference in height of the oil in the two legs of the tube. When refilling, the entrapped air forces out of the U-tube the oil which previously formed the seal. The air then escapes until the reservoir is full and oil again flows out. A steady flow of oil is a positive indication that the reservoir is full. The "plugging" action of the waste is sufficient to prevent the oil rising on that side and escaping through the bearing window while filling. No airtight joint is disturbed in filling.

The cover over the waste chamber in nearly all motors is felt-lined and held on by two bolts. A few of the larger motors, due to space restrictions, use the "scissors"



Graph showing decrease of oil flow with lift on 40 hp. motor having oil and waste lubrication

type cover. The bolted-on cover is removed only when packing the waste, thereby eliminating the entrance of foreign matter which occurs with the ordinary type of cover.

Oil-sealing eliminates the necessity of gaging oil levels. New motors should be lubricated and run for 6,000 miles as a trial period. The motors should then be oiled, keeping a record of the oil consumption of each bearing. Knowing the capacity of the reservoir, the safe oiling period may be ascertained. This period will be from 60 to 90 days, which corresponds with 6,000 to 10,000 car-miles. After this period has been determined, no gaging is required, each housing or axle cap being filled at the specified intervals.

Maintenance Costs Reduced by New Equipment

By W. H. McALONEY
*Superintendent of Equipment,
Georgia Power Company, Atlanta, Ga.*

SINCE 1922 the Georgia Power Company, Atlanta, Ga., has purchased 200 new double-truck, low-floor, four-motor cars for city service, dismantling and scrapping an equal number of two-motor cars, the greater portion of which were single-truck. The new cars are larger and of greater seating capacity. Their use has resulted in an improvement in the service and a saving in platform labor and maintenance cost.

As to advantages gained in maintenance with the smaller motors, numerous parts of small dimensions naturally cost less and are easier to handle. This logically tends to hold down maintenance costs. The only way to show actual results, however, is to give our maintenance costs for the entire division of equipment maintenance accounts, not including depreciation, which are as follows: 1925, \$21.53 per 1,000 car-miles; 1926, 19.99 per 1,000 car-miles; 1927, 18.45 per 1,000 car-miles.

Logically, we are getting some advantage from our new equipment, which reflects in our lower maintenance. On the other hand, these new cars and equipment began going into service in 1922, so that the earlier ones have already covered a period of five years.

A stack of 80 of the older type, heavy, split-frame motors which have been retired from service was illustrated in this paper for Dec. 31, 1927, page 1180. The total weight of the motors aggregated 111 tons. These motors were replaced by modern motors, an equal number weigh-

ing 56 tons, a reduction in weight of 55 tons, or approximately 50 per cent.

Since 1921 we have retired a total of 426 old motors. During this same period a total of 848 light-weight modern motors have been placed in service, making a net increase of 422 motors. This increase is the result of retiring 159 two-motor cars and 27 four-motor cars, and placing in service 212 four-motor cars.

The total weight of the 426 old motors retired aggregates 516.29 tons as compared to 605.68 tons total weight of 848 motors placed in service, an increase of 83.39 tons.

In 1921 we had a total of 1,038 motors, the total weight of which was 1,406 tons. In 1927, with a net increase of 426 motors, the total weight of 1,464 motors amounted to 1,495.35 tons, an increase of 6.36 per cent. Increasing the weight 6.36 per cent is the result of increase in four-motor equipment over two-motor equipment. Replacing an equal number of motors would result in a reduction in weight of 58.4 per cent, since the average weight of 422 motors retired is 2,445 lb. each, as compared to the average weight of 1,429 lb. each for the 848 new motors placed in service.

Some of the advantages from a maintenance standpoint are that replacement of journal boxes, brasses, axles, etc., for a 3½x7-in. journal, costs less than for a 4½x8-in. journal. Replacement of 4-in. axle bearings costs less than for a large axle. The same holds true of all motor parts. This is not taking into account the saving in energy and possibly track maintenance. Our maintenance cost for 1926 was \$20, as compared to \$18.45 for 1927.

The old motors were rated at 40 hp., 500 volts. They were of the non-ventilated, non-commutating pole, split-frame type. Armature speeds were 500 to 550 r.p.m., gear ratios 16:67 to 18:66, gears 5-in. face, three pitch, spur type, axle bearing finished bore 4½ in. and 5 in. Weights of motors ranged from 2,280 lb. to 2,880 lb.

The new motors are 35 hp., 600-volt, commutating pole type with armature speed 1,100 r.p.m., gear ratio 14:69, gears 4 in. face, four pitch, long and short addendum type, axle bearing 4 in. finished diameter.

In the past five years we have rewound 110 per cent of our old armatures as compared to 0.019 per cent of the new motors. The miles per rewind for the old motors for the year 1927 averaged 307,163 as compared to 10,646,741 miles per rewind for the new motors. This is largely due to newness of the motors, but overhauling, dipping, and baking on a 60,000-mile basis has increased the mileage on the older lot of new motors which have been in service for five years.



The old type motor at the left weighs 2,880 lb., while the new one at the right, a light-weight motor adopted as standard by the Georgia Power Company, weighs 1,415 lb.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—50

Sleeve Prevents Bending While Installing Shafts*

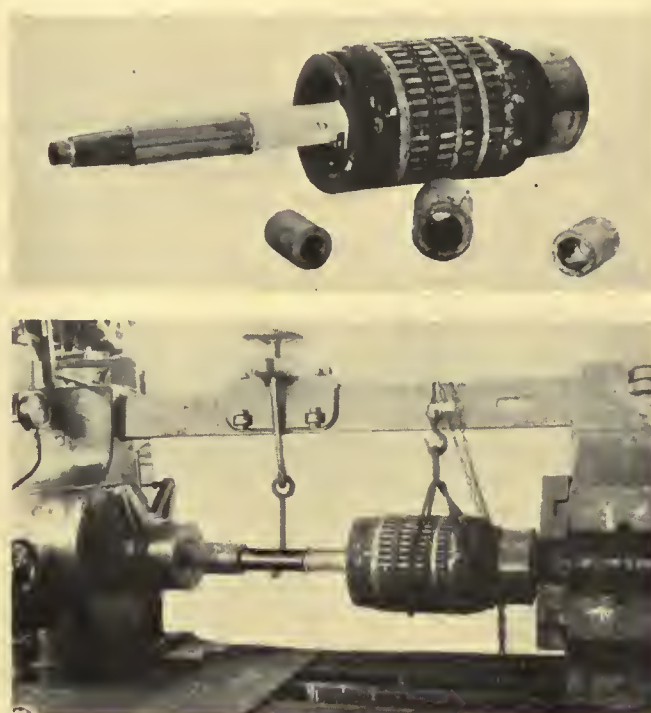
BY C. B. HALL

Chief Clerk Mechanical Department
Virginia Electric & Power Company, Norfolk, Va.

DIFFICULTY was experienced by the Virginia Electric & Power Company, Norfolk, Va., from bending of armature shafts while they were being installed. The practice was to use a wheel press and apply 25 to 30 tons pressure to the pinion end of the shaft while the commutator end of the armature was held against the stationary head of the press. In several instances shafts were bent so as to be beyond repair.

To overcome this trouble a sleeve to fit over the tapered portion of the armature shaft and rest against the end of the bearing surface of the shaft was devised by George S. Cahoon, foreman of the electric shop. This sleeve provides a protection for the shaft end and threads. It transmits the pressure to a larger section of the shaft so that danger of bending is overcome.

One of the accompanying illustrations shows the type of sleeve used together with an armature shaft ready for installation. The other shows the armature in position ready for pressure to be applied.



At top—Sleeves for fitting over the pinion end of armature shafts, with a shaft ready for installation shown in rear
Lower View—Armature in position in wheel press ready for installation of shaft

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—28

Compromise Thermit Joints Made Without Wax*

BY J. A. McCARTNEY

Superintendent of Construction Pittsburgh Railways, Pittsburgh, Pa.

RECONSTRUCTION of track on the lines of the Pittsburgh Railways involves a considerable number of compromise joints. With some experimenting it was found that the old method of using wax molds for the thermit joints could be eliminated.

A standard pair of mold boxes are cut out to fit the particular joints and with a little additional dressing of the molds it is found that compromise joints can be thermit welded with no more difficulty than the ordinary standard joints. This results in a

considerable saving in time and cost. Mold boxes are cut out to fit the most common compromise joints encountered and are now carried as a part of the railway's standard equipment.

In the three accompanying illustrations one shows a set-up for joining 80-lb. A.S.C.E. tee rail with 134-lb. girder groove rail. The view on the right shows a pair of mold boxes cut out and ready for making this joint, and the center view shows the finished weld.



At left—80-lb. A.S.C.E. tee rail set up with 134-lb. girder groove rail. In center—Finished thermit weld.
At right—A pair of mold boxes cut out and ready for applying to the joints

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—51

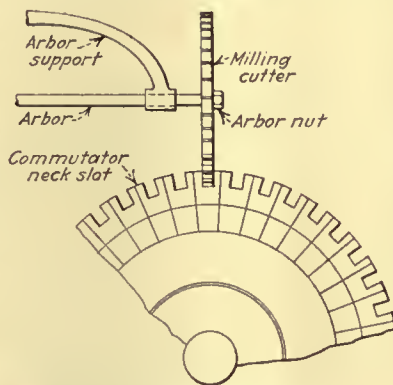
Convenient Commutator Neck Slot Cleaner*

BY ARTHUR E. CLEGG

Foreman Electrical Department San Diego Electric Railway, San Diego, Cal.

CLEANING leads and solder from commutator necks of armatures after they are stripped is a long, tedious, tiresome and costly job. To eliminate the costly procedure a milling cutter was designed and is now used by the electrical department of the San Diego Electric Railway, San Diego, Cal. This speeds up the work and leaves the commutator neck slots perfectly clean.

The milling cutter is 1½ in. in



Method of cleaning commutator neck slot by means of a milling cutter

diameter and 0.099 in. thick, and is made of tool steel. The thickness of the milling cutter depends on the width of the slot in the commutator neck. The cutter is fastened to an arbor by a nut taken from a commutator bar slotting machine. It is set for each commutator neck slot and is moved across the slot slowly by means of a lever, which moves the arbor and thereby clips out the leads and solder.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—29

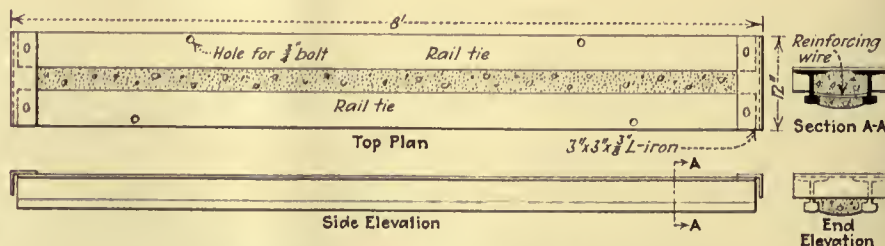
Rails Used in Concrete Tie Construction*

BY LOUIS T. BOTTO

Superintendent Maintenance of Way, San Antonio Public Service Company, San Antonio, Tex.

IN REBUILDING some gravel ballast tracks a number of reinforced concrete ties made up with old rails were used to replace wood ties in twelve paved street intersections. For this purpose and for use under special work where tracks are not concreted this type of tie has been found desirable as it holds the tracks rigidly in line, gives a greater surface bearing on the subsoil and provides a durability equal to steel and reinforced concrete.

As shown in the accompanying illustration, the tie is made up of two pieces of scrap rail 6 ft. long, spaced 8 in. apart. Angles welded at the ends of the bases of the rails hold them in position. Holes are burned in the bases of the rails, forming the



Construction of reinforced tie using discarded T-rails

top of the tie, for fastening the rail ties. Where heavy rail is used or section used. They are then placed in the track and reinforcing wire is placed so as to hold the concrete firmly in position and then the concrete is poured.

When 50-lb. or 60-lb. rail is used, the ties are made up complete and are placed in the track like ordinary

ties. Where long switch ties are necessary, it is easier to pour the concrete after the ties are in place.

On this work it was found that a welder and helper could make 32 frames in eight hours. A cubic yard of concrete, of 1:2:4 mix, fills twenty frames using 60-lb. rail.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—TRUCKS—26

Reinforced Trucks Require Little Maintenance*

BY R. T. CHILES

Master Mechanic Cumberland County Power & Light Company, Portland, Me.

THE Cumberland County Power & Light Company has Brill 78-M trucks in service which developed weaknesses. The trouble was overcome by strengthening several parts. The two cross bars of the truck are of 5-in. channels. These were reinforced with $\frac{3}{4}$ -in. x 4-in. plate and the strength of the cross bar gusset plates was increased by making them of $\frac{1}{2}$ -in. stock and of increased length. Three-quarter-inch bolts were used instead of $\frac{5}{8}$ in. To keep the cross bars tight and eliminate tilting toward the wheels four cross-bar brackets were added. These are of 4-in. x 4-in. x $\frac{1}{2}$ -in. angles 8 in. long.

With these improvements the truck has been oper-



Brill type 78 truck with reinforcements

ating for two years and the bolts stay tight and the trucks keep in alignment. The trucks are also now maintained much cheaper than previously.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—34

Compressed Air Vacuum Cleaner*

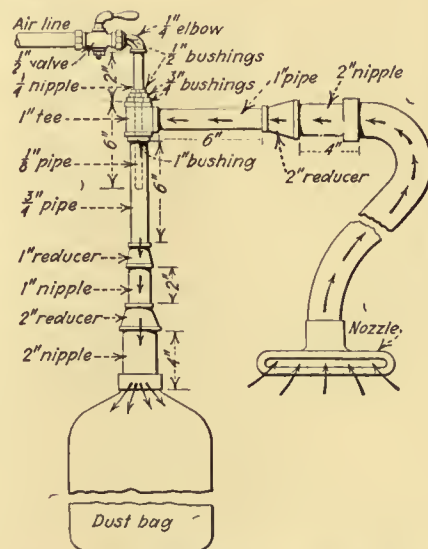
BY O. R. McCLAIN

Foreman Air Brake Department Gary Railways, Gary, Ind.

CLEANING of car interiors and seats, ordinarily a disagreeable task, has been made easier through the use of suction equipment developed in the shop of the Gary Railways, Gary, Ind. Before the use of this equipment seat bottoms were taken to some remote section, the car cleaner donned a dust mask, gloves and clothing fastened securely, and the dust was blown off by use of air with 100 lb. pressure. The job was very messy and seat backs often were not cleaned due to the labor required for removing them. Experiments in cleaning were made with a household type of vacuum cleaner, but this was found insufficient to draw the dust and heavy particles from the upholstery. Four hours of time was also needed to clean the seats in a car with this equipment.

The new device works on the principle of the injector. It was constructed by using ordinary pipe nipples and fittings of appropriate sizes. A partial vacuum is produced through the expansion of 90-lb. compressed air as it leaves a $\frac{1}{8}$ -in. pipe and enters a $\frac{3}{4}$ -in. pipe. The connection from the vacuum cleaning equipment is made to the $\frac{3}{4}$ -in. pipe outside of the smaller one. The accompanying illustration shows the construction.

The shop air which is used produces a vacuum 60 per cent greater than that of the household vacuum cleaner which was tried. The air pressure supply is controlled by a $\frac{1}{2}$ -in. shut-off cock. The vacuum and exhaust openings are of 2-in. pipe nipples turned in a lathe to receive fittings necessary for attachment to a



Vacuum cleaning apparatus as used by the Gary Railways

dust bag and to the intake hose of the household vacuum cleaner. Advantages are low cost, absence of wearing parts, light weight and easy operation. Seats do not have to be removed and but two hours are required per car for the cleaning.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—TRUCKS—27

Improved Adjustment for Brake Release Spring*

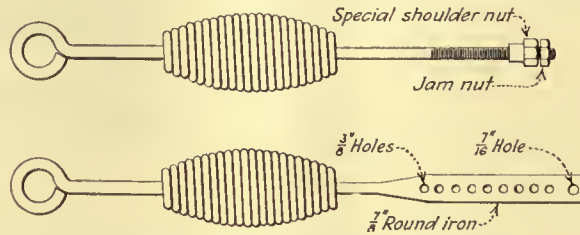
By I. F. MORRIS

Assistant Master Mechanic Southern Ohio Public Service Company, Zanesville, Ohio

CONSIDERABLE trouble was experienced in making adjustments of brake release springs on some Brill 79-E trucks used by the Southern Ohio Public Service Company. The special $\frac{5}{8}$ -in. square nut with shoulder on the end of the spring rod would wear almost through the supporting casting on the truck frame, and the spring rods themselves became worn, due to vibration. For adjustment it was necessary to remove the spring from the trucks, cut off the rod and weld a new piece on. This had to be threaded and special nuts fitted to this end.

To overcome the difficulty, the practice now is to weld a piece of

$\frac{3}{8}$ -in. round steel 15 in. long to the spring rod as close as possible to the first coil of the spring. Beginning 8 in. from the first coil of the spring



Above—Original type of release spring.
Below—Improved construction now used

$\frac{3}{8}$ -in. holes are drilled spaced 1 in. apart. At the end of the rod a $\frac{7}{16}$ -in. hole is drilled for hooking in a small

set of rope blocks to assist in the adjustment. To adjust the spring tension one end of the rope with blocks is hooked to the brake beam while the other is fastened through the $\frac{7}{16}$ -in. hole in the end of the rod. When the desired tension is obtained a $\frac{3}{8}$ -in. cotterpin is inserted through the nearest $\frac{3}{8}$ -in. hole, and a $\frac{7}{8}$ -in. washer is placed between the cotterpin and the supporting castings. The edges of the flat washers are cut off slightly to allow both washers to lie flat against the supporting casting. With this arrangement one man can install and adjust a spring, and supporting castings and rods wear very little. The springs also have less vibration and special ease of adjustment has resulted.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—35

Gutters Reduce Window Cleaning*

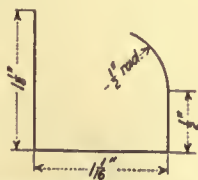
By J. E. BODOH

Master Mechanic Wisconsin Public Service Corporation, Green Bay, Wis.

CAR WINDOWS streaked with dirt are annoying and repulsive to the street car rider. Rain carries dust and soot from the roof down the

sides of the cars where it stays until the car can be returned to the shop for cleaning. To improve the appearance of cars and reduce the amount

of cleaning, gutters have been placed over the letterboards of the cars of the Wisconsin Public Service Corporation. To make the gutter retain the water while a car might be swaying in service, a special shape is adopted for the top edge. This is bent over as shown in the accompanying sketch. Gutters were installed on the eave line a few inches above the windows on either side of the car. This construction has been effective, and the cost of \$10 per car has undoubtedly been saved several times in car washing, besides increasing the immeasurable value that neatness of a car gives.



Cross-section of gutter used

sides of the cars where it stays until the car can be returned to the shop for cleaning. To improve the appearance of cars and reduce the amount



Gutter installed on car roof

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest

"TOOL STEEL" Pinions pay Big Dividends on Safety Car Motors

A User tells his Experience

"Due to excessive breakage of the pinions we were using, we began, about two years ago, and eventually replaced all of our 108 motors, with 'Tool Steel' pinions which, of course, stopped the breakage. When we had so many pinions break last year, it was not uncommon to have a broken gear or a pair of wheels ruined due to the Operator or Inspector trying to clear up the line and sliding the wheels to a turnout or clear to the barn. You know how much a new gear costs and you probably know that it costs about \$30.00 to change a pair of wheels, so I feel satisfied that I'd rather have a 'Tool Steel' pinion."

The above quotation from the letter of a user of "Tool Steel" Pinions further confirms our contention that "Tool Steel" Gears and Pinions reduce maintenance.

The Tool Steel Gear
& Pinion Company
CINCINNATI OHIO



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TOOL-STEEL QUALITY
GEARS AND PINIONS

AN OVEN FOR THE BAKING OF CAR MOTOR ARMATURES AND COILS

The well-designed and properly constructed oven for baking car motor armatures and coils, effects important savings in maintenance costs, because:

1. Its general layout is fitted to the needs of the plant where it is located.
2. It reduces to a minimum the amount of handling and operating labor required.
3. It conserves fuel by means of properly disposed insulation, heat-proof construction and the recirculation of heated air.
4. It gives a high degree of product uniformity, due to a carefully balanced system of heating and ventilation, that subjects all units of the oven load to the same temperatures.
5. It is highly flexible and under complete control, so that baking conditions can be accurately varied to suit the needs of any type of coils or armatures being run.
6. It can be operated with complete safety, concentration of inflammable or explosive mixtures of gas in dangerous quantities being prevented.
7. It does not allow burning or embrittlement of the insulating varnish.
8. It produces a thoroughly dry film, tough enough to withstand the most severe treatment in service and developing the full dielectric strength of the varnish.
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Young Brothers Company are prepared to investigate and make recommendations for means of increasing your oven efficiency.

You are under no obligation in accepting this service.

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lubricants, specially compounded for electric railway car maintenance, are compounded by specialists. TULC is recommended for securing better lubricating results.

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THE UNIVERSAL LUBRICATING CO.

1400 Schofield Bldg., Cleveland, Ohio

Electric Railway Journal Maintenance Data Sheet

BUSES AND TRUCKS—13

Bus Garage Spring Rack

By J. C. BAINE

*Engineer of Rolling Stock and Shops Department
New Orleans Public Service, Inc.,
New Orleans, La.*

SPRING leaves and assembled bus springs are stored in a rack in the bus garage storeroom of the New Orleans Public Service, Inc. The rack is built of wood and steel strap, and requires but a small amount of floor space. The A shape makes it suitable for racking of spring leaves of different lengths and its lightness makes it easy to move. The two ends

and cross braces are constructed of 2x6-in. timber. Openings for the springs are 5 in. square, and the supports are made of 1x $\frac{1}{4}$ -in. steel strap. The floor space occupied is 3 ft. 8 in. x 4 ft. 2 in. and the height is 8 ft.

The illustrations on the reverse page show the appearance and dimensions of the rack.

Electric Railway Journal Maintenance Data Sheet

BUSES AND TRUCKS—14

Bus Air Reservoirs Filled from Shop Air

By GUS C. KRAUS

*Assistant to Superintendent of Rolling Stock and Shops,
New Orleans Public Service, Inc.,
New Orleans, La.*

FILLING air reservoirs on buses from the garage reservoirs instead of running the engine to drive the 6-cu.ft. air compressors with which buses are equipped, is the practice of the New Orleans Public Service, Inc. Connection is made from the garage air supply tank to air hose suspended on a spring return hose reel attached to the lower chord of one of the roof trusses. An additional 15-ft. length of hose was added to that supplied with the reel. A rubber ball attached to the hose acts as a stop to limit the return travel on the reel.

The free end of the hose is fitted with a standard Westinghouse Air Brake Company's air cock and a Chicago Pneumatic Tool Company's two-prong air hose connection mates with

a similar one located on the bus. About 3 ft. of the free end of the hose is painted white to attract attention.

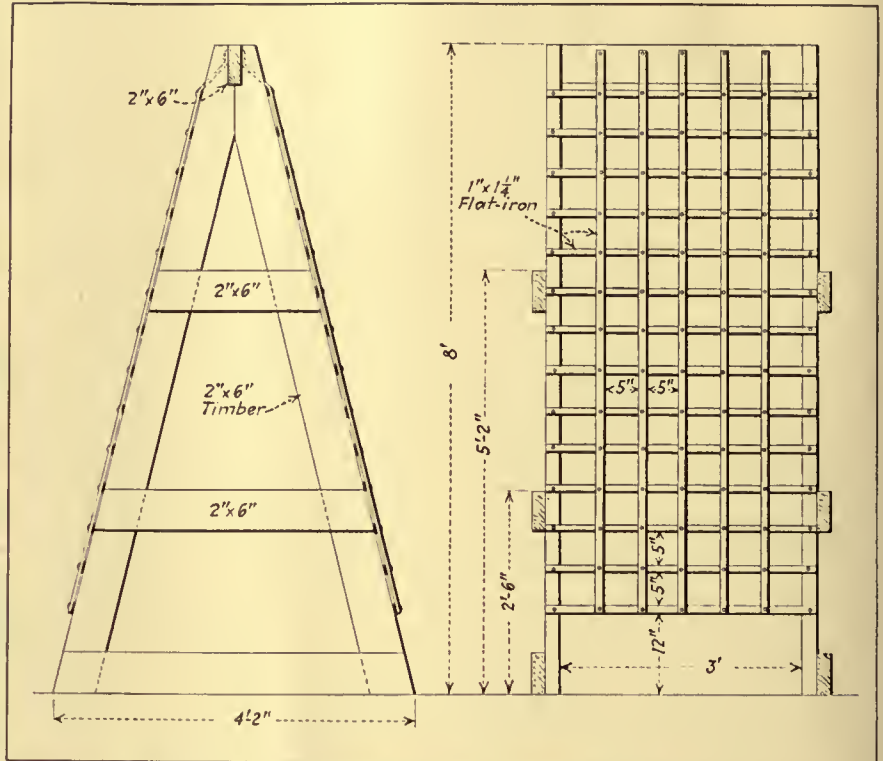
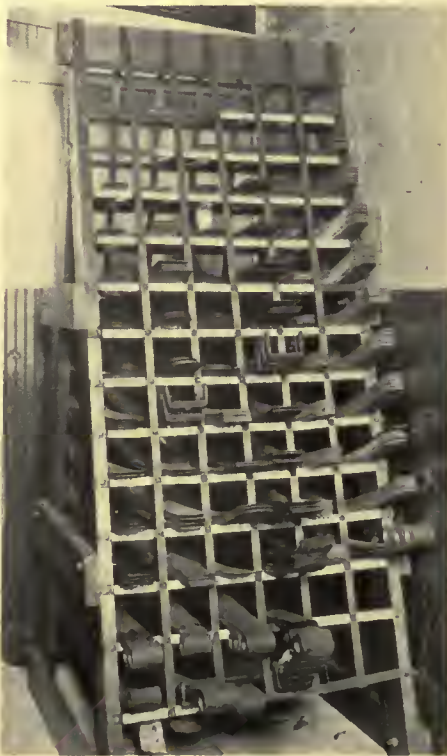
Four of these reels are installed in the garage building and each will serve approximately nine buses. A fifth reel is installed alongside the gasoline pump house. A considerable saving in gasoline has resulted from charging bus air reservoirs from the garage reservoir instead of running the gasoline engine on the bus. The greatest saving results when air brakes and air-operated doors are inspected, adjusted and tested. If a bus stands for any considerable time near the gasoline pump house, the reel method is used for building up the air supply, and this method is used just before buses leave.



Spring return hose reel attached to roof truss with length of hose sufficient to reach several buses. Insert shows hose connection at bus

Electric Railway Journal Maintenance Data Sheet

BUSES AND TRUCKS—13A



Convenient storage for bus springs is provided by this rack in the bus garage of New Orleans Public Service, Inc. At right—Detail of construction

Electric Railway Journal Maintenance Data Sheet

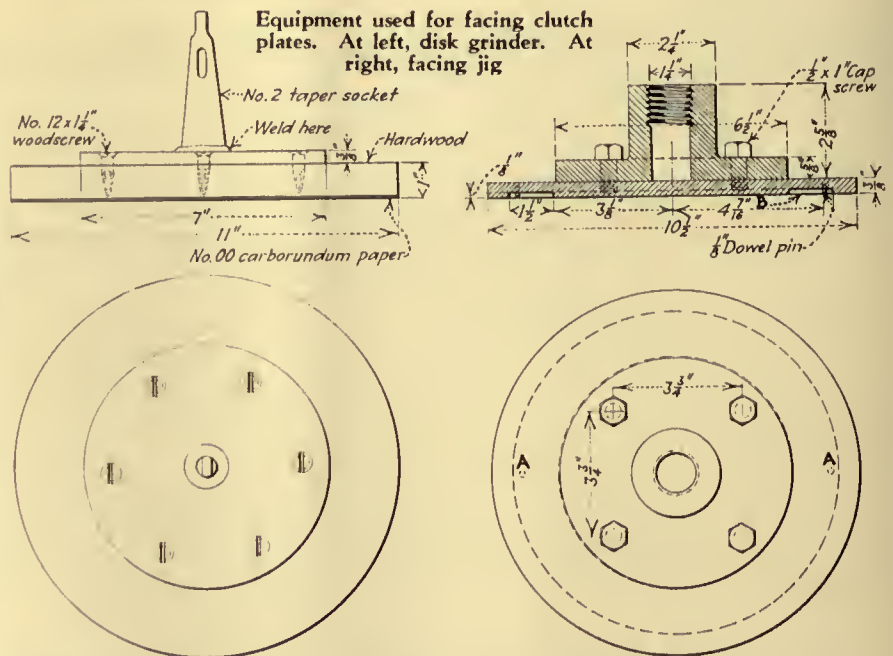
BUSES AND TRUCKS—15

Clutch Plate Facing Jig*

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

CLUTCH PLATES of buses of the San Diego Electric Railway, San Diego, Cal., are trued up with the aid of a clutch plate truing jig. It was found that composition plates became badly worn when in service from 15,000 to 20,000 miles. The wear is only on parts in contact with the metal clutch plate and consequently abrupt shoulders are formed on the composition plate at the end of the steel plate. Starting becomes jerky due to the steel plates catching on these shoulders.

Ordinarily the plates would be scrapped when they reached this stage, but in order to increase the life, a disk grinder was designed for re-facing a set of plates. The accompanying illustration shows the jig marked A. The jig itself is mounted on the lathe chuck spindle which holds the clutch plate which is pressed into slot B, and arranged so as to engage the two dowel pins of the lathe.



paper is used by gluing it to the face of the disk grinder. One piece of paper will face several hundred plates absolutely true.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

May Maintenance Prize

Won by

R. J. Fennell

CROSS bonds are kept tight on the lines of the Toronto Transportation Commission where these are installed in concrete by making provision for movement. This is a very serious problem which electric railways have with this type of construction. A length of hose is slipped over the end of each bond before the terminal is welded to the rail. When this is imbedded in the concrete, the bond has a free movement for the length of the hose. With this method, if a rail becomes loose in the concrete bed any movement is taken up in the free length within the hose and the bond does not break at the terminal. The judges in *ELECTRIC RAILWAY JOURNAL'S* Maintenance Contest awarded the \$25 monthly prize for May to R. J. Fennell of the Toronto Transportation Commission, who originated this method of installation and submitted a description of it.

Honorable mention was awarded to R. T. Chiles, master mechanic Cumberland County Power & Light Company, Portland, Me., for his description of the general utility line truck used by the company. By rigging up a derrick on a truck much of the maintenance and construction work has been done better, more quickly and with a saving in labor.

The Maintenance Data Sheet section published in this issue includes another group of articles submitted in *ELECTRIC RAILWAY JOURNAL'S* competition. These, together with others published in the May 26, June 2 and June 9 issues, will be judged for the monthly prize of \$25 to be awarded for June.

The amount of material which has been received in the contest is of considerable volume and each

mail is bringing in additional items, so that many interesting descriptions of methods and devices will be published in future issues. These should serve as a guide to contributors as to the kind of material that is being submitted in the contest and also assist maintenance men toward perfecting practices which will prove of great value. Contestants should read the rules carefully and, as the contest is scheduled to close on July 31, all are urged to submit their material at once.

Send in Your Maintenance Items at Once

MAINTENANCE men have six weeks more to submit items in *ELECTRIC RAILWAY JOURNAL'S* Maintenance Contest. There are many men in the industry with knowledge of improved methods and devices for making repairs that stand a good chance to win one of the prizes and at the same time assist other maintenance men in improving their work.

The following are the revised conditions for submitting material in the contest:

1. Any employee of an electric railway or bus subsidiary may compete.
2. The author does not need to be the originator of the idea.
3. Articles may be submitted by several persons or by a department.
4. Any maintenance practice or device for electric railway or bus repairs may be submitted.
5. Articles should be 100 to 200 words long, with one illustration, and in no event longer than 400 words with two illustrations.
6. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."
7. Manuscripts should be mailed to the Editor of *ELECTRIC RAILWAY JOURNAL*, Tenth Avenue at 36th Street, New York, N. Y.



R. J. Fennell

who was awarded the May prize in *ELECTRIC RAILWAY JOURNAL'S* Maintenance Contest, is assistant road master for the way department of the Toronto Transportation Commission, Toronto, Canada. His employment by the commission began in 1921, when he organized the welding and grinding section and continued as superintendent until 1927, when he was promoted to be assistant road master.

Mr. Fennell is keenly interested in electric welding and all its uses throughout the electric railway industry. His varied experience was gained during eight years with the Canadian Allis-Chalmers, Ltd., Montreal, where he started as a machinist and advanced through the position of shop foreman, to become superintendent in charge of field erection of hydraulic turbines. Moving to Toronto in 1916 he spent two years in munition manufacturing as superintendent of the Consolidated Steel Company. For two years prior to his joining the Toronto Transportation Commission he was mechanical superintendent with Baldwin's Canadian Steel Corporation, Ltd. Under Mr. Fennell's supervision and direction the electric welding practice of the Toronto Transportation Commission has become standardized on a very high plane and improvements in methods are being made.

8. A prize of \$25 will be awarded each month for the best maintenance idea in the group published during that month. A minimum of \$5 will be paid for each article accepted for publication. Manuscripts will be received until July 31, 1928.

9. Announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the month in which the article was published.

10. Additional details were given in *ELECTRIC RAILWAY JOURNAL* for April 16, 1927, pages 700-701.

High-Temperature Gas Furnace

MUCH importance is attached by General Foreman George Johnson of the Binghamton Railway, Binghamton, N. Y., to a high-temperature furnace he has designed and built in his shop. It is considered as essential as the machine tools and other equipment. This furnace has been found very useful, and without it a great many jobs could not have been completed. The design is very simple, yet very effective. It is made in two parts, viz., a stand and the furnace. The stand is made of 2-in. angles bolted together and is 28 in. square. The legs are tied together by $\frac{3}{4}$ -in. bolts. The furnace is 28 in. square and is made of 2-in. angles and $\frac{1}{8}$ -in.



Shop constructed gas furnace

sheet steel. The walls of the furnace are lined with fire brick. Front, side, back and bottom walls are 3 in. thick and the top 6 in. thick, thus making the furnace approximately 20 in. long by 11 in. high by 20 in. wide. The front of the furnace is closed with a sheet-steel door 19 in. high by 22 in. wide by $\frac{1}{8}$ in. thick. This door slides vertically and is held in the open position by a counterweight attached to a $\frac{1}{8}$ -in. cable running over 1-in. pulleys. A 1 $\frac{1}{2}$ -in. gas pipe encircles the furnace entirely and four taps are taken off at the center of each side which extend within it. Each of these taps is connected to a $\frac{1}{2}$ -in. Bunsen burner. Gas is obtained from the city supply. A 3 $\frac{1}{2}$ -in. pipe installed through the top of the furnace provides air.

Dick Prescott Inspects the Shop And Plans a Trip



SEVERAL days after Dick Prescott, superintendent of equipment of the Consolidated Railway & Light Company, had appointed Steve White his assistant, he suggested that they take a turn through the shop together to look over the several departments. Dick had made this a regular practice ever since his appointment as engineer of equipment, long before he had even dared to think of being in full charge of the department. He had found the custom of taking a regular trip through the shop profitable from many angles. It helped him to get better acquainted with the foremen and with the men. Each department liked to feel that its work was of sufficient interest to attract his attention regularly. He found that many routine shop problems that the foremen would hesitate to bring to his office came to his attention in this way.

Shortages of material, minor friction between departments, questions of personnel or discipline, the need for new machines or better facilities—in fact, innumerable things, each small in itself but looming large in their aggregate effect upon shop efficiency and costs, came to light in these regular trips through the shop.

As the two men entered the carpenter shop where they had first met, Dick as a new apprentice and Steve as foreman of the department, both were struck with the changes that had taken place within a few short years.

"This doesn't look much like the shop you came to work in a few years ago, Dick," ventured Steve.

"No, there have been a lot of changes," replied Dick.

"I was just checking up the other day and find that there are about half the number of men in the shop that there were three years ago; although we're putting cars through for overhaul about a third faster than we did then."

"We're doing a more thorough job at that, Steve."

"There's no question on that score, Dick. Our cost per car has dropped,

but our pull-ins are lower than they have ever been."

"We still have three groups of cars, though, that are costing us a lot of money to operate and maintain. There has been some discussion whether we ought to undertake to rebuild them for one-man operation like those we put through last year, but I don't think it would be a wise expenditure."

"I don't either, Dick. There is little question but that these last three lines should be operated with one man; it would reduce costs and improve service to the public. But it would cost over \$4,000 each to put those old battleships into proper condition, and after we got all through they would still be an eyesore on the streets, heavy and expensive to operate."

"Nevertheless, Steve, something should be done promptly about them. Its costing more money than we can afford to keep them going as they are."

"I've been watching with interest the articles on some of the new cars that are being developed, and hoping that our management would soon see the wisdom of buying some modern equipment."

"That's one of the improvements that I think we can look forward to in the near future. In addition, there are many other things that are being discussed in the industry, to which we could profitably give attention. I have been thinking for some time, that you and I ought to be getting out more than we are to see what other properties are doing."

"I believe you're right, Dick. I've been reading about a lot of practices that I would like to look over at first hand."

"Good. Suppose you make up a list of the properties you think we ought to cover, and I shall take it up with Mr. Milburn, after the staff meeting tomorrow."

Association Activities

Largest Canadian Convention Held

Meeting at Toronto exceeds in attendance and in number and size of exhibits any ever held by the Canadian Electric Railway Association

SOME 725 delegates and guests gathered at the Royal Coliseum in the National Exhibition at Toronto last week for the 24th annual meeting of the Canadian Electric Railway Association. This was far and away the largest convention of the association ever held. The exhibits were the most comprehensive, covering a wide range of products. Varied entertainment features gave the delegates time for relaxation from the serious business of the meetings.

The technical sessions were held on the mornings of June 6 to 8. Each day a luncheon was served immediately after the session, at which an address was made by some man prominent in the industry or in the life of the Canadian nation. The afternoons were reserved for inspection of the exhibits. For entertainment a supper dance was held on Wednesday evening, and on Thursday a cabaret dinner, followed by a dance, was given.

A special entertainment feature was a concert given each afternoon by the Toronto Concert Band, an organization consisting of some 50 pieces, all recruited from the Toronto Transportation Commission.

Inspection trips were conducted to the various operating units of the T.T.C., and special sightseeing parties were arranged for the ladies.

The registration up to and including Friday was 395 operating men, 207 manufacturer representatives and 123 guests, including ladies, a total of 725.

In his opening address at the Wednesday session President H. E. Weyman stressed the need for a modern viewpoint and for the throwing off of the shackles of precedent. An abstract of his address appears elsewhere.

Reports were presented by the committees on motor buses and trucks, safety and accident prevention, rail corrugation, and publicity and merchandising of transportation.

PROGRESS OF THE MOTOR BUS

The report of the motor bus and truck committee was presented in abstract by the chairman, C. H. Dahl. The development of and progress made by the motor bus in the past ten years according to the committee, have been so marked that it can now safely be asserted that there no longer is any doubt as to the fact that the motor bus fills a distinct need in transportation. Losses on motor bus operation quite frequently are not the fault of buses, although buses

are blamed for them. It is no doubt that a profit-and-loss statement of a good many of the motor bus routes operated today would show losses. An analysis of the circumstances under which bus routes were inaugurated would readily explain the reason for many such losses. One reason for losses being shown is that buses were put in service on routes where the number of people to be carried was so limited that the route could not possibly pay, and yet buses were installed to save a larger investment for car service. The loss was not the fault of the motor bus.

Closely allied with the foregoing, says the committee, are those cases in which the company has permitted itself to be prevailed upon to provide service where a simple analysis of the traffic to be served would have indicated that it was not sufficient to warrant the operation of a motor bus route. The matter of installing an extra bus route may not involve any relatively large outlay of money, so that an unprofitable line will be instituted. Subsequent statistical analyses of bus operations may blame the bus for operating at a loss, but the fact that a loss occurs under such circumstances is not legitimately the fault of the motor bus.

The committee states that the motor bus operations, as regards fares, should have distinct treatment from electric railway operations. At the present stage of motor bus development it costs approximately twice as much per space unit to operate a transportation mile by bus as it does by street car. Under these circumstances it is folly to hope that the motor bus can be operated at the same fare as the street car. In this connection the trend toward higher bus fares in the United States is cited.

As to the proper economic size of the bus, the committee states that this cannot be determined definitely. While the 29-passenger size seems to be most popular for de luxe and street car service, both the smaller and the larger types have attracted considerable attention. Where the traffic is not too heavy it is believed that 21-passenger buses with fair frequency will give better results than larger units with long waits between. On streets with heavy traffic in large cities the 40-seat bus of types recently developed would appear to have an economic place.

On the subject of taxation the committee states that while the industry should bear its proper share of the

burden of maintaining highways, excessive taxation by various government bodies may discriminate against this method of transportation to such an extent as very seriously to curtail the scope of its operations. Timely action by interested associations may be a considerable factor in securing fair treatment in this regard.

In the discussion which followed, J. L. Smith, superintendent motor coach department Toronto Transportation Commission, stated that for the larger properties he favors 29-passenger buses to those of smaller seating capacity, even though the seats are not always filled. This is because of the greater flexibility in giving varied service. For instance, the regular city buses can be used in an emergency to assist on sightseeing routes, tours, and occasional trips. A use of buses which was not mentioned in the report, he said, is to bridge gaps in the street car service temporarily, as when a track is torn up for repairs.

D. E. Blair, general superintendent Montreal Tramways, stated that under the conditions prevailing in Montreal express service with street cars is not possible. He believes that it is possible to use for this purpose buses leaving the congested district during the rush hours, and that an important service of this kind can be built up.

W. J. Woolley, traffic superintendent auto bus division, Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, said that in Rio some 150 buses are in use in city service. On most of the routes the equivalent of a 10-cent fare is charged, with no transfers. The policy there is to make the tramways feed the buses rather than the reverse, as is customary in this country, because the business streets are so narrow and so congested that the buses make better time.

Eustace Smith, Jr., secretary of the association, stated that the association is trying to have legislation adopted eliminating the 10 per cent import duty on bus bodies. Removal of this tax should stimulate the use of the most recent types of buses in Canada.

RAIL CORRUGATION

The report of the committee on rail corrugation was presented by C. R. Kinnear, chairman. It was a well-presented résumé of the work done on this subject by the Canadian association, as well as a review of the investigations of the A.E.R.E.A. and the International Association committees on the same subject. An abstract of this report will appear in a future issue of this paper.

R. M. Reade, superintendent Quebec Railway, Light & Power Company, presented the report of the committee on safety and accident prevention. Accord-

ing to him it is necessary to develop a safety consciousness, if accidents are to be prevented automatically.

A spirited discussion ensued. W. R. Robertson, general superintendent Hydro-Electric Railways, Toronto, held that local conditions will govern to a considerable extent what should be done to promote safety. Most of the accidents are due to automobiles.

J. F. H. Wyse, general manager Ontario Safety League, spoke of the "Just Kids" Safety Club which has been organized in Toronto by one of the daily newspapers. This has been a very constructive force in teaching safety in the schools and protecting a class of persons particularly subject to street accidents.

Through streets on entering which vehicles must come to a full stop, have done much to promote safety on the highways, and particularly to prevent collisions with street cars, according to Leonard Tait, manager London Street Railway. In this statement he was corroborated by Mr. Wyse.

MERCURY RECTIFIERS

A paper giving operating results after a year's experience in conversion of alternating current to direct with mercury and rectifiers was read by M. L. de Angelis, assistant electrical engineer Montreal Tramways. An abstract of Mr. de Angelis' paper will appear in a future issue of this paper. He told how the operation of the station has been perfected, and indicated that the results at present are highly satisfactory.

C. A. Butcher, substation engineer, Westinghouse Electric & Manufacturing Company, compared the rectifier with the synchronous converter. He does not think the margin of efficiency between the rectifier and the 60-cycle converter at 600 volts is sufficient to justify the extra cost entailed by the former. For higher direct-current potentials he believes there is a legitimate field for the rectifier.

The discussion on this subject was continued at the Friday session, W. R. Robertson offering figures comparing the Montreal substation with a recent synchronous converter substation at Windsor.

K. B. Thornton, assistant general manager Montreal Tramways, offered some figures in comparison of the two conversion systems. These indicate that the rectifier has considerable advantage from the standpoints of weight and performance.

J. S. Arbuckle, electrical engineer American Brown Boveri Electric Corporation, gave an extended discussion of the relative merits of rectifier and converter, and pointed out that while few installations of rectifiers have been made in this country it is in general use on European rail systems.

TRAFFIC IMPROVEMENTS

"Making Street Railways Serve" was the title of a paper presented by E. J. McIlraith, staff engineer Chicago Surface Lines. There has been too much haphazard development of traffic control, he said. Street railway men must

think in terms of general traffic control rather than in the movement of street cars. Helping to keep the automobiles moving will help public transportation as well as create a better public feeling. Parking should be curtailed where it will interfere with the free movement of vehicles. In Chicago, for instance, the elimination of parking has greatly facilitated movement and increased the street capacity, particularly during the rush hours.

The importance of a system of street signals was stressed by Mr. McIlraith. Most of the signals installed in the United States are improper, he said, but signals that are appropriate and are properly installed will speed up traffic.

While the majority of railways must continue to use some of their old cars, Mr. McIlraith holds that it is possible to improve them. In particular the old slow-acting brake, which requires two seconds to take hold fully, should be replaced by one with quick-acting devices where full action is obtained in not more than one-half second. The motors usually are powerful enough to permit a reasonable acceleration, although it is better to install motors that will permit of as high rates of acceleration as are practicable.

Fast schedules are necessary to meet competition, and rapid acceleration are essentials. It is possible to make a practical schedule as high as 12 m.p.h., which is approximately the same as the speed of private automobiles, which will not average higher than 15 m.p.h. including stops and slowdowns. Training of the personnel is necessary to obtain results such as these.

Mr. McIlraith's paper will appear in abstract in a later issue.

A. E. K. Bunnell, consulting engineer, Toronto, commented on the fact that Mr. McIlraith has approached his talk from the point of view of the car rider rather than that of the operator. He felt that this is the way to determine what improvements are needed. Not all the public desire to use the cars all the time, he believes. The car rider wants (1) clean equipment; (2) a smooth track, and (3) well-kept schedules. The riders more and more want speed and a preferred type of service. They want safe service and reliable service, but he questions if they all care whether the service is economical or not. Unless a preferred service is given at a higher rate he feels that the transportation system is not meeting its responsibilities.

H. B. Potter, general manager United Railways & Electric Company, Baltimore, believes that the street railways are the most important element in handling the traffic in cities. The railway men should work closely with the public officials, particularly the police. They should take a prominent part in the organization of safety councils.

A paper on general overhead line practice was prepared by M. C. O'Donnell, electrical engineer Ottawa Electric Railway. The organization of the line department in Ottawa was outlined. The system is divided into two districts,

one in the city and the other including the suburban lines. A system of keeping records of trolley wire breaks was described. It was noted that approximately twice as many breaks occur in winter as in summer.

TROLLEY WIRE MAINTENANCE

Discussing the paper, J. F. Neild, electrical engineer Toronto Transportation Commission, pointed out that real maintenance required that the trolley wire be renewed before an interruption to service occurs. To do this it is necessary to keep a close record of the wearing parts. The life of material for each intersection is recorded and checked carefully. It has been found possible to get up to as high as 275,000 wheel passes for each trolley car. To do this the trolley is carefully centered with a plumb line and a track gage, and 7½ to 8 per cent of trolley wire is renewed each year.

Many trolley breaks are beyond the control of the department, but by an analysis of the causes of breaks it has been found possible to reduce the total number materially. For instance, in Toronto there were 421 breaks, while in 1927 there were only 21 breaks, of which 10 were beyond the control of the department.

J. Metcalf, assistant traffic superintendent Toronto Transportation Commission, stated that there had been a notable improvement in car service due to the improved condition of the trolley wire.

Mr. Neild's department has adopted a standard wear of 45 per cent of the area before discarding wire. He believes that if grease can be placed on the top of the trolley wire there is an advantage in keeping preventing the formation of sleet. The trolley wire is strung in cold weather to get maximum tension and minimum sag.

ELECTRIC TRACK SWITCHES

A paper on the maintenance of electric track switches was presented by L. H. McAdam, general inspector electric switches, Toronto Transportation Commission. An abstract of this will appear in a future issue. Discussing this paper E. S. Olmstead, vice-president Cheatham Electric Switching Device Company, stated that there is a saving of approximately twenty seconds per switch movement by the use of electric switches. For anything closer than a ten-minute headway or for one-man cars he believes that electric switches are absolutely necessary. If a sufficient number of cars are in service so that one or more can be eliminated due to the time saving, the monetary value is considerable. If it is not possible to save a car the headway may be reduced to improve the service.

THE NEW OFFICERS

Officers were elected for the ensuing year as follows:

Honorary president: Julian C. Smith, president Montreal Tramways.

Honorary vice-president: Acton Burrows, president Acton Burrows, Ltd.

and proprietor *Canadian Railway and Marine World*.

Honorary advisory council: Hon. Thomas Ahearn, president Ottawa Electric Railway; Lt. Col. J. E. Hutcheson, vice-president and general manager Montreal Tramways; George Kidd, president British Columbia Electric Railway; Charles A. Magrath, chairman Hydro-electric Power Commission of Ontario; W. E. Phin, president Dominion Power & Transmission Company; A. E. Warren, vice-president Canadian National Electric Railways.

President: D. W. Harvey, general manager Toronto Transportation Commission.

Vice-president: C. H. Dahl, assistant general manager Winnipeg Electric Company.

Treasurer: H. C. Patten, comptroller Toronto Transportation Commission.

Auditor: J. E. Richards, manager and treasurer London & Port Stanley Railway.

Executive committee: The president, the vice-president, the treasurer, the immediate past-president (H. E. Weyman, Levis), and D. E. Blair, Montreal; T. W. Brackenreid, Port Arthur; F. D. Burpee, Ottawa; A. H. Foster, Brantford; W. S. Hart, Three Rivers; D. W. Houston, Regina; W. R. Robertson, Toronto; Leonard Tait, London; K. B. Thornton, Montreal; G. E. Waller, Hamilton.

At a meeting of the new executive committee Eustace Smith, Jr., of the Toronto Transportation Commission, was reappointed secretary of the association.

LUNCHEON TALKS ON VITAL SUBJECTS

A feature of the convention was the series of talks at the luncheons held each noon immediately after the business session. At Tuesday's luncheon Mayor Samuel McBride of Toronto welcomed the delegates, pointing out the progress that has been made in transportation in the city. He was followed by Chairman P. W. Ellis of the Toronto Transportation Commission, who sketched the growth of the system. The city now has invested in this enterprise more than \$50,000,000. It serves an area exceeding 35 square miles. At an average fare of 6.17 cents per passenger all costs have been met, including provision for depreciation, redemption of debenture debt and for contingencies. Besides these costs an annual surplus ranging from \$60,000 to \$110,000 has been accumulated.

The principal address was made by Lucius S. Storrs, managing director of the American Electric Railway Association, who stressed the point that the street railway is the front door of the city, and that it should be made as attractive as possible. He also pointed out the great safety of electric railway travel. Only one passenger in every 55,000,000 carried by street cars is fatally injured.

At Thursday's luncheon the speaker was W. H. Moore, chairman of the advisory board on tariff and taxation, Dominion of Canada. He showed the

urbanization of the nation in the last 30 or 40 years. Both in that country and in the United States the proportion of people living in the cities has grown tremendously, until now approximately half the total population reside in them. This development, he holds, is due in large measure to the influence of short-haul transportation, principally the street railway. This urbanization has thrown new responsibilities on the street railways that have created it.

On Friday the luncheon speaker was Hon. George S. Henry, acting premier and minister of public works and highways, Province of Ontario. The civilization of a people, he holds, is measured by their transportation. The steam roads have not filled all the needs, so that the street railways and buses have been essential. As to the buses, out of some 500 in Canada about one-third are operated by the electric railways. There will always be a field for the railroad, the interurban electric railway and the city railway, he feels. He deplores destructive competition. Since the public will take any form of transportation it wants to use, the existing operators must be protected by governmental agencies as a matter of fairness and for the benefit of the public in the long run.

On the subject of taxation, Mr. Henry pointed out that the bus operator in Ontario now must pay the ordinary

taxes, a gas tax of 3 cents per gallon and a tax of 0.1 cent per passenger seat-mile traveled on the provincial highways. Besides this it is compulsory to carry public liability insurance.

LARGE EXHIBIT A FEATURE

In connection with the convention the manufacturers' section of the association had the largest exhibit of the kind ever presented in Canada. Under the leadership of C. H. Clancy, chairman of the exhibit committee, 39 exhibitors displayed a wide range of electric railway and bus equipment.

At the close of the convention the manufacturers' section held a meeting, at which votes of thanks and suitable gifts were extended to Mr. Clancy, Eustace Smith, Jr., secretary of the association, and J. F. Neild, chairman of the entertainment committee, for the work they had done in making the convention a success.

A vote of thanks also was extended to the Toronto Transportation Commission for the fine service and attention given by that organization.

Don M. Campbell was elected honorary chairman of the manufacturers' section; O. C. Rehffuss, chairman; H. T. Gibbs secretary-treasurer, and W. G. Gordon and S. E. M. Henderson additional members of the executive committee of the section.

Better Transportation Can Be Sold*

BY H. E. WEYMAN

Manager Levis Tramway, Levis, Quebec

WE ALL recognize that our industry has been and still is, perhaps, passing through a period of transition. A new transportation tool, the motor bus, made its appearance a few years ago and at first entered the transportation field as a competitor. The bus was placed in the hands of irresponsible persons, permitted to run wild without regulation, and provided with a roadbed and other facilities practically free of cost, while the electric railway is required to pay for the cost of not only its roadbed, but the pavement for its competitors to use free of cost. It is taxed right and left, and required to clear the streets of snow to allow circulation of all vehicles.

I think we all realized from the first that if the bus had to provide its own roadbed and other facilities on an equal basis with the electric car and submit to regulation as eventually it must, it could not exist and compete. Unfortunately this was not recognized by those in authority and the public at large. The natural result has been that the credit and financial status of the electric railways was somewhat undermined. In consequence we have been passing through a hard and critical period, but one which I think we have now passed successfully and with great credit.

Public and civic authorities have not

*Presidential address before the Canadian Electric Railway Association at the annual meeting, Toronto, June 6-8, 1928.

yet realized that our industry is the most severely regulated one in the world. Competition is said to be the life of a nation, but to permit competition with a strictly regulated industry is hitting a man whose hands are tied. It is obvious that we must all endeavor to correct this weakness and take every means to inform the public and authorities of the facts and conditions under which we operate. I believe we will then obtain public co-operation instead of opposition.

BUS AND CAR CAN SERVE TOGETHER

Time and experience have made it evident that the bus is not going to replace the electric car except under certain conditions, such as where the railway should never have been built. The public is beginning to realize this and it remains for the public authorities to recognize that the established transportation organization is the logical party to use this new tool, and that it can be co-ordinated with the electric railways to the mutual advantage of themselves and the public. It is for us to recognize that this new vehicle will broaden out our facilities and provides us with an elastic accessory which readily lends itself to momentary adjustment and is of exceptional value when co-ordinated with the electric railway service. The fact that the railway utilities have now more than 300 buses in service in Canada supplementing the

electric car service is a proof of their desire to furnish the best possible transportation. It is for the public to recognize that the electric car is the most economical mass transportation vehicle, which is not going to be replaced, but that the two vehicles can be co-ordinated to render a "greater transportation service" for the public.

AUTOMOBILE TEACHES PUBLIC TO RIDE

We have, however, a greater problem to face in the private automobile. It has become not only our greatest competitor but the greatest obstacle to our giving rapid transportation service which is so desired by all. It is teaching the public to demand speed, frequency of service, comfort and luxury. Lastly, it is teaching the public to ride. This is something in our favor and we should take every advantage of it and cater to the public by every means in our power. The time is gone when the railway manager could place a number of cars in service and then sit back for the public to use them. Today it is necessary for the progressive operator to find new ways and means to induce the public to use the service. In other words, we of today must get out and sell transportation. If this is properly done the public will respond. It may even be necessary in a large transportation system to introduce a commercial department with a manager whose sole duty it is to interpret the public requirements and to sell the service.

It is, however, necessary to assist the sale of our service by having clean, bright, well-painted cars, courteous employees, smooth roadbed, quiet running rolling stock, and reliable service. If these are not provided you can't sell your transportation. Do not forget that this also applies to the bus. In addition, we have also to meet the new demands emanating from private cars, such as comfortable seating, speed and frequency of service.

May I say to our friends, the civic and other authorities, that the railways are able and prepared to meet these modern demands, but that they can do so only if and when permitted. We have franchises still in existence which limit the speed of the electric car while the motor vehicle is allowed to run at any speed up to 40 m.p.h. Streets originally designed and built for the circulation of vehicular traffic, trade and commerce, are now permitted to be used as public storage yards for a small favored number of automobile owners with the result that the legitimate traffic, trade and commerce are obstructed, causing serious delay to the transportation of 80 per cent of the public using the public transportation system.

DE LUXE RIDES AT COST

We can provide equipment having the same comfort and ease as the private car but the cost must be met by the car riders—just as the automobilist has to pay for his de luxe ride. It is not the railways' fault, if by fare restrictions imposed by regulatory authorities, they are unable to meet modern public re-

COMING MEETINGS OF

Electric Railway and Allied Associations

June 20-27—American Railway Association, Div. 5—Mechanical, annual convention and exhibit, Atlantic City, N. J.

June 21-22—American Railway Association, Motor Transport Division, Atlantic City, N. J.

June 21-22—Wisconsin Utilities Association, Accounting Section, Hotel Pfister, Milwaukee, Wis.

June 25-29—American Institute of Electrical Engineers, summer convention, Cosmopolitan Hotel, Denver, Colo.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 12—New York Railroad Club, annual outing, Indian Point, N. Y.

July 13—A.E.R.A. Executive Committee on yacht "Florida," New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

effected we are giving more and better service today than was thought possible a few years ago. This can be more clearly seen by a comparison with the costs of 1913, which shows that labor is now approximately 200 per cent higher, material 200 per cent, while the average rate of fare of all railways has only increased about 80 per cent. I do not know of any industry which can show such a record.

TRAFFIC INCREASING IN CANADA

I think it is appropriate and it will be of interest to the manufacturers and workers of this country to state that the electric railways of Canada in 1927 paid out in wages approximately \$26,000,000 and purchased material to the value of \$15,000,000, which does not include capital expenditures covering new development and equipment. We employ more than 17,000 people while there are many more employed indirectly. We have some \$229,500,000 invested in our industry, which places us in the front rank of the most important industries of Canada.

Passenger revenue of the Canadian electric railways for 1927 was \$48,290,000, an increase of 3.2 per cent over the previous year. Revenue passengers carried were 776,615,193, an increase of 3.75 per cent, while we gave more service to the public by operating 49,800 passenger car-miles per mile of track, an increase of 6.5 per cent.

These figures show a healthy increase and are most encouraging, but I must remind you that the private automobile has not reached its peak and density in this country and that it will require our best efforts to maintain our present position and normal increase. I believe we can afford to be optimistic in regard to the future, and that the electric railways will regain their position in the financial world as a desirable investment.

Finally, I wish to emphasize that the franchise requirements, conditions of operation, rate of fare and municipal taxation are the foundation stone of the whole transportation systems structure. If onerous conditions are imposed by those in authority the channel through which money flows for the maintenance and development of the enterprise will be stifled and the collapse of the system is assured. All transportation systems require additional money every year, but such is attracted only when there is an assurance of a return on the investment.

Where the franchise or operation requirements are such as to assure a fair return on the investment, the transportation system will be up to date, a well-operated property becomes the most valuable asset and the finest advertisement for the community it serves, but there is no worse abomination than a run-down, dilapidated property. If our industry is to fulfill modern requirements of the traveling public a fair return on the investment must be assured by relief from unfair operating conditions and burdens which I have already mentioned.

quirements. It is in the hands of the same authorities if the speed of the electric cars is limited by street congestion.

The transportation system, whether publicly or privately owned, is on the same basis as any other industry. The rate of fare must fully cover the cost of production. To impose the cost of pavement on the transportation system or the cost of snow removal or a tax of 3 per cent on the gross revenue is, contrary to the general impression, not an assessment on the transportation utility but a tax on the car rider, for the rate of fare must of necessity meet the full cost of operation. It is of just as great importance to the transportation utility as it is to the public that the rate of fare be kept low, but it cannot be if civic authorities assess and load us down with taxes and other obligations which the car rider must pay.

Yet in spite of all handicaps the electric railway industry has not been standing still, for through economies

Outing Excursion of New York Railroad Club

ARRANGEMENTS have been completed for the annual outing of the New York Railroad Club on July 12. This will be an old-time excursion up the Hudson to Indian Point, on a specially chartered steamer of the Hudson River Day Line.

The boat leaves at noon and luncheon will be served en route. Upon arrival at Indian Point there will be a parade headed by a special band. In addition to baseball, tennis and swimming, there will be a series of athletic contests: a three-legged race, sack races, a push-ball game, greased pole and a greased pig, besides quoits and a short golf tournament. Prizes for the different events will be provided.

Southern Properties Plan Program

PROGRAM arrangements have all been made for the Cincinnati-Covington meeting of the Electric Railway Association of Equipment Men, Southern Properties, to be held at the Gibson Hotel, Cincinnati, Ohio, July 25-27, according to Robert M. O'Brien, president. Nine prominent men of the association have been requested to prepare papers, so there should be much of interest to all who attend.

The business session on July 25 will open at 9 a.m. The entire day Thursday will be given over to answering the questions in the question box and discussion. On July 27 an inspection trip has been arranged which will consist of a visit to the shops of the Cincinnati Street Railway, the Cincinnati Car

Company and the Tool Steel Gear & Pinion Company.

Complete details of the program will be announced later.

Various Claims Subjects to Be Discussed in San Diego

PACIFIC CLAIM AGENTS' ASSOCIATION will hold its annual convention in San Diego, Cal., July 19-21, 1928. The following program will be presented:

"Organization and Value of Safety Committees," by J. H. Handlon, claim agent Market Street Railway, San Francisco, Cal.

"Disciplining Employees Responsible for Accidents," by J. P. Potter, vice-president Key System Transit Company, Oakland, Cal.

"San Diego the Safe City," by Police Sergeant Lyle, Police Department, San Diego, Cal.

"Preparing Cases for Trial; Court Experiences," by M. P. Poundstone, Pacific Electric Company, Los Angeles, Cal.

"Industrial Dentistry," by Dr. Sam Kaufman, Pacific Electric Company, Los Angeles, Cal.

"Recent Court Decisions in Negligence Cases," by A. L. Levinsky, attorney Stockton Electric Railway, Stockton, Cal.

Question box discussions:

"What Methods Should Be Adopted to Obtain the Best Results in Our Relations with Private and Public Hospitals," led by C. M. McRoberts, claim agent Los Angeles Electric Railway, Los Angeles, Cal.

"Obtaining the Good Will of Employees in Accident Prevention," led by B. F. Boynton, claim agent Portland Electric Power Company, Portland, Ore., and followed by S. E. Mason, general manager San Diego Electric Railway, San Diego, Cal.

Association members are also invited to prepare papers on any topic which they think will be of value.

vate automobile has demonstrated the necessity of developing a rail vehicle which is attractive to patrons and fast schedule speed is an essential feature. There are, of course, many things which affect schedule speed, but a car must first be provided with motors and control that have the capacity and characteristics to perform the fast schedules desired.

Schedule speed in frequent-stop city service is primarily a matter of rapid accelerating and braking, and if car movement is speeded up more motor capacity is required. It is not desirable to apply heavier motors to secure more horsepower per car, since car weight is increased and larger wheels may be necessary. High-speed motors and drives which have been developed provide maximum horsepower, minimum weight and ample clearance.

The high-speed motor is available in two sizes, 35 and 50 hp. The weights complete with gears and gear case are 1,000 and 1,350 lb. respectively, and these figures compare with 1,475 and 2,300 lb. for standard motors of the same horsepower. The 35 and 50-hp. high-speed motors can be applied on cars of a size now equipped with 25 and 35 hp. equipments to provide the necessary additional capacity for securing high schedule speeds.

A feature of the two high-speed motors mentioned which has a direct bearing on schedule speed improvement is the adaptability for application on small wheels. The 35-hp. motor can be used on 22-in. wheels and the 50-hp. motors on 24-in. wheels with ample clearance, 4½ in. under both motor and gear case, a material increase over what is obtained with present standard equipment. The lower car floor level possible with the high-speed motors contributes to ease of passenger interchange and safety, while low steps insure rapid movement of riders into and out of cars.

An important accomplishment of the high-speed motor and drive is the reduced unsprung weight obtained with the assembly of truck, motors and gears. The complete motor and one-half of the weight of the gear unit are spring supported, reducing the force of the "hammer blows" at rail joints and special work.

Comparison of spring supported and unsprung weights of standard 25 and 35-hp. motors with the 35-hp. high speed motor including gears and gear case shows that the latter saves 345 lb. per axle or 1,380 lb. per car unsprung weight compared with the standard 25-hp. motor, and 575 lb. per axle or 2,300 lb. per car compared with the standard 35-hp. motor.

Where the changes in speed are uniform high accelerating and decelerating rates are not objectionable. Accelerating and braking rates of 3 m.p.h.p.s. appear feasible.

Light-weight pneumatic and magnetic remote control are recent developments. The inductive effect of the new edge-wound type resistor lowers the accelerating current peaks, permitting more rapid rates without discomfort to pas-

New Car Designs Are Here*

By R. L. HERMANN

Transportation Manager Southwestern District Westinghouse Electric & Manufacturing Company, St. Louis, Mo.

DEPARTURE from conventional designs of the past is required if the surface car is to meet operating conditions of today and keep pace with the developments of the future. Safety, speed, comfort and ease of passenger interchange are the primary considerations which influence design. Comfort, of course, includes such features as pleasing appearance and quiet operation.

The first departures from conventional designs were initiated by the Springfield Street Railway and the Chicago & Joliet Electric Railway. These two railway properties each designed and constructed a car equipped with Timken worm-drive axles and Westinghouse high-speed motors. The interesting mechanical features are: motor weight entirely spring supported, high-speed, light-weight motors operated two in series on 600 volts, high gear reductions, automotive-type brakes and quiet oper-

ation. Additional cars utilizing this type drive have recently been placed in service, or are about ready for operation, in Boston, Cleveland, Cincinnati, Montreal, Pittsburgh and St. Louis.

The second progressive step in modern car construction was the introduction of the Brill 1928 model which embodies the application of Westinghouse high-speed motors, connected two in series for 600-volt operation, and W-N drive. The mechanical features mentioned in connection with the Springfield and Joliet cars are also included. The car has a pleasing interior and exterior appearance and provides speed with comfort and safety. Cars with this type of motor and drive either are being operated or are about ready for service in Chicago, Cincinnati, Houston, Montreal, Oakland, Pittsburgh, Parkersburg and Richmond.

The need of quick and comfortable transportation is the principal factor that is leading to the introduction of a new type car. Competition of the pri-

*Abstract of paper presented before the Midwest Electric Railway Association, Kansas City, Mo., June 4-6, 1928.

sengers. The weight saving is some 70 per cent in comparison with alloy grids.

Dynamic braking as a means of securing more rapid braking and utilizing the energy wasted in braking for car heating during the winter months with control equipment developed for such applications is being tried on cars in Joliet and Pittsburgh. Two sets of resistors are used, a special heater type mounted within the car, the other, the edge-wound type located beneath the car. The duty on the traction motors is increased considerably, necessitating the use of larger motors and more complicated control equipment. The value of the reclaimed energy for car heating depends on the temperature normally maintained within the cars and the cost of power, both local considerations.

The results obtained with a single car in Joliet, as outlined in an article recently published in *ELECTRIC RAILWAY JOURNAL*, indicate a very favorable performance. The equipment in service in Pittsburgh has not been operated a sufficient length of time to determine its economic value.

The new type cars which have been built indicate that the street railway industry is endeavoring to improve the character of service provided for car riders. It is evident that the electrical equipment and mechanical features are the subject of careful study and test in an effort to secure improved operating units. Further development may be expected, and the surface car of the future will differ in many respects from the present day conventional design.

companies struggling to keep afloat while operating under the onerous and exacting terms of an antiquated and hopeless franchise, and again there are companies with so complicated and fearsome a financial structure that any new financing for additions and betterments, however necessary, is made difficult on any reasonable basis or, not infrequently, impossible on any basis. In either of these situations, and there have been companies cursed with both, the owners and their managements should face it squarely and courageously. Nothing is to be gained by blinking at the facts. If your own house is in order, if your record for service and straightforward, honest dealing is clear, then you can go to the city authorities and get from them a new franchise under which you can live and operate successfully, because at all times, and never more acutely than to-day, their interest and your interest is absolutely common.

If your corporate financial structure is such a misfit and so badly conceived as to make difficult or impossible new financing, then you would better undertake voluntarily to put it right before you are forced to a drastic and involuntary reorganization. If we are to enjoy a clear field, and this is what we all must have, then we must expect to meet adequately all fair demands for service. We must take the bitter with the sweet, we must give honest and good service, and we must keep abreast of the times; in other words, our equipment must be modern and the character of our service such that no reasonable man may complain.

I think we all can learn a great deal about this business if we study what has happened in Cleveland during the past few years. In that city has been evolved, after years of bitter controversy and travail, what I believe to be the most workable and satisfactory franchise in effect anywhere in this country. This franchise is not only satisfactory to the company, but the people as well. Cost of the service is the basis or foundation on which has been reared the structure of the Cleveland Railway. The functioning of this franchise is largely automatic and the effect has been to eliminate the company as a football of politics. The result is a property second to none in its physical aspects, a service almost universally satisfactory to the car riders of Cleveland because they themselves, through their accredited representatives, are dictating what that service shall be, and a company on a sound and stable financial footing, one abundantly able to finance on a reasonable basis the cost of any betterments or extensions demanded by the people.

There seems to be no good reason why the rest of us cannot accomplish substantially the same result. Your lawyers may tell you it is difficult of accomplishment in your particular city, or under the laws of your state, but so long as the thing aimed at is clean, and decent, and constructive, I cannot be convinced that a way may not be found for its accomplishment.

Play the Game Square*

By J. N. SHANNAHAN

President Omaha & Council Bluffs Street Railway, Omaha, Neb.

NEVER has there been a time when the future of the electric railway as such was more shrouded with uncertainty than at the present moment. Never has there been a time when it was so necessary that the owners and those charged with the management of these great properties should take their courage in their two hands and go out to do battle for them.

In this day and age the manager of an electric railway not only must have experience to enable him accurately to judge of the problems that confront him, but sand in his crop and brains in his head.

The history of American business contains but few instances of an industry called upon to face so many apparently insuperable obstacles, one so menaced by enemies from without and divided councils within. I believe there are but few, if any, economists or students of the situation who believe that the electric railway can be wiped out except with disastrous results to the communities they serve. The cities of this country must be served by a system of local transport, and in my judgment the backbone of it will continue to be the car running on rails.

The cities that for any reason permit the transportation companies serving them to be destroyed or starved out of existence, will presently find themselves lagging behind their more far-visioned sister municipalities.

Except in certain outstanding instances it seems to me that we ourselves have not met the fast-changing situation with as much courage as we should have, and certainly not with far-sighted vision of our opportunities, to say nothing of our duty.

I believe in the essential fairness of the American people, and that they can be depended on to decide justly and fairly any question with which they are

confronted. When they fail so to do I believe a study will show that it was because the question was not clearly understood by them. And nine times out of ten this is due to the true situation not having been presented in a fair, adequate and understandable way. In my mind there is no doubt if our own houses are in order, if we are meeting our responsibilities squarely and fully, and we and our co-workers are courteous and considerate of the public and its demands, that we can get a fair deal and sympathetic consideration of our difficulties and problems. But to get such consideration, gentlemen, we must come clean. We must put the cards on the table face up. This may sound so trite as to make you smile, but I want to say to you that too many times have I observed a man negotiating with the municipal authorities holding out some vital fact or information that he thought, or imagined, would help to effect a settlement more favorable than would otherwise be obtainable. When this sort of thing is "pulled" we call it sharp practice, and it is exactly that, no matter who "pulls" it. There is no more sure and certain way to forfeit public confidence than to pretend to play the game with the cards face up on the table. And without public confidence any utility man is "sunk." He is "through," and so far as being of any service to the company he is there to administer, he might just as well leave town.

The American people are quick to detect pretense, and relentless when they have unmasked the man who is but pretending to play fair. One false move, one instance of corrupt use of money, and years of straight dealing go by the board, affecting not only ourselves and our own properties, but, indirectly, bringing discredit and suspicion on our innocent associates in the utility field. There are two respects that occur to me in which some of us may help ourselves, and help to put our properties on a sound and stable footing. There are

*Paper presented before the Midwest Electric Railway Association, Kansas City, Mo., June 4-6, 1928.

Conditions of Miller Welding Award Changed

NO PAPER submitted to the Samuel Wylie Miller Medal board of trustees of the American Welding Society during the calendar year 1927 was of sufficient value to merit the yearly award, established by Past-President Miller. The board has, therefore, revised the conditions under which the medal may be awarded, as follows:

1. The medal may be awarded annually for any meritorious achievement which, in the judgment of the board of trustees, has contributed conspicuously to the advancement of the art of gas fusion welding and cutting, or the art of electric arc fusion welding and cutting.

2. The award for any calendar year shall be announced and the medal, together with a suitable certificate, presented at an annual meeting or a fall meeting of the society, as the board of trustees may elect.

The conditions governing the award of this medal have been made very broad so that it can be granted for an achievement of any character which has contributed conspicuously to the advancement of either of the two branches of the welding art which are specifically mentioned. Thus, the award may be made for a meritorious paper or an invention, or a conspicuous application of welding in industry which has advanced the art either on account of unique technical features or important economic advantages. The award may even be made for conspicuous service of a non-technical character which distinctly advances the welding art.

California Association Meets

MANY interesting addresses and papers were presented at the California Electric Railway Association annual meeting held in the Cliff Hotel, San Francisco, May 7-8.

Samuel Kahn, president Market Street Railway, opened the meeting with an address outlining the Byllesby policies which have been put into effect during the two years the San Francisco property has been under Byllesby management. Other papers presented were: "Opportunities for Greater Co-operation," by R. B. Hill, Los Angeles Railway; "Problems and Possibilities for Increasing Patronage," by J. P. Potter, Key System Transit Company; "Re-examination of Employees," by Dr. W. L. Weber, Pacific Electric Railway; "The Motor Coach from an Engineering Standpoint," by P. B. Harris, Los Angeles Railway; "What and When to Buy, and Obsolete Material," by C. Thorburn, Pacific Electric Railway; "Economics in Shop Practice," by J. W. Delaney, Market Street Railway; and "Cost and Necessity of Detail Analysis," by R. O. Crowe, Los Angeles Railway.

A banquet was presided over by E. H. Maggard, president and general manager, Northwestern Pacific Railroad, at which E. C. Thomas, manager public relations department, Pacific Electric Railway, was the principal speaker. Mr. Thomas dealt with the public relations

problem as it exists within an organization.

Election of officers was postponed until such time as a meeting of the executive committee can be held. The next annual meeting of the association is to be held in Los Angeles during May, 1929.

Wisconsin Accountants' Program

ANNOUNCEMENT has recently been made of the program for the Milwaukee, Wis., meeting of the Wisconsin Utilities Association, Accounting Section, to be held at the Hotel Pfister, June 21-22, as follows:

THURSDAY, JUNE 21

9 A.M.

Registration.

10 A.M.

Chairman's remarks—D. W. Faber, Wisconsin Public Service Corporation, Milwaukee.

"The Story of the Electric Utilities as Presented Before the Legislative Committee," by E. J. Steinberg, service engineer Milwaukee Electric Railway & Light Company.

Discussion.

"An Accountant's View of Municipal Ownership," by Karl F. McMurry, certified public accountant, Madison.

Discussion.

Report of the committee on statistics.

Announcements.

12:15 P.M.

Luncheon Talks

"Proper Basis of Value of Public Utility Securities," by Paul M. Binzel, buying department Morris F. Fox & Company, Milwaukee.

"Making the Office More Convenient for the Customer," by Frank A. Coffin, commercial manager Milwaukee Electric Railway & Light Company.

2:30 P.M.

Inspection trip through offices of the Milwaukee Electric Railway & Light Company.

6:30 P.M.

Annual Accounting Section Dinner.

Dancing.

FRIDAY, JUNE 22

9:30 A.M.

Report of the committee on classification of accounts; chairman, John Dockendorf, the Milwaukee Electric Railway & Light Company.

Discussion.

"Field Auditing," by L. G. Roemer, Wisconsin Public Service Corporation, Milwaukee.

Discussion.

"The Position of the Railroad and Utility Commissioners on State vs. National Control and Regulation," by Lewis E. Gettle, chairman Railroad Commission of Wisconsin.

Discussion.

Report of the nominating committee and election of accounting section officers for the coming year.

1:30 P.M.

"One-tenth of One Per Cent." by

Stephen A. Bialecki, credit manager the Milwaukee Gas Light Company.

Discussion.

"Centralized Stores Accounting," by A. A. Meisenheimer, general storekeeper the Milwaukee Electric Railway & Light Company.

Discussion—Led by L. C. Christensen, Wisconsin Public Service Corporation, Green Bay.

"Cost Accounting of the Operation and Maintenance of Farm Line Extension," by J. E. Gray, auditor Wisconsin Power & Light Company, Madison.

Discussion.

Plans for C.E.R.A. Outing Completed

IN ADDITION to the addresses and committee reports, ample entertainment has been arranged for every one attending the Central Electric Railway Association annual outing at Cedar Point, Ohio, June 28-29, including games for children, indoor baseball, bridge for the ladies, a golf tournament at the Plum Brook Country Club, and dancing. The program, which has just been completed, is as follows:

THURSDAY, JUNE 28

9:30 A.M.

Address of welcome, by the Mayor of Lake Erie.

Address of the president, by W. S. Rodger, general traffic manager Detroit United Lines, Detroit, Mich.

"What Does the Future Hold for Interurban and City Lines in the Middle West?" by Charles W. Chase, president Gary Railways, Gary, Ind.

"Outside Observations of the Electric Railway Industry," by H. V. Bozell, Bonbright & Company, New York, N. Y.

2 P.M.

Meeting of executive committee.

6:30 P.M.

Association dinner and entertainment (informal).

FRIDAY, JUNE 29

9:30 A.M.

Reports of Committees

Constitution and by-laws, by F. D. Carpenter, chairman, president Western Ohio Railway Co., Lima, Ohio.

Supply men, by E. H. Arnott, chairman, manager Central Service Bureau, Indianapolis, Ind.

Power supply and distribution, by R. J. Custer, chairman, engineer way and structures Interstate Public Service Company, Columbus, Ind.

10:30 A.M.

"Employees Welfare and Publicity Work," by Clinton D. Smith, superintendent department of personnel Cleveland Railway, Cleveland, Ohio.

"Employees Education and Salesmanship," by R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company, Youngstown, Ohio.

Report of committee on promotion of more profitable business, by L. G. Tighe, chairman, assistant general manager Northern Ohio Power & Light Company, Akron, Ohio.

Address, by J. B. Dugan, secretary Public Utilities Commission, Columbus, Ohio.

Adjournment.

Need for Progress Stressed at New York State Meeting

MORE intelligent use of available street space, more scientific selection and training of employees, application of common sense and fair dealing in the improvement of public relations, and better facilities for equipment maintenance were urged at the annual meeting of the New York Electric Railway Association held at Coney Island, N. Y., on June 14-15, 1928.

The meeting, which completed the 46th year of the association, was replete with papers urging the need for a changed viewpoint and improved methods suited to meet present day transportation conditions. President W. G. Gove presided. Speakers included J. A. Miller, Jr., editor *Aera* and associate editor *ELECTRIC RAILWAY JOURNAL*; H. S. Simpson, traffic engineer Essex County, N. J.; L. S. Storrs, managing director American Electric Railway Association; C. P. Segard, assistant secretary Third Avenue Railway, New York; A. L. Hodges, assistant general manager Brooklyn City Railroad; R. R. Hadsell, general superintendent of transportation New York State Railways, Rochester; Dr. Philip Conroy, chief surgeon New York State Railways; B. J. Yungbluth, president International Railway, Buffalo; Hugh Savage, superintendent of equipment Brooklyn City Railroad; Niles Persons, superintendent surface lines shops, Brooklyn-Manhattan Transit Corporation; E. C. Brandt, assistant works manager Westinghouse Electric & Manufacturing Company.

TRAFFIC RELIEF WITHOUT EXCESSIVE COST

Substantial relief from existing street traffic congestion can be obtained without the enormous expenses involved in many proposed remedies. This was pointed out in Mr. Miller's paper. He argued that the capacity of present streets can be increased several hundred per cent by utilizing the entire roadway for moving traffic, and by utilizing

signal lights effectively to speed up the movement. Despite all that can be done to increase the efficiency of traffic movement, however, the majority of riders must continue to use public transportation vehicles. Agencies which furnish public transportation will benefit by anything that improves general traffic conditions, according to Mr. Miller.

In discussing this paper, Mr. Simpson condemned as impractical the visionary schemes of multi-level cities of the future, which have become the vogue in Sunday newspaper supplements. He compared the costly construction of Wacker Drive in Chicago with the comparatively inexpensive installation of co-ordinated traffic lights, and the "no-parking" regulations which have afforded more relief than the half-mile of double-deck street. Traffic lights should be installed as the result of engineering study, he said, not as the result of manufacturer salesmanship.

Mr. Storrs pointed out that public transportation vehicles should be so operated as not to impede other traffic. More rapid acceleration and braking are needed. Public transportation officials must take the lead in the solution of the traffic problem.

Electric railways have given more attention to the selection of their equipment than to the selection of their men, according to Dr. Segard. Man power, however, determines production and quality of service. Greater attention should be given to the selection of men.

Mr. Hodges spoke of the necessity of finding the right job for every employee. His training should continue as long as he is employed by the company. Mr. Hadsell pointed out that it is desirable to have more than one examiner pass on each applicant for employment, as frequently a second or third interview will disclose things which escape the earlier examiners. Dr. Conway emphasized the need for stringent examinations of the eyesight of applicants for employment on electric railways.

Under the title of "How I.R.C. Is Building Good Will," Mr. Yungbluth characterized the International Railway's efforts to improve its relations with the public of Buffalo, as merely the application of common sense to the job of winning public confidence and good will. To illustrate the methods used for developing a spirit of teamwork among employees and for telling the railway company's story to the public, large photographs of typical employee activities and reproductions of publicity material were displayed in the meeting room.

Lack of progress in car cleaning methods was emphasized in the paper by Mr. Savage. He drew a striking comparison between the progress made in many phases of railway operation and maintenance, and the comparative inefficiency of available car cleaning methods. The attention paid to keeping cars clean, he held to be out of proportion to the importance of clean and sanitary equipment in affecting riding and public attitude toward a transportation company's service.

Niles Persons carried the discussion of equipment maintenance further in a paper outlining the need for adequate electric railway shop and machine facilities. He described briefly the new shops and equipment recently completed by the Brooklyn-Manhattan Transit Corporation in Brooklyn, both for the maintenance of surface and rapid transit equipment. The manufacturer's view of the electric railway maintenance problem was presented by E. C. Brandt. He argued for the use of high-grade replacement parts, supplied preferably by the original manufacturer of the equipment, and explained the organization and viewpoint of the Westinghouse renewal parts division. Mr. Brandt attributed the practice of home manufacture of parts by many railway properties to the failure by the manufacturer in the past adequately to understand the operators' replacement parts problem.

J. M. Fitzgerald, a member of the Eastern Conference of Railroad Executives, was the principal speaker at the dinner on Thursday evening. He outlined the development of transportation in the United States, citing the motor vehicle and the airplane as the most recent addition to the companies' permanent transportation facilities. He deprecated the expenditure of public money in visionary and economically unsound waterway transport schemes and pleaded for a spirit of fair play in dealing with transportation, strong enough to resist personal or community advantage at the expense of the general good.

Upon recommendation of the nominating committee, presented by its chairman, H. B. Weatherwax, the following officers and directors were unanimously elected for the ensuing year:

President, W. E. Thompson, vice-president Third Avenue Railway, New York;

Association Papers Coming!

SO MANY excellent papers and addresses have been presented at the recent meetings of the Midwest Association, the Canadian Association, the New York State Association and the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, that it has been entirely impossible to publish them all in this and the preceding issues. Many of them are referred to in the general reports of the meetings published in this and last week's issue. Watch for the articles!

First vice-president, Ernest A. Murphy, general manager United Traction Company, Albany;

Second vice-president, Roy R. Hadsell, general superintendent of transportation of the New York State Railways, Rochester;

Third vice-president, A. L. Hodges, assistant general manager Brooklyn City Railroad;

Secretary-treasurer, W. F. Stanton,

assistant to president New York State Railways, Rochester;

Executive committee: W. S. Menden, J. F. Hamilton, S. W. Huff, H. B. Weatherwax.

Friday was devoted to an inspection of the new Brooklyn-Manhattan Transit shops at Coney Island, which are considered the largest and best equipped electric railway maintenance shops in the world.

New Bulletins

SEVERAL special reports are being prepared by the Bureau of Information and Service of the American Electric Railway Association and will be available upon request. These are:

Bulletin No. 202—Operating Costs of Electric Railway Motor Bus Lines 1927.—Based on the reports of all companies that have reported their operations. There is also shown a comparison of operating costs in 1927 and 1926, based on those companies that were able to report data for two full years. The operations have been classified as city, interurban, or combination city and interurban service, and a separate statement and analysis of cost prepared for each class. Details of average operating expenses are given for each group.

Bulletin No. 203—Comparison of Electric Railway Operating Conditions, Operating Expenses and Results of Operation on Various Unit Bases 1927—Part I, City Lines.—This is a tabulation of comparative unit figures and ratios derived from the operating reports of electric railways for 1927. The cities are grouped according to their population and there is shown for each city riding habit, average speed, number of revenue passengers, car-miles per mile of track and per car operated, revenue per mile of track, operating ratio, number of passengers per car-mile, proportion of passengers using transfers, cost of maintenance of plant and equipment per car-mile, per unit of property maintained and in percentage of total operating expenses. The operating expenses as distinct from maintenance expenses are also given on comparative unit bases and in percentage of total expenses.

Bulletin No. 204—Relief from Paving Burdens.—An up-to-date review of developments in the movement to obtain relief from state and municipal requirements to pave, repave or maintain the pavement along the electric railways' tracks, with accounts of all cases in which relief has been obtained. It contains all of the cases included in Bulletin No. 125, issued Feb. 1, 1927, and, in addition, it covers all cases in which relief from paving has been obtained since that date.

Bulletin No. 205—Excursion and Chartered Bus Rates.—A tabulation of the rates charged by electric railways for special bus excursion trips and also the rates fixed for chartered buses, based on answers of 166 electric railways to a questionnaire on this subject.

The following supplements also have been prepared, bringing the information they cover down to date.

Supplement No. 8 to Bulletin Nos. 163 and 164: "Electric Railways Fares."

Supplement No. 3 to Bulletin No. 188: "Wages of Trainmen."

Supplement No. 3 to Bulletin No. 189: "Wages of Bus Men."

Cost of Living Studies (Bulletin No. 206).

American Association News

Engineering Program

CHAIRMEN of the various standard committees of the Engineering Association outlined their programs for submission to the executive committee at a meeting held at the Association headquarters, New York City, June 12. Those present were: Howard H. George, chairman; John Y. Bayliss, W. E. Bryan, and A. T. Clark.

There will be three sessions, on the afternoons of Monday, Wednesday and Thursday. The sessions for Monday and Wednesday will be divided into the various divisions of power, rolling stock, track, and purchases and stores. A joint session will be held on Thursday. In the rolling stock division reports of special committees will be presented on Monday. On Wednesday it is proposed to have two papers presented. The subjects suggested were lubrication and trends in new rolling stock.

In the way and structures division reports of special committees will be presented on Monday and Wednesday. There will also be a number of short addresses on both of these days made on subjects which are of outstanding interest to track and way men.

In the purchases and stores division the Monday meeting will be devoted to presentation of papers dealing with the high spots which have been studied by various committees of the division during the past year. On Tuesday it is proposed to have a luncheon conference, and Wednesday will be taken up by a joint session with the accountants. At this session papers will be presented which are of joint interest to both divisions.

The general and business session of the engineering association will be held Thursday. In addition to the various routine reports, election of officers, etc., at that meeting, there will be a paper of general interest presented. The subject suggested is economics of labor-saving machinery.

Motor Brushes

DISCUSSION of methods for reducing side wear of motor brushes formed the principal topic at a meeting of rolling stock special committee No. 8, motor brushes, held at association headquarters, New York City, on June 6. Those present were R. A. Hutchins, chairman; H. E. Childs, J. Markel,

F. W. McCloskey and R. D. Voshall.

Tests and investigations made by the committee showed that side wear is due largely to dust and dirt that gets into brush-holders. Side wear of brushes is much greater with the ventilated type motor, and manufacturers have been altering designs so that ample ventilation is obtained without drawing in air with dust so that dirt is deposited on brush-holders.

The committee has investigated numerous means that are being tried to reduce side wear and the report will include results accomplished. Limits of wear for brush-holders and brushes were agreed upon.

Current Collecting Devices

ROLLING stock committee No. 11, current collecting devices, held a meeting at association headquarters, New York City, on May 21. Those present were Hugh Savage, chairman, H. S. Murphy, W. Schaake, and R. E. Wade. The committee went over a tentative report of the work done during the past year, and made suggestions for additions and corrections.

This year's study has been devoted to three classes of current collecting devices: (1) Wheel collector with pole; (2) sliding shoe collector with pole and base; and (3) pantograph collector with sliding contact. Information was collected by means of questionnaires. These have been analyzed and the various types in use have been tabulated with a view toward standardization. An effective means of visualizing the answers to the questionnaire is used by the committee in the form of spot diagrams. This shows the results in such a manner that the reader can see at a glance just what the answers were. Tabulations on trolley wheels gave information on the shape of groove, depth of groove, width of wheel, diameter of axle pin, length of bearing and thickness of bushing. Proposed standard trolley wheels were discussed and will be incorporated in the report.

Information on standard length for trolley poles has been assembled and analyzed. Design of trolley base that meets most general conditions of railway service will be presented by the committee, together with standard recommendations for certain details that are considered essential.

News of the Industry

Nine Cents in East Cleveland

Arbitrators authorize Cleveland Railway to install sliding scale in suburb. Await probable change in Cleveland Heights

THE Cleveland Railway recently won its plea for a higher car fare in East Cleveland, Ohio. An award was made by Arbitrators E. W. Doty and Charles Higley fixing the rate for a through ride between Cleveland and East Cleveland at 9 cents, with six tickets for 50 cents. Charles M. Buss, the third arbitrator, refused to sign the award, charging the increase was not justified by the evidence. The award established a sliding scale of fares for East Cleveland, rising or falling with the Cleveland rate, with a variable differential. The differential will be in effect only for a ride between Cleveland and East Cleveland. For a local ride between any two points in East Cleveland the fare is to be the same as that charged in the city of Cleveland.

A complete schedule of fares was established for a through ride from Cleveland to East Cleveland, with a different rate for each possible Cleveland rate. If the maximum rate of 10 cents, six tickets for 50 cents, should go into effect in Cleveland, the East Cleveland rate would be 13 cents, four tickets for 50 cents. If the minimum rate of 2 cents should go into effect in Cleveland, the rate for East Cleveland would be 3 cents, eighteen tickets for 50 cents. Between these two extremes, seventeen intermediate steps are set up.

The new rate goes into effect on June 19 for a period of five years. In the last five years, East Cleveland has been paying the same rate of fare as Cleveland. Although the basic rate in the East Cleveland franchise is 5 cents, this is modified by provisions that the fare shall never be less than the Cleveland rate and that the rate may be the subject of arbitration every five years.

The award is a milestone in the history of Cleveland railway affairs. It is the first time in the eighteen years' history of the Taylor grant that the service-at-cost provisions will have been extended to a suburb. There is considerable expectation that the same differential will be acceptable to Cleveland Heights, which has been negotiating for three years for a new franchise and extensions, and that eventually Lakewood, the third large suburb of Cleveland, may be prevailed upon to accept the differential.

Since about half the traffic on lines entering suburbs originates in the suburbs, the losses in suburban operations have been one of the large factors in increasing the Cleveland rate of fare. Another factor responsible for a 7-cent fare in Cleveland is the obsolete and costly routing of some of the Cleveland

Railway lines under the direction of the Cleveland City Council. Receipts of the Euclid Avenue line will be increased by \$150,000 to \$175,000 a year as a result of the East Cleveland award. This will postpone for a long time the prospect of any further increase in the Cleveland rate of fare even if there is no appreciable increase in the number of passengers carried.

In an *obiter dictum* attached to the end of their opinion, the arbitrators took occasion to urge the Cleveland Council to adopt a zone system of fares. The East Cleveland situation is com-

plicated by the fact that the city of Cleveland extends east of the suburb. Both East Cleveland lines run from Cleveland, through East Cleveland and terminate in Cleveland. The Cleveland riders living beyond East Cleveland will get a longer ride than the East Clevelanders, and they will still pay the Cleveland rate of fare.

The problem is complicated for the Cleveland Railway by the need for devising some system that will offer the least inconvenience in distinguishing between Cleveland and East Cleveland riders.

Terminal Lease Approval

I.C.C. authorizes Illinois Terminal Company to lease lines of St. Louis, Troy & Eastern, St. Louis & Illinois Belt, St. Louis Electric Terminal and main division of Illinois Traction

FOLLOWING the decision of the Interstate Commerce Commission authorizing the Illinois Terminal Company to acquire control of four other steam and electric lines serving St. Louis and many points in Illinois—the St. Louis, Troy & Eastern, the St. Louis & Illinois Belt Railway, the St. Louis Electric Terminal Railway and the lines comprising the main division of the Illinois Traction, Inc.—the Illinois Power & Light Corporation

purchased all the stock of the Illinois Terminal Company for \$7,500,000.

Clement E. Studebaker, president of the Illinois Power & Light Corporation, was made chairman of the board of the new company, and George M. Levis, president of the Illinois Terminal Company, and William E. Levis, also a stockholder of the Illinois Terminal Company, were made members of the board of the new company. Officers of the new company are: L. E. Fischer, president; H. H. Ferguson, vice-president in charge of the steam division; D. W. Snyder, vice-president in charge of the electric division; Henry I. Green, general solicitor; George T. Buckingham, general counsel; P. L. Smith, treasurer, and D. H. Holmes, secretary. These officers are also members of the board of directors.

In concluding its decision authorizing the Illinois Terminal Company to acquire control by lease of the four railways mentioned the Interstate Commerce Commission summarized the advantages from the standpoint of public interest taking cognizance of the testimony of an executive of the Illinois Power & Light Corporation. That official said that it was a matter of great importance to the people of central Illinois that the service of the Traction Company be preserved and that this would not be possible without the kind of relief proposed; that the contemplated economies would be of benefit to the shippers because the savings would ultimately be reflected in tariff reductions; and that the unified and improved system would promote development of the territory served. Finally, it was urged, the applicant's proposals would conform to public policy in effecting a union of weak and strong lines. Witness insisted that the proposals were not in-

200 Industries on New Belt Line

THE joining of facilities of these several companies gives this unified transportation system the benefit of a vast amount of freight tonnage in the Alton industrial district, the industrial district to the east of the Mississippi River at St. Louis and the coal territories; as well as an outlet via the Illinois Traction System to the north and through interchange with other railways to any point in the United States and Canada.

In effect, these lines form an outer belt around a section which promises to be one of the country's greatest industrial regions. With Alton on the north and Belleville on the south they link it directly to St. Louis by way of the McKinley Bridge, and reach out by steam and electrified lines to central and northern Illinois, and connecting lines to other points. The system serves exclusively more than 200 industries and reaches 3,000 others through reciprocal switching arrangements.

tended to work injury to any other carriers. It was hoped, through expedited service, to obtain a normal amount of business, but it was not intended to develop a switching road.

The commission held that the proposed acquisitions of control would be approved upon condition that, so far as lay within its power, and unless and until otherwise ordered, the applicant should preserve existing routes and channels of trade and commerce established by other carriers in connection with the applicant or by the applicant in connection with other carriers, maintain existing gateways for the interchange of traffic with such carriers, and continue the present neutrality of handling traffic by the applicant, so as to permit equal opportunity for service and routing or movement of traffic which may be competitive with traffic of the unified system to and from all lines connecting with the applicant's line, so long as the carriers operating those lines desire the maintenance of such existing routes, without discrimination in service against such competitive traffic.

Upon the facts presented, the commission was of the opinion that the proposed leases would be in the public interest; and that the considerations and terms and conditions of the proposed leases were just and reasonable.

In connection with the approval of the purchase of all the stock of the Illinois Terminal by the Illinois Power & Light Company certain provisions follow in part:

Except as to parties and rentals payable to the lessors, the terms of the proposed leases are to be substantially identical.

They are to be dated as of Jan. 2, 1928, and are to be for 99 years, beginning Jan. 1, 1928, but may be sooner terminated at the option of either party upon six months prior notice in writing or by default. The annual rentals payable to the respective lessor companies are as follows:

The Traction Company, \$650,000; the Electric Terminal, \$190,000; the Troy and the Belt, \$160,000; total, \$1,000,000.

In support of the applicant's proposals herein, it is urged that operation of the properties of the applicant and of the lessors under common control and management will result in large economies in the costs of operation, better service through more prompt and expeditious movement of traffic, preservation of the service performed by the traction company, and opportunities for the development of coal fields and for the location and expansion of industries along the routes traversed by the lines of the proposed unified system.

Each of the operating carriers serves territory not served by any of the others, so that none of the proposed lessors compete with the applicant or with each other.

The proposed rentals are just and reasonable, it is contended, because they bear an appropriate relation to investment, are sufficient to provide for fixed charges of the lessors, and are within the unified system's earning power as demonstrated by past experience.

The Terminal Company owned and operated 15 miles of railroads in Madison County, Ill., and several miles in St. Clair County. The Troy, also an Illinois Corporation, owned and operated lines in southern Illinois. About five miles owned by the Belt was under

lease by the Troy. The Electric Terminal, a Missouri corporation, owned and operated an electric railway from Granite City, Ill., to St. Louis. The Illinois Traction, Inc., was formed in 1923 under the laws of Illinois by the consolidation of five constituent electric railways.

Originally conceived primarily for the transportation of passengers, the traffic of the lines comprising the Illinois Traction Company's system has been materially affected by extensive construction of improved highways in the territory served. Practically all the lines are paralleled by one or more hard roads and the Traction Company is facing motor-vehicle competition over practically every mile of its lines. The ratio of the passenger revenues to total earnings has declined steadily from 83

per cent in 1910 to 43 per cent in 1927. This change in the business of the system has been accompanied by substantial losses. Thus, although dividends aggregating \$455,006 were paid in the period 1904-1907 and in 1917, losses sustained by the various proprietary interests from 1908 to 1916 and from 1918 to 1926 aggregate \$7,092,934, after crediting dividends received. In view of these and other considerations the commission agreed with the summary of the advantages of the proposed leases, from the standpoint of public interest as outlined by an executive of the Power company that it was a matter of great importance to the people of central Illinois that the service of the Traction company be preserved and that this would not be possible without the kind of relief proposed.

Commuter Fares Raised on Key System

Local fares kept at 7 cents. Company not getting a fair return. Censure for railway in not trying out commission's 5-cent zone plan

FINDING that the Key System Transit Company is now in serious financial difficulty, due to inadequate return from its transbay and local traction operations, the California Railroad Commission on May 29 authorized monthly commutation fares of \$6.50 between San Francisco and East Bay points, with the exception of Richmond, Point Richmond, Pullman and San Pablo, for which a monthly rate of \$7 was set.

The commission also took similar action with respect to the application of the Southern Pacific Company for an increase of transbay and local railway fares.

The monthly commutation fare between San Francisco and points on the Southern Pacific interurban lines is fixed at \$6.50, with the exception of Sequoia Avenue, where the rate is made \$6.65, and Dutton Avenue and Stonehurst, where the rate is made \$7.

The commission as indicated in the *ELECTRIC RAILWAY JOURNAL* for June 2, page 917, held open the proceedings with respect to local fares on the Key System Transit Company's lines until such further time as the company by resolution of its directors may petition the commission for authority to file fares

which it believes will most nearly meet the exigencies of the local situation.

Commissioner Seavey, in his opinion, points out that urban transportation is in a serious period of transition. Competition of the private automobile and buses is making serious inroads into, or is transplanting, the old method of transportation. In many instances the change has entirely taken place, either by a total abandonment, or by transplanting street railway service with automobile service.

Commissioner Seavey observes that the record seems to indicate that the wolf has been kept from the door of the street railway longer in those cities where there has been a direct assumption of municipal responsibility for operation, or full and open public cooperative arrangements between local authorities, and the utility, and concessions made on both sides, and experimental rates tried with joint approval. He felt he could not recommend any of the forms of experimental fares discussed in the hearings. He says:

Any such action would be in the nature of questionable experimenting with a situation extremely hazardous both to the applicant and to the public. The company itself should, if possible with the aid of local authorities, prepare the way for some form of fare experimentation, and other means of lessening the stress on this system, that appears to have more reasonable chance of success.

The order results in the one-way transbay fare of 21 cents remaining as at present on both the Key and the Southern Pacific systems, the commission holding in effect that the present one-way fare is as high as it could reasonably be made in comparison with local and commutation fares after the adjustment of the latter. The present 7-cent local car fare is also unchanged. The companies asked for fares of 25 cents and 10 cents, respectively.

Company Accepts Key System Decision

PRESIDENT A. J. Lundberg of the Key System Transit Company has issued a statement in which he says the company will accept the commission's decision. He is quoted as follows:

While the company did not receive the fare structure for which it applied, it will accept the present order of the Railroad Commission and will exert itself to the utmost to achieve every possible economy along the lines pointed out by the commission.

Commissioner William J. Carr filed an opinion concurring in part and dissenting in part from the majority opinion of the commission. He declared himself in general agreement with his associates that some substantial relief must be given the Key System, but that he is not in entire accord with the other commissioners as to the nature of the relief, or the kind of order which should be made. The rate of return on the cost of its properties is less than 3 per cent, he points out. Commissioner Carr says:

Questions usually important in rate proceedings are here unimportant, for here the question insistently forces itself to the front—"can any system of fares having some semblance of fairness between classes of riders be devised, which will make it possible for this company to exist and to continue to serve the great populations tributary to its lines?"

He calls attention to the fact that previous attempts of the commission to relieve the company's situation through increases in fares failed to produce the expected results. Instead of producing an annual increase of revenue of \$846,000 the increased fares produced an increase in 1926 of only \$280,000, and only \$135,000 increase in 1927.

Competition, both of the privately-owned automobile, and potential bus competition with the traction service, in the event that the fares are again increased, will most likely be the determining factor in fixing the rates that can be charged by the railway, he declares.

Commissioner Carr holds that any such increase of fares is futile if the public will not ride. Competitive and economic conditions have become far more potent than the order of any regulatory body such as the Railroad Commission, he states. To a very large extent the riding public fixes and determines the rate of fare.

Commissioner Carr agrees with his associates that increased transbay fares should be authorized, but there is a limit upon the fares which may reasonably be imposed upon this class. They should not have to carry the entire burden of the unprofitable traction system.

CASUAL RIDER SHOULD PAY INCREASE

Commissioner Carr favored leaving the commutation fares substantially unchanged and to seek increased revenue from the casual or occasional riders.

He agrees that the present fare structure is unreasonable in the sense that the fare does not yield any substantial return on the property. He does not believe that the commission would be warranted in ordering any other experimental plan of local fare than that proposed by the company, namely, a 10-cent fare with a \$1 weekly pass. However, Commissioner Carr is in entire accord with his associates that competitive and economic conditions will largely determine the level and kind of fares. He feels that any experimental fare structure to which the company is opposed would never receive a fair trial and would be sure to fail. He believes the company should be given

some reasonable latitude in establishing new fares which it believes will, under existing competitive conditions, yield something in the way of a return. He believes the company should be given an opportunity to try out its plan.

Commissioner Ezra W. Decoto also filed separate opinion concurring with the majority opinion, with one exception. He declares that from his study of the record in this case it is clear that there is no street car fare proposed, or that can be devised at this time, that will yield a greater gross revenue than the fare now in force.

BETTER POSITION WITH 6-CENT RATE

In his opinion Key System Transit Company would be in a better position now from the point of gross earnings if it had left in force the 6-cent fare. He points out that following the increase of 1 cent in the local fare there were 4,000,000 fewer rides in the first seven months it was in effect. He says:

These 4,000,000 rides did not vanish in the thin air. They represent people who took the automobile or to walking. This company cannot compete with the privately-owned automobile or with buses, or with the tendency of the people to leave the street cars, by raising the cost of street car travel.

Commissioner Decoto calls attention to the springing up of local business districts at short intervals throughout the transbay territory, ranging from a few stores to several blocks of stores, and including a moving picture house, seating upwards of 1,000 people. There are very few sections served by the company that are not within easy walking distance of these business centers. This has created a tendency to buy in the immediate vicinity of one's residence, thus lessening street car riding. A raise of fares would certainly tend to accentuate this tendency, he declares.

Commissioner Decoto calls attention to the fact that the commission has repeatedly emphasized that the solution of the Key System's difficulties lies in rigid economies, reduction in operating expenses, and the abandonment of duplication of services by it and the Southern Pacific Company. In his judgment complete operation of a one-man car system on the traction lines would save \$350,000 a year.

Commissioner Decoto believes also that regulation of street car fares seems to have passed from the realm of regulation by the commission into that of regulation by competition, and that the competition now furnished by privately owned automobiles will be augmented by competition by buses as soon as street car fares approach 10 cents. For this reason, he believes, that for the next several years, or until the community served by the company becomes most densely populated, the company cannot hope to obtain the rate of return usually allowed to public utilities, through any combination of street car fares that can be devised.

Commissioner Decoto does not concur in leaving the street car fares open for further consideration. He believes

that little additional can be learned by further study of the problems, and for this reason local fares should be fixed definitely at 7 cents and the case closed.

The Key System Transit Company has accepted the decision of the California Railroad Commission raising transbay commuter fares to \$6.50 from \$5.20 monthly but leaving all other rates unchanged. The rate decision adds only about \$175,000 annually to Key's income on the present traffic basis, whereas the company holds its needs at least \$1,000,000 additional annually. The company will attempt to meet the situation by severe economies.

Higher Rates on Cincinnati Interurban

Unless prevented by the Ohio Public Utilities Commission, increased fares will be charged by the Cincinnati, Hamilton & Dayton Railway beginning on July 1. Officials announced on June 9 that they had filed a new tariff with the commission. The new rate will average about 2½ cents a mile. This the company says is lower than that of any other transportation system between Cincinnati and Dayton, Ohio. Actual fare between the points, now \$1.30, will be \$1.40.

Officials said a year's operation following reorganization showed the fare was too low. The company just about "broke even" during the year. About \$2,000,000 was spent in improvements.

Seven Railroads Aligned Against Electric

Seven railroads opposing the extension of the Piedmont & Northern Railway in the Carolinas have filed suit in federal court at Greenville, S. C., asking to be made "parties defendant" with the United States government in a suit by which the Piedmont & Northern seeks to set aside an adverse ruling of the Interstate Commerce Commission on the extension project. Judge H. H. Watkins set June 12 as the date for the Piedmont & Northern to show cause why the petition should not be granted.

Simplifies Transfer in Denver

With the adoption of the one-man car on its major line, and to expedite the loading of passengers and incidentally relieve the car attendant from three or four movements in issuing transfers, the Denver Tramway, Denver, Colo., has issued a new and improved form of transfer slip. As opposed to the old ones on which the conductor punched the time, place of transfer and direction all he punches on the new form is the time. The passenger is privileged to transfer to any car line, going any direction at any intersection of the line from which he or she alights. The only restriction is that the passenger cannot use a transfer in either direction on the line of issuance.

Status of Cincinnati's Construction Explained

When, if ever, the underground "tube" of Cincinnati's Rapid Transit system will be utilized by trolley cars, the subway extended downtown and other changes made which were suggested in the Beeler report, seems to be still in doubt with the approach of the second half of the year. It was stated on June 4 by Frank Raschig, chief engineer of the city, that the construction work of the entire Central Parkway (the surface of the system) from Broadway to Ludlow Avenue, would be completed before Dec. 31. On that date, the life of the Rapid Transit Commission ends by mandate of the city charter.

The charter provides that the commission shall cease to exist "upon the completion of the rapid transit system and in any event not later than Jan. 1, 1929." It is regarded as improbable that even the submission to the electors of a negotiated lease and an additional bond issue will be made in years. The charter further provides that when the commission ends, "its powers shall be transferred to such officer or officers as the Council shall direct." Some of the powers, however, it is claimed, must legally rest in the City Council, since they are purely legislative. Executive and administrative powers are expected to be transferred to the city manager.

The Rapid Transit Commission, as now constituted, has been in existence about fifteen years. The present membership of five is headed by E. W. Edwards. At first the commissioners were unsalaried, but afterwards were paid \$3,000 a year each. These salaries were met out of bond issues, and legal right to do this was questioned, the matter being now in the courts. At the time the commission was organized, a real need was felt in the city for a rapid transit system, but with the increasing use of automobiles and the improvement of other transportation factors, operation of a rapid transit system such as that originally projected was felt to be so uncertain of returns that the Cincinnati Street Railway offered to operate cars on it only with suitable guarantees—guarantees which the city has not thus far felt justified in making.

Arbitration at Toronto

The members of the Toronto Street Railway employees' union have decided to submit their case to arbitration. D. W. Harvey, general manager of the Transportation Commission, has stated his satisfaction with the proposal. The principal point at issue is the question of a vacation for the men with pay similar to that granted by the city to other employees. The *Post* said:

Toronto is generally well satisfied with its railway system. It has confidence in the Transportation Commission and in General Manager Harvey, and believes they are wrestling earnestly and effectively with the problem of giving the public the best serv-

ice at reasonable cost. It does not desire, however, to see any injustice done to those upon whom the stress—and the success—of the service so largely rests. The decision to submit differences to a competent Board of Arbitration is highly satisfactory.

Another Move Toward Unification in New York

A plan of rapid transit unification which is substantially the proposal originally advanced by Samuel Untermyer, special counsel for the New York Transit Commission, will be submitted by Mr. Untermyer to the Transit Commission, the Interborough, Brooklyn-Manhattan Transit Corporation and Manhattan companies and the Board of Estimate soon after July 1. The plan is intended to be a basis for further negotiation between the city and the companies.

It is understood that the Brooklyn-Manhattan Transit Corporation representatives have indorsed the plan in principle, but the price which that company would be willing to accept for its subway and elevated lines is still far from agreed upon.

Transit Policy: A Change Needed



There is no more urgent problem before the city today than that of transit. It is now clear that its solution will have to be undertaken in a spirit wholly different from that which has characterized the proceedings of the past eighteen months. The task calls for the services of a group of competent, public-spirited and non-partisan citizens who harbor none of the old grudges. Such a group, working in the interest of a reasonable settlement and possessing the confidence of the community, should encounter no insuperable difficulties in bringing the city and the companies together on a program which will be fair alike to the city treasury, the strap-hangers and the companies. This suggestion is not a counsel of perfection; it is entirely practicable. It does call, however, for a change of policy and of personnel, and the recent barren record shows that such a change is in order.—*New York World*.

Biddeford Company Thrives on Low Fare

If riding does not increase on the branch line operated by the Biddeford & Saco Railroad between Sanford and Biddeford via Kennebunk it is expected the company will turn the property back to the York Utilities Company from which it has been renting the track on a day-to-day basis. This branch line operation in no way concerns the regular route of the Biddeford & Saco Railroad operating on a 5-cent fare since 1887, carrying approximately 1,500,000 passengers each year and paying dividends for the past 22 years.

In September, 1927, the York Utilities Company, which operated cars between Sanford and Biddeford, Me., about 2½ miles, decided to discontinue the line. It seemed to offer possibilities of continuation if linked up with the property of the Biddeford & Saco Railroad. That company took over the operation of one car on this line at a 5-cent fare which was just half of what the York Utilities charged on this zone. For a time the company made money, but as industrial conditions became worse and the newness of the service began to wear off, riding decreased rapidly. A cut in the schedule did not solve the problem. When, in January of this year the company signified its intention of quitting, a petition of 39 residents was forwarded requesting that the fare be doubled. The Public Utilities Commission approved the plan and operation was started on a 10-cent fare. This, too, started with a favorable showing, but now receipts have slackened.

The Biddeford & Saco Railroad is attracting attention in New England for its interesting and progressive advertising. A recent advertisement in the papers entitled "Our Challenge" invited someone to name any other company in America of like size serving a similar community on a 5-cent fare. In the *Biddeford Daily Journal* of May 5, under "People's Forum," J. B. Stride, general manager of the property, sent a letter to the editor on unfair competition typified by the popular pick-up of potential passengers. Congratulations came in so fast from the public for his views that the company ran a "thank you" ad the following Monday.

West Penn Prize Awarded

For the best paper submitted in the contest advanced by the American Water Works & Electric Company, Inc., controlling company of the Monongahela West Penn Public Service Company, H. F. Smiddy has won the first prize with his article "What Should My Company Mean to the Public?" Mr. Smiddy is assistant commercial manager of the West Penn Power Company. He receives five shares of the American Water Works & Electric Company's common stock. A second and third prize were also awarded. The Monongahela West Penn Public Service Company employees submitted 23 papers.

Would Increase Rate on California Line

The San Francisco-Sacramento Railroad has applied to the California Railroad Commission for authority to increase its commutation rate \$1.30 per month. Applicant has a contract with the Key System Transit Company whereby its passengers are carried between 40th and Shafter Streets, Oakland, and San Francisco by the Key System Transit Company and for which the applicant pays the Key System Transit Company the usual full commutation rate charged by that company. Due to the increase recently granted the Key System Transit Company the petitioner would be compelled to pay that company an additional \$1.30 a month upon each joint commutation ticket sold, and as its deficit for the year 1927 was \$122,793, it claims it cannot assume the additional burden.

Traction Referendum and Bus Lines Approved in Chicago

The voters of Chicago at a judicial election held on June 4 approved three public policy questions relating to the city's local transportation problems. Results of the vote are purely advisory and are not binding upon the administration. The questions were placed upon the ballot at the instance of the Amalgamated Improvement Association. Last month that body presented to the Board of Elections petitions for the referendum carrying more than 300,000 signatures.

The first question calling for a referendum on all transit legislation and ordinance was approved by a ratio of more than two to one. The question of whether the city should refuse to pass any ordinance other than one that would have for its purpose the use of the \$50,000,000 traction fund in the building of downtown subways and another which would authorize the city to utilize the traction fund in providing municipal bus lines in outlying districts was approved by only a narrow margin.

New Plans for McKinley Bridge Approach

To meet objections of city aldermen and many residents of North St. Louis, the Illinois Traction System on June 4 agreed to modify its original plans for a subway, surface and elevated line connecting the McKinley Bridge with a new underground freight and passenger terminal at Twelfth Street and Lucas Avenue, St. Louis, so as to divert the surface lines to the river front north of North Market Street. This new proposal was made to the public utilities committee of the Board of Aldermen by H. I. Green, general attorney for the railway, and was later incorporated as a section of a proposed 50-year franchise for the company now pending before the aldermanic board.

The new plans will require the con-

struction of a southern railroad approach to the McKinley Bridge at a cost of about \$1,250,000. The new route would cost the company \$1,500,000 more than the original plans, estimated to cost \$5,000,000.

Governor Makes Requests of Massachusetts Legislature

Governor Fuller of Massachusetts sent a special message to the Legislature on June 12 requesting the appointment of a committee to draft legislation for the extension of transportation facilities in Boston and continued public control of the Boston Elevated Railway. This is in line with the Governor's earlier assertion that he would keep the Legislature in session until it produced satisfactory legislation relative to the Elevated. He says he wants a subway in Governor Square to solve the traffic jams there and lower overhead, lower rental charges and lower dividend payments. The Governor claims it is meaningless to talk about private operation and futile to talk about public ownership at this time; but its the duty of this Legislature to solve the problem.

Riding Free in El Paso

Patrons of the El Paso Electric Company, El Paso, Tex., were invited to ride to town on the morning of May 28 between the hours of 8 and 10 a.m. as guests of the Popular Dry Goods Company. The invitation applied to any street car, any of the Pershing Line buses or any of the Lower Valley buses. The store did this to make it convenient for patrons to attend the opening of its 26th anniversary sale. Tickets were provided for the return trip.

The Keen Eye, the Discerning Instinct and the Convenient Waste Basket

PUBLICITY in modern business and industry is almost as vital as capital and labor, but along with the need for proper information in industry has come the greed or mania for unnecessary newspaper mention. This has made the handling of proper publicity difficult. The publicity man should send no story to the newspaper that does not render a service to the paper and that does not compete in interest with the material turned in by the newspapers' own reporters. Papers have only two sources of news—what they find and what is brought to them. From it all, they have to select the wheat from the chaff. And the modern editor has a keen eye, a discerning instinct and a most convenient waste basket. —Hudson R. Biery of the Cincinnati Street Railway before the Cincinnati Electric Club on June 1.

Detroit Municipal Said to Be Over Insured

Several millions of dollars' worth of insurance which it does not need is being carried by the Detroit Municipal Railway, Detroit, Mich., and thousands of dollars now expended annually in premiums could be used to make extensions and betterments to the system.

These are conclusions cited in a report submitted to G. Ogden Ellis, president of the street railway commission, by William M. Hauser. The system is carrying \$15,600,000 in fire insurance alone, which amount could be reduced to \$5,000,000 or less, according to the report. Of this sum \$10,000,000 is carried in accordance with an agreement made with the Detroit United Railway at the time the city agreed to purchase the system. This was to protect the private company against loss in the event of fire destroying the property upon which the city was making semi-annual payments. The report states:

Two-thirds of the cost of Detroit Street Railway property acquired from the Detroit United Railways is equal to \$13,233,332, so that the \$10,000,000 of insurance placed as of May 15, 1922, would cover insurable property. But it should be borne in mind that payments have been made upon the Detroit United Railway property until Jan. 31, 1928, when there remained only \$7,875,000 outstanding represented by bonds against the property; that is, all the interest the Detroit United Railway or the bondholders can have in the property so that the insurance could be materially reduced and at the same time meet the obligations of the contract. It might be reduced to approximately \$5,000,000 or even lower.

Heavy insurance is carried upon such equipment as air compressors, engines, etc., upon which no insurance was carried when the property was privately owned. The report recommends that most of this insurance be eliminated.

All insurance of the municipally operated lines is handled by Rufus G. Lathrop, secretary to the commission. Some months ago the methods in vogue in handling insurance were questioned by agencies, and Mr. Ellis on Feb. 14 asked Mr. Hauser to report on the insurance carried. This report was presented to Mr. Ellis on March 9, but has not previously been made public. At that time Mr. Hauser was auditor of the municipal system.

"Skip Stop" in Columbus

Faster street car service, operated on the "skip stop" plan, was started for the first time on June 17 on the High Street and Cleveland Avenue lines of the Columbus Railway, Power & Light Company, Columbus, Ohio. Although the ordinance authorizing the company to increase its speed from 20 to 25 m.p.h. and requiring all traffic to come to a full stop before entering or crossing streets with car tracks became effective on June 13, officials of the company were not ready to place them in effect. It is understood that this service will be applied on other lines.

Montreal Halfway Stops Abolished

Halfway tramway stops on both sides of St. Denis Street, Montreal, Canada, in certain double-length blocks were abolished on May 31 by the Montreal Tramways Commission to aid in speeding up the north end car service. The question of abolishing these stops has been before the tramways traffic experts for some time. No longer is it merely a question of speeding car traffic during the rush hours. The load practically all day on main thoroughfares is considered sufficient to require a service as fast as is possible.

Removal of Fifth Street Line, Kansas City, Opposed

A slight misunderstanding has arisen in connection with the new ordinance in Kansas City, under which the Kansas City Public Service Company is to operate buses for a six months' trial. According to a provision of the franchise, a new feeder line to be designated as No. 6 was to be started and a part of the Fifth Street car line was to be abandoned and the tracks removed. When the work of removing the tracks was begun residents protested and H. L. McElroy, city manager, ordered the work stopped.

Powell Groner, president of the Kansas City Public Service Company, said the plan to remove the tracks was explained to the Council when the company submitted the first suggestions for a revision of bus routes. At that time it was pointed out that rather than spend \$77,000 to relay the tracks a bus line be installed to give service one-half mile beyond the end of the Fifth Street car line. No objection was raised then to the removal of the tracks. Mr. Groner said the district could not support both the bus line and the car line.

Service to America's Largest Airship Port

In the talk about air fields reached by electric railways Scott Field, at Belleville, Ill., served by the Illinois Power & Light Corporation must not be forgotten. It is America's largest airship port. It is owned and operated by Uncle Sam under the control of the chief of air corps of the United States Army, and plays a highly important part in the nation's aerial development program. The hangar at Scott Field is a huge, looming affair, built to house the largest present-day airships. The inside clear dimensions are 810 ft. in length, 150 ft. in width and 175 ft. in height. The outside dimensions are about 100 ft. greater. Translated into every-day terms, the hangar is three city blocks long and almost a city block in width and is as tall as a fifteen story office building. The ground floor covers an area of 5 acres. It would be possible to crowd the United States Army of 100,000 men into the building

shoulder to shoulder and still have enough space left for a speaker's platform. The Illinois Power & Light Corporation furnishes electricity for all lighting equipment at Scott Field and for the operation of all machinery, including the hydrogen gas plant and the purifying plant for helium gas.

Useless Cars in Glens Falls Burned

More than 25 trolley cars, all from 30 to 37 years old, are being burned at the Queensbury carhouse of the Hudson Valley Railway, Glens Falls, N. Y., to make room for new buses which are to arrive on July 1. Wheels, motors, copper and brass are being salvaged. Some of the vehicles are those which replaced the old horse cars when the Glens Falls-Sandy Hill-Fort Edward street railway was electrified in 1890. Others are small belt-line cars which have been housed at Glens Falls since the Saratoga line was abandoned.

"The Martyrs" Sung in Cleveland

The first important public appearance of the male chorus of the Cleveland Railway, Cleveland, Ohio, dignified the Masonic auditorium on May 31 with "The Martyrs," an oratorio. Charles D. Dawe directed, and assisting artists were Helen Protheroe, William Simmons and Samuel Roberts. The company's male chorus was organized about a year ago and since that time has been heard over the radio and on the phonograph. Approximately 150 voices took part in an impressive rendition and the program was termed a very satisfactory one from the standpoint of performance and attendance.

In an introductory note in the printed program Col. Joseph H. Alexander, president of the company, explained that the creation of the male chorus was one example of the Cleveland Railway Company's policy to afford employees opportunity not only to carry on their duties with the company but to develop an avocation "which makes for better work and a happier environment."

Foreign News

Intercommunication System Improved in London

Eighteen tape recording machines are being installed by the London Underground Railways at its various offices, depots and the power station, in order to provide a method of giving details of failures and detentions quickly to those responsible for remedying them. The message transmitting system thus adopted is such as is used by newspaper offices, clubs, etc.

With the extensions to the London underground, heavier services, and increase in traffic density, the system of telephonic communication is said not to meet present-day requirements.

Six recording clocks were installed quite recently. The faces of these clocks are paper dials and are connected electrically with a contact lever on the track. Passage of a train makes an electrical contact which causes a small inked hammer to strike the fringe of the dial. The dial rotates at the equivalent speed of a clock and if the trains are running on schedule the markings on the dial will be spaced equally. The dial makes a complete revolution every 24 hours, thus giving a complete record for the day. However, it affords no explanation of what has occurred. The installation of the tape machines will overcome this difficulty.

Soudan Starts an Electric Railway

An electric railway has been built in Khartoum and Obdurman, adjoining communities at the junction of the Blue Nile and the White Nile Rivers in Soudan. The system comprises about 13 miles of narrow gage track (3 ft. 6 in.)

with twelve single-truck motor cars and six trailers, besides a few cars for hauling freight. The property is owned by the Soudan Light & Power Company, Ltd., largely an English concern.

One-Man Locomotives Successful in Switzerland

During 1927 the Swiss Federal Railways equipped 30 electric locomotives with special devices to insure their safety with only one man in the cab, in this way saving wages of about 55 men. The results obtained have been so satisfactory that 30 additional locomotives of this type will be installed this year thus permitting additional economies in personnel.

Substitutions by British Tramways

Bills passed by a committee of the House of Lords, London, England, authorize the Greenock & Port Glasgow Tramways to substitute buses and the Nottinghamshire & Derbyshire Tramways buses and trackless trolleys. In both instances a certain amount of protection against competition was allowed.

Traffic in Berlin

The number of passengers carried on the street railways and rapid transit systems in Berlin, Germany, is constantly increasing. A comparison of passengers carried follows:

NUMBER OF PASSENGERS CARRIED IN BERLIN (last 000 omitted)			
	1927	1926	1925
Berlin surface lines.....	834,701	813,219	772,269
Underground and elevated	228,663	167,787	178,027

Recent Bus Developments

Maine Commission Frowns on Substitution in Portland

The Maine Public Utilities Commission has ruled on the petition of the Cumberland Power Company, operating the railway system at Portland, Me., under lease, for permission to abandon parts of the system and to substitute bus service. In its finding the commission says in part:

While operating experience may show the expediency or the necessity of abandoning railway service previously rendered and the substitution of motor vehicles, reasons for such a course should be clear, decisive, unequivocal and reinforced by pertinent evidence.

When it is objected to by citizens accustomed to use the former method, a change such as that suggested in the present case requires the presentation to the commission of facts sufficiently reasonable to dispel any doubt of the commission's duty not to withhold such permission. The evidence in the present case falls short of meeting this standard of proof.

The need for the abandonment of the system these days when so many provide their own transportation by private automobiles may seem imperative, but the economic necessity for the change should be substantiated by evidence before the company resorts to substituted service in the heart of a populous and prosperous city as a means of meeting its public duties.

Sightseeing in El Paso

In a recent issue of the El Paso *Herald* readers took an imaginary trip to places of interest in El Paso and Juarez via a sightseeing bus operated by the El Paso Electric Company. The trip continued for 16 pages. The advertisement stated that it had probably never occurred to the residents of El Paso that they might enjoy a trip on the sightseeing bus quite as much as a visitor to El Paso would. The cost of the round trip is \$1.50 for an adult and 75 cents for a child. Each day the sightseeing bus makes two trips. The operator explains in detail the interesting features at each stop and as he goes along.

P. R. T. Would Compete With Reading Company

Following the rejection by the Reading Company of its proposal for joint operation of buses to serve suburban riders, the Philadelphia Rapid Transit Company sought approval of the Public Service Commission on June 6 for a bus line from Broad Street and Olney Avenue north to Hatboro. Although operating officials of the Reading Company protested the application before Commissioner Benn on the ground that the competition would affect its own bus line between Jenkintown and New Hope, the Philadelphia Rapid Transit filed its proposed rate schedule showing

a contemplated reduction of 14½ cents for the ride compared with the railroad's charge. The transit company plans to hook up the bus route with Broad Street subway for service into the central city.

F. D. Osterhout, passenger traffic manager of the Reading Company, told Commissioner Benn that approval of the Philadelphia Rapid Transit Company's petition might seriously affect the railroad's program for electrification of those suburban lines. He explained that the Reading issued 50 trip and 60 trip tickets which averaged 8 cents lower than the Philadelphia Rapid Transit Company fare charge. Mr. Osterhout added that the Reading Company made no profit from the tickets it sold providing for 50 or 60 trips as the buyer was disposed to choose. The commission withheld its decision.

Wisconsin Line to Use Buses

The Wisconsin Railroad Commission has granted the Wisconsin-Michigan Power Company, controlled by the North American Edison Company, permission to abandon the line through Appleton from Neenah to Kaukauna. Buses will supplant the cars. Permission was given because the company showed a loss of \$174,563 in the last five years.

In 1911 the company was incorporated in Wisconsin as the Peninsular Power Company. The line was improved and extended in 1899 to Neenah and the line to Kaukauna was built in 1901. The present title was adopted in 1927.

The Waster

THE man who plans to park his car on a public street for most of the day may not be sensible to the consequent waste of valuable community space. In the enjoyment of what he considers a natural privilege he is apt to overlook the fact that it is a privilege. But he must see that he is wasting something of his own—he is wasting the time that he has to give to finding a convenient parking place, and he is exposing his valuable property to the weather all the time it might be safe in the garage.

"But I have a car," says he. "Why keep it at home?"

Yes, and he has a dress suit, perhaps. Why not wear that all day? Dress suits and top hats are desirable in one's wardrobe. So is an automobile in one's scheme of life. But a business suit and a derby give more all-round service. So does a street car.—*Ottawa Electric Railway News.*

New Service for New Jersey Shoppers in New York

A new de luxe bus line is being operated by the Public Service Railway between Erie Station, Rutherford, N. J., and the Capitol Theater Bus Terminal, Broadway and 50th Street, New York City. The line runs through the Holland Tunnel. It is known as the Rutherford-New York bus line route No. 152. *Whys and Other Whys*, the company pamphlet, says that theatergoers and shoppers will find this uptown service convenient for their trip into New York.

Connecticut-Rhode Island Line Approved

Authority has been given by the Connecticut Public Utilities Commission to the Groton & Stonington Traction Company to abandon railway service between Groton, Conn., and Westerly, R. I. The company is authorized to operate buses between the two points and has also been authorized to establish a new bus route between Groton and Groton Long Point during the summer months. The change is effective at once and service will start just as soon as schedules can be arranged and buses put into commission.

Effort to Advance Suit in New York City Frustrated

Supreme Court Justice Lydon has denied the application of counsel for the Manhattan Surface Coach Company, Inc., and the New York Railways to advance their suit against the city to change the minutes of the Board of Estimate meeting of July 28, 1927, for trial this month. This is one of the moves in the contest before the Transit Commission to stop issuance of certificates of convenience and necessity to the Equitable Coach Company which has already been awarded bus franchises for Manhattan, Brooklyn and Queens.

Operation in Santa Ana Defined

Permission has been granted by the California Railroad Commission to the Pacific Electric Railway to operate motor coach lines in the city of Santa Ana over prescribed routes. The company was also authorized to reduce the present 7-cent fare (four tickets for 25 cents) to a flat 5-cent fare, including transfer to and from applicant's rail lines within the local fare limits of Santa Ana.

New Service in Dallas

A permit has been granted to the Dallas Railway & Terminal Company to operate sightseeing buses in the city limits of Dallas. Each vehicle will have a capacity of sixteen persons. This is the first service of its kind to be operated in the city.

Financial and Corporate

Amsterdam Line to Be Abandoned

A declaration of abandonment by the Fonda, Johnstown & Gloversville Railroad of the Vrooman Avenue line in Amsterdam, N. Y., covering a trackage of about 11,000 ft., was approved by the Public Service Commission on June 8. It was conditioned on the company's removing its rails and other structures from the various streets and putting the streets in serviceable condition. The city did not oppose the petition.

The Vrooman Avenue line abandonment was proposed in 1926 but was not made effective pending results of operation under an increase in fare which was allowed about that time. The evidence submitted on the recent abandonment hearing showed that there had been a continued falling off in revenue under the present fare charged in Amsterdam. The evidence also showed that 250,719 fewer passengers were carried on the Amsterdam city lines in 1927 than in 1926.

Rerouting Planned in St. Louis

The St. Louis Public Service Company, with the consent of the director of streets and sewers, has decided to reroute certain lines through the congested sections of St. Louis, Mo., in order to speed up traffic and eliminate bothersome curves. Proposed changes, according to estimates, will cost the company \$200,000. The changed routing will become effective about Sept. 1. Ordinances providing for the new routes must be passed by the Board of Aldermen and signed by Mayor Miller. This will be done before the aldermanic board adjourns for its summer vacation.

Improvements Effected in Hamilton in 1927

In the 28th annual report of the Dominion Power & Transmission Company, for the year ended Dec. 31, 1927, W. E. Phin, president, states that most of the \$1,109,064 expenditure under the classification of additions was made on account of the Hamilton Street Railway. In accordance with the terms of the agreement with the city, 90 per cent of this amount was contracted for and expended by the company in the city of Hamilton. The Dominion Power & Transmission Company controls and operates the Hamilton Street Railway, the Hamilton Radial Electric Railway, the Hamilton, Grimsby & Beamsville Electric Railway and the Brantford & Hamilton Electric Railway. The aggregate net profits of the company for the year were \$649,629 against \$654,220 for the year 1926.

New car shops and garage located in Hamilton were completed. During the year six new buses and 24 new cars

were added to the railway service and twelve new cars were ordered. The construction of a new automatic substation in the West End was projected as an improvement to both the railway and lighting services.

In the report, mention is made of the service supplied by Hamilton Bus Company under a Provincial license between Hamilton and St. Catharine in competition with the Hamilton, Grimsby & Beamsville Electric Railway. Negotiations were conducted with that company and the purchase of its seven buses was effected.

According to the annual statement the company intends to seek an increase in fares on the Hamilton Street Railway and the Hamilton, Grimsby & Beamsville Electric Railway since both companies are operating at a loss.

\$27,855 Available in Stockton for Charges and Dividends

The Stockton Electric Railroad operating in Stockton, Cal., reports to the Railroad Commission its 1927 operating revenue at \$305,443, compared with \$314,189 for 1926. Operating expenses, excluding taxes for 1927, are reported at \$251,557, and at \$262,232 for 1926, leaving net operating revenue of \$53,886 for 1927, and \$51,957 for 1926. During 1927 taxes charged to operation amounted to \$21,101 and for 1926 to \$21,867. Deducting the taxes leaves operating income of \$32,785 for 1927, and \$30,089 for 1926. Adding to the operating income, the non-operating income of the company and deducting non-collectible revenue and rents, results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of \$27,855 for 1927, and \$24,959 for 1926.

New York State Railways Sold

New York Central Railroad disposes of holdings in New York State Railways and in Mohawk Valley Company. Railways will continue to be operated separately

ANNOUNCEMENTS were made in New York on June 13 by A. H. Harris, chairman of the executive committee of the New York Central Railroad, and by E. L. Phillips, president of the Empire Power Corporation and the Long Island Lighting Company, of the sale of New York Central's holdings in the Mohawk Valley Company and in the New York State Railways to Mr. Phillips and his associates, bringing under their control public utility properties with assets valued at nearly \$227,500,000.

The statement of the New York Central chairman reported the sale of the railroad's holdings of 511,430 shares of Mohawk Valley Company stock to Mr. Phillips at \$75 a share, conditioned on his making the same offer to other stockholders. The same arrangement also held for the sale of New York Central's holdings of 136,043 shares of New York State Railways common stock at \$25 a share. These prices represent a total of \$41,758,325 accruing to the railroad from this transaction, which is reported to have been made in cash.

Mr. Phillips announced that the minority stockholders of the acquired companies have the privilege of accepting the same terms as applied to the railroad, or of receiving securities in a new company to be formed in exchange for their present holdings. On the basis of the cash offer, the total deal would represent an outlay of \$61,238,100 for the outstanding Mohawk Valley capital stock and New York State Railways common stock.

The new company to be organized by the Phillips interests will take over the Mohawk Valley properties and con-

tiguous properties already owned by the Empire Power Company, bringing into a single organization electric and gas properties in New York State having an aggregate value in excess of \$150,000,000.

Associated with Mr. Phillips in this transaction were the Jonas interests, represented by the Manufacturers Trust Company, and W. C. Langley & Company, New York, long interested in the financing of light and power companies. The terms of the offering made to the minority stockholders of the acquired companies will be mailed on or before July 1.

The New York State Railways will continue to be operated separately. The company owns 465 miles and leases 131 miles of trolley lines, supplemented by bus services at numerous points. The system comprises the city lines in Rochester, Syracuse, Oneida and Utica, and suburban lines to numerous resorts. It owns 88.3 per cent of the Rochester Electric Railway capital stock.

Assets of New York State Railways totaled nearly \$59,800,000 at the close of 1926. There is \$19,997,700 authorized and \$19,952,400 outstanding \$100 par common stock, of which New York Central owned \$13,604,300, and \$3,862,500 authorized and outstanding 5 per cent cumulative \$100 par preferred stock. The funded debt is about \$26,500,000.

The Mohawk Valley Company had assets of about \$12,500,000 at the end of 1926 and had 750,000 authorized and outstanding shares of no par capital stock, of which New York Central owned 511,430 shares. There is no funded debt. The company owns all the common stock of the Rochester Gas

& Electric Corporation, which had assets of \$60,600,000 at the end of 1926, with a funded debt of \$23,499,500. The latter corporation has 756,070 outstanding no par common shares of an authorized issue of 825,000 shares and \$18,530,300 preferred stock of three series, out of \$30,000,000 authorized.

SOME OTHER AFFILIATED COMPANIES

The Empire Power Corporation controls the New York Central Electric Corporation with assets of \$12,250,000, which in turn controls the Empire Gas & Electric Company, with assets of \$12,500,000, the Seneca Power Corporation, a \$1,700,000 property, and the United Gas & Electric Corporation, valued at \$24,750,000 on the books at the close of 1926.

The Long Island Lighting Company, with assets of \$35,500,000, controls six other Long Island properties valued at \$40,700,000. This was the first organization developed by Mr. Phillips in his quarter century of experience as a public utility operator. The Long Island properties are expected to continue as a separate organization. Elsewhere in this issue the career of Mr. Phillips in the utility field is reviewed.

Receiver Named for Buffalo & Erie Railway

Supreme Court Justice Thomas H. Noonan on June 8 ordered the Buffalo & Erie Railway into a receivership after a judgment for \$382,126 was filed against it.

Application for the receivership was made by the International Utilities Corporation, New York. George MacLeod, Dunkirk, general manager of the railway, was named receiver.

Charles M. Blair, attorney for the railway, said the action was a friendly one designed to protect and conserve assets of the corporation.

The company operates from Buffalo, N. Y., to Erie, Pa. It was in the hands of a receiver from 1915 to 1925, when the International Corporation refinanced it.

Reorganization Plan of Detroit United Operative

Reorganization plans, of the Detroit United Railway, Detroit, Mich., dated April 1, have been declared operative, as a result of the depositing of more than 80 per cent of certain securities. The deposits include outstanding mortgage and collateral trust sinking fund five-year 6 per cent bonds of Detroit United Railway and first mortgage bonds of the Detroit, Monroe & Toledo Short Line Railway. The time limit within which holders of certificates of deposit for bonds of the Detroit United Railway may exercise the right of subscription to the syndicate has been advanced to June 29. The terms of the reorganization were reviewed at length in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 5, page 754.

Corporate Simplification in Philadelphia

Another attempt being made to arrange for the elimination of subsidiaries. Last year's survey resulted in recommendation that city pay \$36,000,000 to surrender rights

HEARINGS are about to begin before the Public Service Commission of Pennsylvania at which the effort will be made to bring together all sides in an amicable agreement on the question of the disposition of the underlying companies of the Philadelphia Rapid Transit Company. While the matter has been agitated before, the present is the first really definite attempt to condemn the franchises of nearly forty so-called underlying companies and give the City Administration power to dictate future transit policy without encountering obstacles inherited from politicians of pre-Civil War days. In substance the question is:

What is a fair price for the city to pay in return for the property now held under 999-year franchise by the underlying companies?

AN INHERITANCE FROM HORSE-CAR DAYS

These companies originated in the days when local transit matters were in the hands of the State Legislature. Whenever a group of Philadelphians decided to operate a string of horse cars, it obtained from the Legislature a charter permitting it to lay tracks on certain streets, establish a fare and start business.

Finally conditions reached the point where a gradual consolidation became desirable to gain riders and save fares, with most of the franchises of these original companies being leased to three larger concerns. Finally in 1895 the Union Traction Company was organized to gain control of all of the lines, and it in turn later leased its holdings to the Philadelphia Rapid Transit Company, the present operating concern.

Some of the tracks have disappeared altogether, leaving nothing except a franchise to show that lines ever were operated on the deserted streets. Yet through contracts that apparently are iron-clad, holders of securities in the underlying companies have continued to split a sum of \$8,500,000 paid annually by the Philadelphia Rapid Transit Company as rental charges for operating privileges. Most of the underliers are leased on a rental of 6 per cent on their capital stock.

Now, when in the process of city planning a move is made to eliminate further car lines, as was the case last year when the Pennsylvania Railroad wanted to begin work on its \$62,000,000 beautification program, it is necessary to gain the consent of from two to seven distinct boards of directors, owing to ramifications in the transit structure. In this particular case, tracks were removed from five blocks of Filbert Street. The process was this:

Permission had to be obtained from the Philadelphia Rapid Transit Company's directorate. It, however, had leased the lines from the Union Traction Company, whose directors then had

to be consulted. This company had leased the line from the Philadelphia Traction Company, which in turn was guaranteeing rental charges to the Union Passenger Railway, which in its turn was making a similar guarantee to the Continental Passenger Railway, holder of the surface rights on Filbert Street under a charter obtained in 1873.

Opponents of the condemnation scheme habitually refer to the old franchises as "dead horse" and ask what the city will have to show for the money it spends in buying them. Proponents of the plan offer the always attractive argument of a prospective lower fare, a net saving to the city over a term of years and ultimate freedom from the bothersome tangle of perpetual charters and bewildering series of leases.

"Protection committees" have been appointed by the principal underlying companies to prepare the financial demands of some 18,000 stockholders. Lawyers for the underliers declare that the "innocent investors" in the stocks and bonds of these companies must be protected.

In many instances, trust funds totaling millions of dollars are made up largely of underliers' securities, and the biggest trust companies in the city are interested in the fight. Three or four years ago, these companies themselves took the initiative in what was to have been a reorganization of the whole transit financial structure. A plan prepared by Joseph Gilfillan, counsel for the Union Traction Company, was shelved at that time, however, when certain influential persons appeared adamant to the project.

BASED ON THE McCHORD SURVEY

The present movement is based largely upon a survey made last year for the Public Service Commission by Charles C. McChord, former chairman of the Interstate Commerce Commission. He recommended that the city pay the underliers \$36,000,000 to surrender their rights.

In Mayor Mackey's opinion, a solution of this kind would mean that "carrying charges on the city bonds used for the purchase would, with the savings in taxes thus brought about, be \$4,500,000 less than the rentals now paid by P.R.T. to the underliers."

Opponents are equally firm in their belief that money spent for the old franchises would be squandered.

St. Louis Official Made Director

Sam W. Greenland, vice-president and general manager of the St. Louis Public Service Company, St. Louis, Mo., was elected to the board of directors of the company on June 5.

Net Income \$707,454

Capital Traction reports falling off in net and traffic. Bus lines show improvements.

Statistics of operation interesting

THE number of passengers carried in 1927 by the Capital Traction Company, Washington, D. C., showed a greater decrease than during either of the two preceding years, and the net earnings from operation were less than in either of those two years. While the net income for 1927 was not equal to the amount required for the 7 per cent dividend on stock, the directors considered it entirely proper to continue the dividend disbursement at that rate, making up the deficiency from undistributed profits of former years. These facts were contained in the annual re-

and on Dec. 31 the reserve for depreciation was \$3,019,086.

On Feb. 7 the Court of Appeals of the District of Columbia rendered its decision on an appeal of the commission and fixed the value for rate-making purposes as of Jan. 1, 1925, at \$25,765,880.

Tax accruals for the year were \$370,289, a decrease of \$29,361 from the preceding year. This decrease was due to the abolishment by Congress of the Capital stock tax, and to a decrease in gross receipts and federal income taxes on account of decreased gross and net earnings, offset by increases in real estate and special crossing police taxes.

The Employees Relief Association membership includes 982 out of a total of 1,261 employees. After paying sick

ations for 1927 amounted to \$29,790, or \$33,081 less than the loss during the preceding year. Three new bus lines were opened during the year.

During the year 2,128 miles of track were replaced with modern construction. Of this, 0,632 mile was track jointly owned with the Washington Railway & Electric Company.

Seven street car type buses were purchased in 1927 to replace an equal number of the same type buses retired from service, and four additional parlor-car type buses were purchased and placed in service. Full provision for depreciation had been made on the buses retired.

In accordance with the authority ton & Maryland Railway, which still retains its corporate identity.

SUMMARY OF OPERATIONS OF THE CAPITAL TRACTION COMPANY FOR YEAR ENDING DEC. 31, 1927

		Change Over 1926
Passenger revenue, railway.....	\$4,220,017	\$195,301
Passenger revenue, bus.....	210,759	36,128
Special car revenue.....	21	27
Special bus revenue.....	10,838	7,015
Total revenue from transportation.....	\$4,441,636	\$152,184
Revenue from operations other than transportation.....	37,463	14,297
Gross operating revenue.....	\$4,479,099	\$137,886
Operating expenses (68.5 per cent of gross revenue).....	3,099,573	574
Net operating revenue.....	\$1,379,525	\$137,312
Taxes assignable to transportation operations.....	370,289	29,361
Operating income.....	\$1,009,235	\$107,955
Non-operating income.....	43,032	11,947
Gross income.....	\$1,052,268	\$96,002

DEDUCTIONS FROM GROSS INCOME

Interest on funded debt.....	\$280,300
Interest on unfunded debt.....	52,182
Rent for leased road.....	8,074
Income tax paid at source.....	4,257
Total deductions.....	\$344,814
Net income.....	\$707,454

PROFIT AND LOSS STATEMENT

Credits:		
Balance at beginning of year.....	\$1,410,641	
Net income for the year.....	707,454	
Profit from sale of Federal Farm Loan Bonds.....	67	
	\$2,118,163	
Debits:		
Dividends.....	\$840,000	
Appropriation for injuries and damages reserve.....	50,000	
Additional Federal income taxes, 1918, 1919.....	809	
Cancellation of account receivable.....	50	
	890,859	
Credit balance at close of year.....	\$1,227,303	\$133,358

Italics denotes decrease.

REVENUE AND TRANSFER PASSENGERS OF CAPITAL TRACTION COMPANY

	1927	1926
Railway passengers:		
Number of passengers carried at 8 cents.....	17,543,570	17,719,054
Number of passengers carried at 6 1/2 cents.....	40,376,123	43,128,140
Number of passengers carried at 5 cents.....	758,666	830,780
Number of passengers carried at 3 cents.....	369,397	383,007
Number of cash passengers carried on Kensington Line.....	104,221	110,896
Number of ticket passengers carried on Kensington Line.....	41,004	46,130
Total railway revenue passengers.....	59,192,981	62,218,007
Bus passengers:		
Number of passengers carried at 25 cents.....	428,111	343,899
Number of passengers carried at 10 cents.....	65,015	64,814
Number of passengers carried at 8 cents.....	342,866	310,085
Number of passengers carried at 6 1/2 cents.....	562,025	528,022
Number of passengers carried at 5 cents.....	206,301	60,511
Total bus revenue passengers.....	1,604,318	1,307,331
Total revenue passengers railway and bus.....	60,797,299	63,525,338
Other passengers:		
1 cent inter-company transfer passengers.....	2,888,278	2,814,693
2 cent bus to car transfer passengers.....	675,693	556,225
2 cent car to bus transfer passengers.....	417,735	374,550
2 cent Eastern High School ticket passengers.....	459	8
Free transfer passengers.....	16,301,004	16,982,373
Other free passengers:		
Employees.....	696,508	709,610
Policemen and firemen.....	*46,374	52,295
Total passengers.....	81,823,350	85,015,092

* Exclusive of policemen and firemen riding free while in uniform.

COMPARATIVE STATEMENT—DEPRECIATION RESERVE OF CAPITAL TRACTION COMPANY

	1927	1926
Balance in reserve at close of preceding year.....	\$2,716,657	\$2,458,454
Accruals for the year.....	365,334	361,934
Interest received during the year.....	98,853	90,140
Total.....	\$3,180,845	\$2,910,530
Less—Expenditures during the year.....	161,759	193,872
Balance at close of year.....	\$3,019,086	\$2,716,657

port of the board of directors to the stockholders.

Net additions to capital account were \$204,893. Of this amount, \$63,963 was expended for bus line plant and equipment.

No change was made during the year in the basis for accruing depreciation. The total amount accrued through operating expenses in 1927 was \$365,334,

and death benefits and all other expenses, the year's operation showed a profit of \$2.69 per member. A Christmas Savings Club was again maintained and in December the amount disbursed to members, including deposits and interest, was \$53,459.

All bus lines which were operated throughout the year showed material improvement. The net loss on bus oper-

granted to the directors at the annual meeting of the stockholders held in January, 1927, negotiations were concluded in July for the purchase for \$98,000 of all outstanding securities of the Washington & Maryland Railway, the actual transfer being made as of July. Subsequent to the purchase of these securities an agreement was made covering the operation of the lines of the Washing-

CAR AND BUS MILES OF THE CAPITAL TRACTION COMPANY

	1927	1926	1925
Car-miles, city lines.....	7,409,753	7,630,890	7,723,259
Car-miles, Chevy Chase line.....	1,012,382	992,109	983,687
Car-miles, Washington and Maryland line.....	175,898	193,965	189,998
Car-miles, Kensington line.....	69,961	69,951	69,842
Total car-miles.....	8,667,994	8,886,915	8,966,786
Bus-miles.....	1,084,992	968,454	601,102
Total car and bus miles.....	9,752,986	9,855,369	9,567,888

EXPENDITURES ON ACCOUNT OF ROAD AND EQUIPMENT OF CAPITAL TRACTION COMPANY DURING 1927

Carhouse building additions.....	\$30,331
Shop building additions.....	4,561
Track and line betterments.....	93,540
Car betterments.....	5,899
Buses and bus service equipment.....	59,301
Bus garage additions.....	4,661
Miscellaneous.....	7,705
Credit—Power Station equipment retired.....	\$206,002
	1,108
	\$204,893

Sale of Geneva Road Planned

The way is believed to have been cleared for the sale of the property of the Geneva, Seneca Falls & Auburn Railroad, Geneva, N. Y., under foreclosure on June 20, particularly since a compromise settlement of paving assessments and taxes has been effected between the Common Council and the railroad. The city accepts \$500, to be paid within thirty days, in full settlement of \$25,466 owed for city paving and \$27,861.81 of taxes. At the meeting at which the settlement was arranged Attorney Lansing G. Hoskins and Receivers James M. Ryon and Lansing S. Hoskins, representing the railway, explained that efforts to sell the property have failed because none would assume the burden of \$72,345 that the line owed the municipalities of Geneva, Waterloo and Seneca Falls.

The failure of city buses to operate was explained in a letter from officers of the Geneva Railway Bus Lines, which set forth that companies carrying insurance cancelled policies for non-payment of premium, and that the road could not operate without insurance under its franchise.

Operation Discontinued in Lincoln

The Lincoln Municipal Street Railway discontinued operation of its line in Lincoln, Ill., on May 15 and the City Council now contemplates selling the line and equipment. For several years the line has been operated by the Illinois Public Utility Company under lease at \$1 a year. Recently that company asked the Council for permission to stop operation. C. E. Steinfort, manager, told the Council that the line had been losing money constantly. The line was 5 miles long.

Decision on Indiana Merger Awaited

A compromise basis for exchange of securities, announced by Halsey, Stuart & Company, indicates that the proposed merger of the Terre Haute, Indianapolis & Eastern Traction Company and the Central Indiana Power Company, under the title of the Indiana Electric Corporation, either is to be declared operative or entirely abandoned soon after July 1. It is believed the exchange plan will be acceptable because it was proposed by committees of affected bondholders and stockholders and that the merger will be consummated. The compromise proposal states that holders of the first mortgage bonds of three companies—Indianapolis & Northwestern Traction Company, Indianapolis & Martinsville Rapid Transit Company and Indianapolis, Crawfordsville & Danville Electric Railway—are to receive one share of Indiana Electric Corporation preferred stock, series A, for each \$100 principal amount of bonds; that holders of the 5 per cent cumulative preferred stock of two companies—Indianapolis

& Northwestern Traction Company and Indianapolis, Crawfordsville & Danville Electric Railway—are to receive Indiana Electric Corporation preferred stock, series B, on a par for par basis.

In a letter submitting the compromise, the Chicago firm said that after the expiration of the twenty-day withdrawal period, the manager will check the securities then on deposit under the plan and agreement as amended or shall otherwise have assented thereto, to determine whether in each case they are sufficient to declare the plan operative.

Traffic Increase in Tennessee

Transportation earnings of the Tennessee Electric Power Company, Chattanooga, Tenn., covering the operations of the Nashville Railway & Light Company were \$3,314,225 in 1927, compared with \$3,284,487 in 1926. Approximately 26 per cent of the gross earnings was derived from the transportation business. The number of revenue passengers carried on the system during 1927 was 45,621,217, or approximately the same as in 1926. Figures showing the revenue passengers carried were contained in the annual report of the board of directors to the stockholders. For the past five years the figures are as follows:

Calendar Years	Revenue Passengers Carried
1923.....	45,929,865
1924.....	45,057,283
1925.....	45,489,991
1926.....	45,615,025
1927.....	45,621,217

About 13 per cent of the capital expenditures in 1927 was used in the transportation department. In that department considerable track and roadway construction was undertaken on various streets in Nashville and Chattanooga and improvements were made to rolling stock and equipment.

Report of New York Railways

The New York Railways, operating 75 miles of underground conduit surface lines in the Borough of Manhattan, reports earnings for the year ended Dec. 31, 1927, compared with the year 1926:

	1927	1926
5 cent cash fares.....	\$6,252,640	\$6,506,229
2 cent revenue transfers.....	138,514	157,916
Other transfer fares.....	1,086	1,269
Total.....	\$6,392,240	\$6,655,415
Other operating revenues.....	515,679	523,317
Total operating revenues.....	\$6,907,920	\$7,188,732
Total operating expenses.....	5,421,255	5,473,058
Taxes.....	478,191	515,065
Operating income.....	\$1,008,475	\$1,200,609
Non-operating income.....	102,923	69,096
Gross income.....	\$1,111,398	\$1,269,705
Interest on funded debt.....	268,010	231,354
Controlled companies, account operation.....	501,513	506,060
Other deductions.....	213,089	174,924
Net income available for other charges.....	*\$128,785	*\$357,368

*Excludes accumulated and unpaid interest on income bonds which interest has not been declared due and payable and claims of minority stockholdings in controlled companies, if any.

Discontinuance on One Long Beach Line

The Pacific Electric Railway has been authorized by the California Railroad Commission to discontinue passenger service on its Magnolia Avenue line in the City of Long Beach. Removal of the tracks is also authorized.

Loss on Salt Lake & Utah

The Salt Lake & Utah Railroad, Salt Lake City, Utah, finished the year 1927 with a deficit of \$231,102. In the report filed by the company the great decrease in revenues and heavy interest and taxes were cited as the cause of this condition. Operating revenues in 1927 were \$638,289, which was \$92,841 less than the amount received in 1926. Expenses were \$623,723, or \$16,627 more than in 1926. The total corporate surplus of the company showed a deficit of \$428,895 at the close of 1927.

Net Loss of \$171,853 in Portland

In the report of the Cumberland County Power & Light Company for the fiscal year ended Dec. 31, 1927, it is stated that operation of the leased railroad, the Portland Railroad, Portland, Me., showed a continuing decrease in gross receipts and an increase in the net deficit. Reference is made to the intention of the company to petition the commission for authority to discontinue some portions of the railroad mileage which yielded revenue far below the cost of service. Where practicable, the company will, if approved by the commission, provide bus service to former railway territory.

The report of the Portland Railroad follows:

INCOME ACCOUNT FOR THE YEAR ENDED DEC. 31, 1927, FOR THE PROPERTY LEASED FROM PORTLAND RAILROAD	
Gross earnings.....	\$1,296,423
Operating expenses, maintenance and taxes (including retirement appropriation \$120,600).....	1,120,729
Net earnings.....	\$175,694
Rent for leased properties.....	263,548
Gross income (deficit).....	\$87,853
Deduction from gross income: Bond and other interest charges.....	84,000
Net loss for the year.....	\$171,853

San Jose Railroads Report

The San Jose Railroads, operating in San Jose, Cal., reports to the Railroad Commission its 1927 operating revenue at \$366,881 compared with \$385,545 for 1926. Operating expenses, excluding taxes for 1927, are reported at \$306,613, and at \$348,034 for 1926, leaving a net operating revenue of \$60,267 for 1927, and \$37,511 for 1926. During 1927 taxes charged to operation amounted to \$29,943, and for 1926 to \$25,265. Adding to the operating income the non-operating income of the company and deducting non-collectible revenue and rents, results in a gross corporate income of \$36,785 for 1927, and \$13,749 for 1926.

Personal Items

E. L. Phillips

Engineer who has worked unobtrusively for years arranges to take over Rochester, Syracuse and Utica trolleys from New York Central Railroad

FINANCIAL engineer. That is the term which fits best E. L. Phillips, announced on June 13 as having arranged on behalf of himself and associates to take over the Mohawk Valley Company and the New York State Railways operating in Rochester, Syracuse, Utica and other cities from the New York Central Railroad at prices estimated to involve more than \$40,000,000.

It is a territory not new to Mr. Phillips, this one in Central New York, since there as a young engineer he helped to construct some of the roads of which he now becomes the owner. More recently he has had a hand in the growth of Central New York communities through the Empire Power Corporation and the United Gas & Electric Corporation, both of which he serves as an officer.

About Mr. Phillips the usual books of biographical reference were mute. Corporation manuals listed his name in a string of companies, but other than these facts and that he was the head of the engineering firm of E. L. Phillips & Company, New York, there appeared at first not to be much to garner. But E. L. Phillips & Company is not a new concern. It was founded by Mr. Phillips about 25 years ago. That means the company was started shortly after the potentialities of the light and power business had first come to be realized. And few men had a keener realization of these potentialities than did Mr. Phillips.

Not so long before the founding of the firm he had been graduated from Cornell as an electrical and mechanical engineer. It was practical experience that the young engineer wanted, and this he obtained in turn with the Sprague Electric Company, the Otis, the de Laval and the telephone companies. But that wasn't enough. Westinghouse, Church, Kerr & Company were at that time installing plants in all parts of the country and so Mr. Phillips joined their forces as an engineer. The record of that company, if it were written, would be largely the record of the country in certain kinds of engineering and development work, and in that work Mr. Phillips participated actively.

As has been indicated before, there stands to his credit no small part of the engineering work done on certain roads in New York State and in the Central West. And among the roads best known at that time in the construction of which Mr. Phillips played a large part was the Detroit, Ypsilanti & Ann Arbor road, projected originally

to be built through to Chicago, but later becoming a part of the Detroit United System.

Meanwhile came the formation of E. L. Phillips & Company, a desire Mr. Phillips had nurtured for some time. And following the founding of the new company gradually came the entrance of Mr. Phillips into the financial side of the light and power industry. At first construction and engineering was the aim of the company, but it was only a step from that into management and



E. L. Phillips

finance. And so becomes logical the list of offices which Mr. Phillips now fills, notable among them that of chairman of the board of the United Gas & Electric Corporation, controlling a score or more of utilities throughout the country, some of them in the very territory where operate the companies into which Mr. Phillips and associates have now arranged to buy.

If there is any company with which Mr. Phillips is identified in which he takes a special interest it is the Long Island Lighting Company. That company, with a few exceptions, now does the entire lighting and power business on Long Island east of the line which marks the boundary of Greater New York. Mr. Phillips was quick to see the future there. His start on Long Island was made in the acquisition of several small properties, but it was not long before he and his associates, by one acquisition after another, had evolved the present well-ordered and ably-managed Long Island Lighting

Company. Other so-called Phillips interests on Long Island are the Kings County Lighting Company, operating in south Brooklyn and Coney Island, and the Queens Borough Gas & Electric Company, which should not be confused with the New York & Queens County Electric Company, a New York & Edison Company interest. In addition a Phillips interest is the New York Central Electric Company, operating in Auburn, Geneva, Hornell and about twenty other places in central New York. This in part is the record of the man who is the principal figure in this \$40,000,000 deal announced on June 13.

C. F. McAuliff Honored by Purchasing Agents

C. F. McAuliff, purchasing agent and assistant to the vice-president in charge of operation of the Texas Electric Railway, Dallas, Tex., was elected vice-president of the National Association of Purchasing Agents at the thirteenth annual convention of the association, held in Kansas City May 28-31. He has been with the Texas Electric Railway for the past fifteen years.

Mr. McAuliff's first railroad experience was with the New York Central in the maintenance of way department. He went to Texas when the interurban line from Dallas to Waco and the line from Dallas to Corsicana were being constructed. He was born in Peekskill, N. Y., in 1892. He attended public school and Worrall Hall Military Academy.

Obituary

Frank J. Linforth, assistant to the general manager of the Market Street Railway, San Francisco, Cal., and editor since 1922 of *Inside Track*, the company's employee magazine, died recently. He entered the employ of the Market Street Railway as a conductor in September, 1908. Later he served as night clerk and was in succession day clerk, investigator and inspector of applicants in the employment department. In July, 1923, he was appointed superintendent of employment and training. It was said that much of the success of the company's personnel policies was attributed to Mr. Linforth's close application to the solution of employment problems.

Before going to the Market Street Railway Mr. Linforth had been a captain of constabulary in the Philippine Islands. He was educated at Notre Dame University. He was one of the original contributing editors to *Byllesby Management*.

JOSEPH GARFIELD ROBERTSON, formerly in charge of signal operations for the Connecticut Company, Hartford, Conn., died on May 14. Mr. Robertson left the Connecticut Company about two years ago to supervise installations on the Shore Line in Guilford, Conn. He was 47 years old.

Manufactures and the Markets

Good Outlook for Second Half of Year

The outlook for the second half of 1928 is for a continuance of the generally good business which has obtained during the first period of the year, according to the Harvard Economic Bureau. A seasonal decline is in prospect, of course, though the recent strength in commodity markets suggests that the periodic curtailment of manufacturing output will be moderate. Later there may be political developments which will slow down the autumn expansion, although nothing definite can be known this early in the year. But this influence, like the seasonal influence, operates at the present time on the side of business conservatism, fundamentally a healthy condition. The spring expansion of manufacturing output has been moderate, and commercial credits appear to be liquid. Already commercial borrowings are below the spring peak.

Uniformity of trends in leading industries cannot be anticipated during the next several months. However, taking a broad view of the industrial situation, the Standard Statistics and Securities Service believe that the mere term prospect is generally more favorable than at this season in the past several years. Not only will the seasonal letdown this summer be comparatively moderate, but there is sound basis for the belief that an excellent seasonal recovery will occur during the fall.

The National City Bank reports that never before has business been so solidly entrenched in cash and so unencumbered with inventory. A few over-extended spots can be found, as always, but nothing which in the event of liquidation would cause more than a local disturbance.

Banking and Credit Conference Held

One hundred economists, bankers, manufacturers and representatives of farm and labor organizations met on June 4 in Washington, D. C., under the auspices of the Chamber of Commerce of the United States to consider questions in relation to the country's banking and credit machinery.

The discussion of the conference centered upon the tentative report of a special committee which for the past year has been making a study of banking and credit problems. The object of this committee is to make recommendations looking to possible improvements to meet changing conditions of all classes of business and industrial activity.

In addition to the main report of the committee, dealing principally with the federal reserve system, the conference had before it auxiliary reports on "Bet-

ter Banking Under the Federal Reserve System," "Rediscount Operations of the Federal Banks," "Open Market Operations of the Reserve Banks," "Guides to Reserve Credit Policy," "Structure and Control of Federal Reserve System," "Reserve Requirements for Reserve and Member Banks," "Federal Reserve Notes and Other Currency," and "Membership of the Reserve System."

The purpose of the conference is to bring to a focus upon these questions the widest and most representative opinion, preliminary to the drafting of the final reports of the committee to be made later in the year.

South Shore Improvements to Continue

An addition of 3,300 ft. of double track in Gary, Ind., will be in operation on the South Shore Line with completion of the increased Virginia Street siding, east of Gary station, in the next two months.

Grading for this new improvement, which will extend the present siding eastward from Virginia Street, is already finished, and the installation of the materials including 100-lb. rail, creosoted ties, and plates will soon be started.

The Virginia Street track will be the third rail-laying work to be undertaken this season by the South Shore Line. Ten and one-half miles of new 100-lb. rail, and a 4,200-ft., high-speed siding signal-protected, are the other two jobs, both being nearly completed.

Far Sighted Purchasers Invite Proper Price

MANY are prepared to accept as a settled conviction the principle that the continued prosperity of one rests on the success of many; that whenever a business man serves well an industry of which his particular enterprise is a part, in the long run he will serve his enterprise most. Conversely, any action he takes contrary to the general welfare reacts upon him to his distinct and usually greater disadvantage. In an address by W. W. Nichols before the Purchasing Agents Association, he brought out that in accepting this principle, one that was laid down by him, the conclusion follows that the success of the vendor is distinctly the concern of the purchaser and the success of the vendor is of greatest consequence to the ultimate success of the purchaser. So little thought is given to this on the part of the purchaser that many times he applies unintentional, perhaps, though none the less active, opposition to the vendor's efforts to supply the require-

ments demanded of him; too many purchasing agents defeat their ends by giving too exclusive attention to a factor which, in the common estimate, crowns their transaction, viz., *Price*: "too exclusive" because it belittles their consideration and warps their judgment as to the merits of other factors, which are often of greater importance.

For several years the heavy machinery industry has given heed to a costly impropriety incurred in furnishing the working drawings required with the proposals which purchasing agents invite. Unquestionably this practice was originally prompted by an occasional and recognized necessity, but the purchasing agent and his engineer, the *real* instigator, have taken an unfair advantage of an opportunity, to create many abuses in this particular. Cribbing legally protected information, a ruthless disregard of patent and other rights became so offensive as to have invited the consideration of our national associations of engineers and others until there has risen a conscientious opinion, with a reference to certain ethical claims, formerly *never* in evidence.

Other instances of like character can be offered to prove how an action, originally harmless in intent, can easily lead to insincere, unfair and dishonorable practices, *prompted in the individual as opposed to the public interest*, with a marked tendency to a moral obliquity sadly demoralizing to good business practices.

None will deny that the manufacturer is entitled to a proper return on his investment of brains and money. Needless price cutting, which too frequently constitutes the purchasing agent's one aim, cannot but work to the positive disadvantage, sooner or later, of his own interests. When a purchasing agent conspires and, by questionable tactics,

Exhibitograph No. 12

IF
You Have Never
Exhibited Before
Don't
Miss Doing So This Year
at the
A.E.R.A. Show
IT
will be the
Biggest and Best Ever
Cleveland, Ohio
Sept. 22 to 28 inclusive

pits one bidder against another until the low price in the first instance has been cut even to less than cost, he unwittingly inflicts on his own company the resulting effect, in more senses than one.

The vendor who accepts orders which sustain losses can only stay in business by carrying these losses to future orders. He does this, of course, by increasing his overhead charges, which will be unavoidably included in his future estimates. If he is not accorded the profits his enterprise requires, he cannot advance, for after paying the necessary returns on his investment, he will have too little left for that progress in engineering, improvement in design and effectiveness the purchaser's own particular success requires.

Within the year the General Motors Corporation, confronted with proof that a contemplated purchase of certain raw material, at the price bitter competition induced, threatened the existence of the industry supplying it, voluntarily allocated its orders at an advance over quoted prices, in order to preserve an industry in which it had a vital concern. In this way, and only in its own protection, did General Motors make it possible for another industry to manufacture profitably, and thus gave recognition to an economic principle: short-sighted purchasing policies, focused solely on the gains of the moment, never insure lasting benefits.

We need the firm and compelling conviction, particularly in business, that, as it has been truly said, "Whatever is economically sound is ethically sound, and whatever is ethically unsound is economically unsound." Much trouble can be chargeable to one's willingness to do that for his business connection he would not think of doing for himself.

The chief need of the executive in every department of business is a high moral understanding—an instinct, with the moral courage to follow its dictates. This exists to day to a greater degree than twenty years ago. It is not difficult to believe that our business stability and its success can be attributed largely to this marked improvement in business conduct with a more settled and sensible reference to the Golden Rule of business. Integrity in business means much more now than formerly. Very properly the buyer requires honest values. Why should he not strive to give correspondingly honest prices?

Substitution Suggested for Part of Pennsylvania Line

The Southern Pennsylvania Traction Company, Chester, Pa., has applied to the Public Service Commission for permission to remove its tracks between Media and Glen Riddle and substitute buses for cars between those points. P. T. Reilly, manager of the company's railway department, has informed Commissioner Benn that it would cost \$54,638 to keep the railway in operating condition during the next two or three years. The application was not opposed.

Changes in Harvard Advertising Awards Announced

Announcements of provisions of the Harvard Advertising Awards of 1928 are now being mailed. Campaign awards of \$2,000 each will be made as follows:

1. For a national campaign of a specific product.
2. For a local campaign for a specific product or merchandise.
3. For a general or institutional campaign.
4. For a campaign of industrial products.

In submitting material a brief will not be required, nor should the advertisements be mounted. A statement of 600 words giving pertinent facts concerning the campaign is the only necessary material to accompany advertisements themselves.

Among the individual awards, a new prize of \$1,000 will be offered this year for the advertisement most effective in its use of display line. In addition there will be the prizes for the most effective use of text, of pictorial illustration, and of typography. The award for the best combination use of text and illustration has been discontinued.

The award for the best advertising research has also been discontinued, because of the belief of the Harvard authorities that this award had not been a stimulus for more effective research work.

The gold medal for distinguished

service to advertising is again included among the awards to be offered.

It is planned next year, according to Assistant Dean D. W. Malott of the Harvard Business School, through which the awards are administered, to publish the results of the awards, with appropriate comments by the jury, in an effort to make the awards of further service to the advertising profession.

The awards were founded by Edward W. Bok in 1923. This year marks the fifth for this series of prizes.

C. A. Terry Elected on Westinghouse Board

Election of directors and modification of the by-laws marked the annual meeting of stockholders of Westinghouse Electric & Manufacturing Company held in the company's East Pittsburgh headquarters on June 13.

Of the four directors upon whom action was taken, three, whose terms had expired, were re-elected. These were Joseph W. Marsh, of General Cable Company, H. H. Westinghouse, of Westinghouse Air Brake Company, and Albert H. Wiggin, of Chase National Bank. The new director, Charles A. Terry, Westinghouse Electric vice-president, takes the directorship left vacant by the death of Gen. Guy E. Tripp.

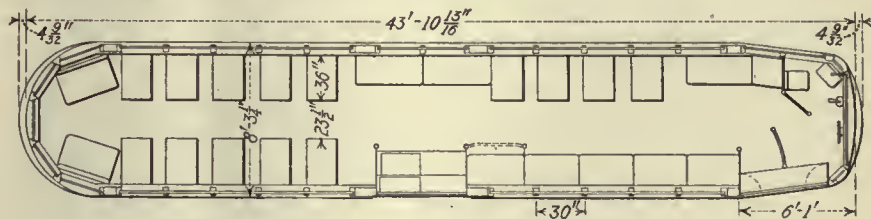
Change in the by-laws under which

Specifications on 100 Cincinnati Cars

One hundred cars to cost \$1,300,000 have been ordered by the Cincinnati Street Railway, Cincinnati, Ohio, from the Cincinnati Car Company, as mentioned in the May 19 issue of the JOURNAL. The cars are of the single-end, double-truck, quick loading type with front entrances and center exits.

Each car is 44 ft. 7 3/8 in. long, 8 ft. 3 1/4 in. wide and weighs 31,000 lb. The

bodies are of steel construction and special attention has been given to the elimination of noise. The car fronts will be fitted with non-shatterable glass. The center exit doors will be treadle operated. Cross seats will be used except on one side of the front section where longitudinal seats will be installed. Further specifications are given below.



Type of unit.	One-man, two-man, motor, passenger city, single end, double truck
Number of seats.	50
Date of order.	May 17
Delivery.	Beginning July 1, 1928
Weight, total.	31,000 lb.
Bolster centers.	25 ft. 8 in.
Length over all.	44 ft. 7 3/8 in.
Truck wheelbase.	5 ft. 4 in.
Width over all.	8 ft. 3 1/4 in.
Height, rail to trolley base.	10 ft. 8 5/8 in.
Body.	Semi-steel
Roof.	Wood, arch
Doors.	Center and end, folding
Air brakes.	General Electric, with safety features
Axles.	Annealed steel, A.E.R.E.A. standard
Car signal system.	Faraday buzzers
Control.	Type K
Curtain fixtures.	50 cars National Lock Washer, 50 cars Railway Curtain Company
Curtain material.	Pantasote
Destination signs.	Hunter illuminated
Door mechanism.	National Pneumatic
Energy saving device.	Economy meters

Fare boxes.	Cleveland
Gears and pinions.	50 cars Westinghouse; 45 car Tool Steel; 5 General Electric
Hand brakes.	Cincinnati
Heaters.	Railway Utility panel type
Headlights.	Ohio Brass WDF dash Type
Headlining.	1/4-in. Agasote
Interior trim.	Cherry, oxidized bronze trimmings
Journal boxes.	Cincinnati cast steel, spring mounted
Motors.	95 cars, four Westinghouse 510; 5 cars, four G.E.-265, inside hung
Sash fixtures.	90 cars Curtain Supply Company, 10 cars O. M. Edwards
Seats.	Hale-Kilburn deluxe No. 108
Seating material.	Brown Spanish leather
Slack adjusters.	Anderson automatic
Steps.	Stationary
Step treads.	Cast aluminum
Trolley catchers.	OB-13141
Trolley base.	US-22A
Trucks.	Cincinnati Arch-bar type
Ventilators.	Railway Utility Company
Wheels.	Rolled steel, 26 in. diameter
Wheelguards or fenders.	H-B life guard

the fiscal year of the company now conforms with the calendar year was ratified. Due to the change in the fiscal year, the annual meeting of stockholders will be held in the future on the second Wednesday in April instead of the second Wednesday in June, as has been the custom.

New Seats for Pacific Electric Cars

Plans for improvement in a total of 198 passenger cars have been made by the Pacific Electric Railway, Los Angeles, Cal. Representing an expenditure in excess of \$105,000, the work to be done consists largely of providing new comfort-giving features to existing interurban equipment, including the installation of 1,260 new heavily cushioned double seats.

Plans made consist of improving 45 of the railway's 950-class cars with an improved type of upholstered seat. Finished in brown Spanish leather, these seats are to be of deep cushion type, with divided back, and double spring.

In addition, the open sections of the 45 cars are to be closed in to avoid the strong winds, cold and dampness.

A total of 111 of the Pacific Electric's 800-class interurban cars used on various lines also are to undergo extensive improvements. Plans made call for the removal of wooden slat seats and substitution of upholstered seats, also the closing in of all open sections.

The company's 1,000-class cars, 42 in number, are to be improved by substitution of upholstered seats for wooden seats.

The improvements follow betterments recently made by installation of new relays which were designed to provide additional speed through faster getaway.

Tire Prices Cut

Reductions in tire prices of from 4 to 17 per cent have been made by the Firestone Tire & Rubber Company. The average reduction on all classes of tires is approximately 10 per cent. First grade low pressure tires were reduced 12½ to 15 per cent; third-grade tires 4 per cent, and solids 10 per cent. The extreme reduction applies only to products that now are almost obsolete.

The cuts were promptly followed by the Lee Tire & Rubber Company and the General Tire & Rubber Company, commensurate reductions being made in both instances. The Kelly-Springfield Tire Company announced that it would meet the reductions, and it is expected that Goodyear, Goodrich, United States Rubber, Fisk and other large tire manufacturers will follow suit.

Reductions have been considered inevitable in view of the 50 per cent decline in crude rubber prices that took place earlier in the year. Rubber quotations were just under 40 cents a pound at the beginning of the year, but drastic declines took place when announcement was made in the British House of Commons that a commission had been ap-

ELECTRIC RAILWAY MATERIAL PRICES—JUNE 12, 1928

Metals—New York	
Copper, electrolytic, cents per lb.	14.525
Lead, cents per lb.	6.30
Nickel, cents per lb., ingot.	35.00
Zinc, cents per lb.	6.525
tin, Straits, cents per lb.	48.50
Aluminum, 98 or 99 per cent, cents per lb.	23.90
Babbitt metal, warehouse, cents per lb.:	
Commercial grade.	53.00
General service.	31.50

Bituminous Coal	
Smokeless Mins Run, f.o.b. vessel, Hampton Roads, gross tons.	4.175
Somerset mine run, f.o.b. mines, net tons.	1.825
Pittsburgh mine run, Pittsburgh, net tons.	1.775
Franklin, Ill., screenings, Chicago.	1.70
Central, Ill., screenings, Chicago.	1.55
Kansas screenings, Kansas City.	2.50

Track Materials—Pittsburgh	
Standard steel rails, gross ton.	\$43.00
Railroad spikes, drive, ½ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.15
Angle bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.875
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	\$1.40

Hardware—Pittsburgh	
Wire nails, base per keg.	2.60
Sheet iron (24 gage), cents per lb.	2.75
Sheet iron, galvanized (24 gage), cents per lb.	3.6
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	3.10

Waste—New York	
Waste, wool, cents per lb.	18.
Waste, cotton (100 lb. bale), cents per lb.:	
White.	17.25
Colored.	13.5

Paints, Putty and Glass—New York	
Linseed oil (5 bbl. lots), cents per lb.	11.1
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	\$0.635
Putty, 100 lb. tins, cents per lb.	5.50

Wire—New York	
Copper wire, cents per lb.	16.625
Rubber-covered wire, No. 14, per 1,000 ft.	5.3
Weatherproof wire base, cents per lb.	17.125

Paving Materials	
Paving stone, granite, 5 in., f.o.b. New York—Grade I, per thousand.	\$150
Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd., f.o.b.	\$2.78
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	51.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ½-in., carload lots, N. Y., per cu. yd., delivered.	3.375
Cement, Chicago consumers' net prices, without bags, f.o.b.	2.05
Gravel, ½-in., cu. yd., delivered.	3.375
Sand, cu. yd., delivered.	2.125

Old Metals—New York and Chicago	
Heavy copper, cents per lb.	12.125
Light copper, cents per lb.	10.675
Heavy yellow brass, cents per lb.	7.25
Zinc, old scrap, cents per lb.	3.25
Lead, cents per lb. (heavy)	4.875
Steel car axles, Chicago, net ton.	\$16.25
Cast iron car wheels, Chicago, gross ton.	13.75
Rails (short), Chicago, gross ton.	15.50
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton.	7.

pointed to consider the advisability of discontinuing the Stevenson rubber export restriction plan. On April 4 Premier Baldwin announced that all restrictions would be abandoned on Nov. 1, and rubber dropped thereafter to 19 cents.

ROLLING STOCK

PACIFIC ELECTRIC RAILWAY, Los Angeles, Cal., is calling for bids for four 62-passenger motor coaches, eight 60-passenger trail coaches and six 52-combination passenger and baggage coaches, bids receivable to noon June 25 at the Los Angeles office.

UNITED ELECTRIC RAILWAYS, Providence, R. I., is considering plans for the purchase of 50 cars.

PITTSBURGH RAILWAYS, Pittsburgh, Pa., has decided to equip fifteen interurban cars of the 3,700 series with individual bucket-type seats.

MONREAL TRAMWAYS, Montreal, Quebec, Canada, is reported to be planning approximately 25 new cars.

HYDRO-ELECTRIC RAILWAYS, Toronto, Canada, is rumored to be making plans for eight interurban cars.

DELAWARE POWER COMPANY, Wilmington, Del., has been asking for bids on ten new cars.

TRACK AND LINE

BRITISH COLUMBIA ELECTRIC RAILWAY, Vancouver, B. C., Canada, will relay car tracks on Pender Street West. The portion between Granville and Nicola Streets will be relaid on existing foundations and from Nicola to Cardero Streets on new foundations. The com-

pany intends to rebuild about 2,000 ft. of double track paving with permanent standard construction.

OKLAHOMA RAILWAY, Oklahoma City, Okla., is making preliminary plans for a 1.3-mile track extension of the Las Vegas car line in Oklahoma City, at an approximate cost of \$35,000.

SHOPS AND BUILDINGS

SOUTHERN INDIANA GAS & ELECTRIC COMPANY, Evansville, Ind., will make extensions on its power plant and system to cost about \$350,000.

WISCONSIN POWER & LIGHT COMPANY, Madison, Wis., will soon take bids for power plant changes to cost \$100,000. The company is also making plans for an equipment, storage and distributing plant to cost about \$30,000.

TRADE NOTES

CANADIAN GENERAL ELECTRIC COMPANY, Peterboro, Ontario, Canada, will spend \$1,500,000 on building and new equipment.

J. K. B. HARE, recently manager of the Columbus, Ohio, office of the Westinghouse Electric & Manufacturing Company, has been appointed assistant central station sales manager, with headquarters at 150 Broadway, New York, N. Y.

BOTFIELD REFRACTORIES COMPANY, Philadelphia, Pa., announces that the Builders & Industrial Supply Company, Toledo, Ohio, has been appointed distributor for the Toledo district.

HEYWOOD - WAKEFIELD COMPANY, Boston, Mass., has appointed George E. Cornwall supervisor of its railway sales division.

Boston El

places ten new cars in service—each equipped with a

“Peacock” Staffless Brake



These one-man, two-man cars will seat 48 passengers

One of the recent news items of the industry is the replacement of the old box cars in service in South Boston by ten new semi-steel cars. These cars were built for the Boston Elevated Railway, by Laconia Car Company, Laconia, N. H. They are of the one-man, two-man double-end, double-truck type, each weighing 31,462 lb., with an overall length of 45 ft. and a seating capacity of 48.

As an assurance of safety each car is equipped with a “Peacock” Staffless Brake—light in weight, positive and unfailing in action, occupying little space and capable of tremendous braking power.

We always welcome inquiries about the many advantages of the peerless, “Peacock.”



One of the ten semi-steel cars recently delivered to the Boston Elevated Railway

The
“Peacock”
Staffless



National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Company, Limited, Montreal, Canada



*Inaugurated by Pittsburgh Railways Co.
using specially designed Hale & Kilburn Seats*

These seats and their arrangement represent an effort to obtain the maximum passenger comfort, together with durability under constant traffic conditions. Pittsburgh Railway executives feel that passengers object to physical contact with other passengers encountered in double seats, and that they also dislike riding on longitudinal seats facing riders on opposite side of car. Executives and engineers of the Pittsburgh Railway Company cooperated with our organization in developing a seat to overcome these objections. Individual Chair No. 905 set at an angle, accomplishes this, and it is hoped that it will prove standard in design and arrangement. Pittsburgh's two experimental cars as well as fifteen standard city type cars are already equipped with

chairs of this type, finished in rattan, with steel backs to prevent mutilation. Cushions are circular and may be turned to three positions, distributing wear. A sanitary feature makes cleaning easy and prevents collection of dust.

This same chair, upholstered in plush and leather, is also being made for 30 Pittsburgh interurban cars, fifteen of which are new, and the rest redesigned for the new seating arrangement.

This represents another H. & K. pioneering job—the ability to adapt comfortable, long wearing seats to modern transportation needs.

HALE & KILBURN COMPANY

General Offices and Works: 1800 Lehigh Ave., Philadelphia

SALES OFFICES:

Hale & Kilburn Co., Graybar Bldg., New York	T. C. Coleman & Son, Starks Bldg., Louisville
Hale & Kilburn Co., McCormick Bldg., Chicago	W. L. Jefferies, Jr., Mutual Bldg., Richmond
E. A. Thornwell, Candlar Bldg., Atlanta	W. D. Jenkins, Praetorian Bldg., Dallas, Texas
Frank F. Bodler, 903 Monadnock Bldg., San Francisco	H. M. Euler 146 N. Sixth St., Portland, Oregon
C. S. Wright Co., 66 Temperance St., Toronto, Ont.	

Hale and Kilburn SEATS

TRY THIS TIRE COST PLAN

*and we'll let SILVERTOWNS
do their own selling*

CAN SILVERTOWNS give you a lower cost per mile? Can the Goodrich Water Cure process of manufacture cut down your repair costs? Can the number of roadside tire changes be reduced?

We leave these answers, and many more, to the simple record plan shown here. These cards will be supplied on request. Put a pair of Silvertowns on each bus or truck in your fleet. Keep records like this for all your tires—and the facts, the savings you discover, will sell you Goodrich Heavy Duty Silvertowns!

Goodrich construction makes this statement possible. Extra rubber between outer plies of the tire provide extra cushion—put “rubber fingers” in the tire where the danger of separation is greatest. The Goodrich Water Cure toughens the whole tire uniformly—sends curing heat to the

deepest layers, changing soft gum into stout rubber.

Leading fleet operators have found

out the facts which the Goodrich Tire Cost Plan will prove to you. Ask any Goodrich dealer who handles Goodrich Heavy Duty Silvertowns to supply you with copies, or send the coupon direct to Akron.

THE B. F. GOODRICH RUBBER COMPANY
Established 1870 Akron, Ohio
Pacific-Goodrich Rubber Company,
Los Angeles, California - In Canada:
Canadian-Goodrich Rubber Company,
Kitchener, Ontario

TIRE CHANGE TAG
The B. F. Goodrich Rubber Co., Akron, Ohio

Date _____
Car or Truck Number _____
Wheel Position _____
Removed Tire No. _____
Applied Tire No. _____
Why Removed _____
Remarks _____
Form 204

DAILY TRIP MILEAGE RECORD
The B. F. Goodrich Rubber Co., Akron, Ohio

Date _____
Car or Truck No. _____
Meter Reading A. M. _____
" " P. M. _____
Day Shift _____
Trip _____ Mileage _____

TIRE RECORD CARD

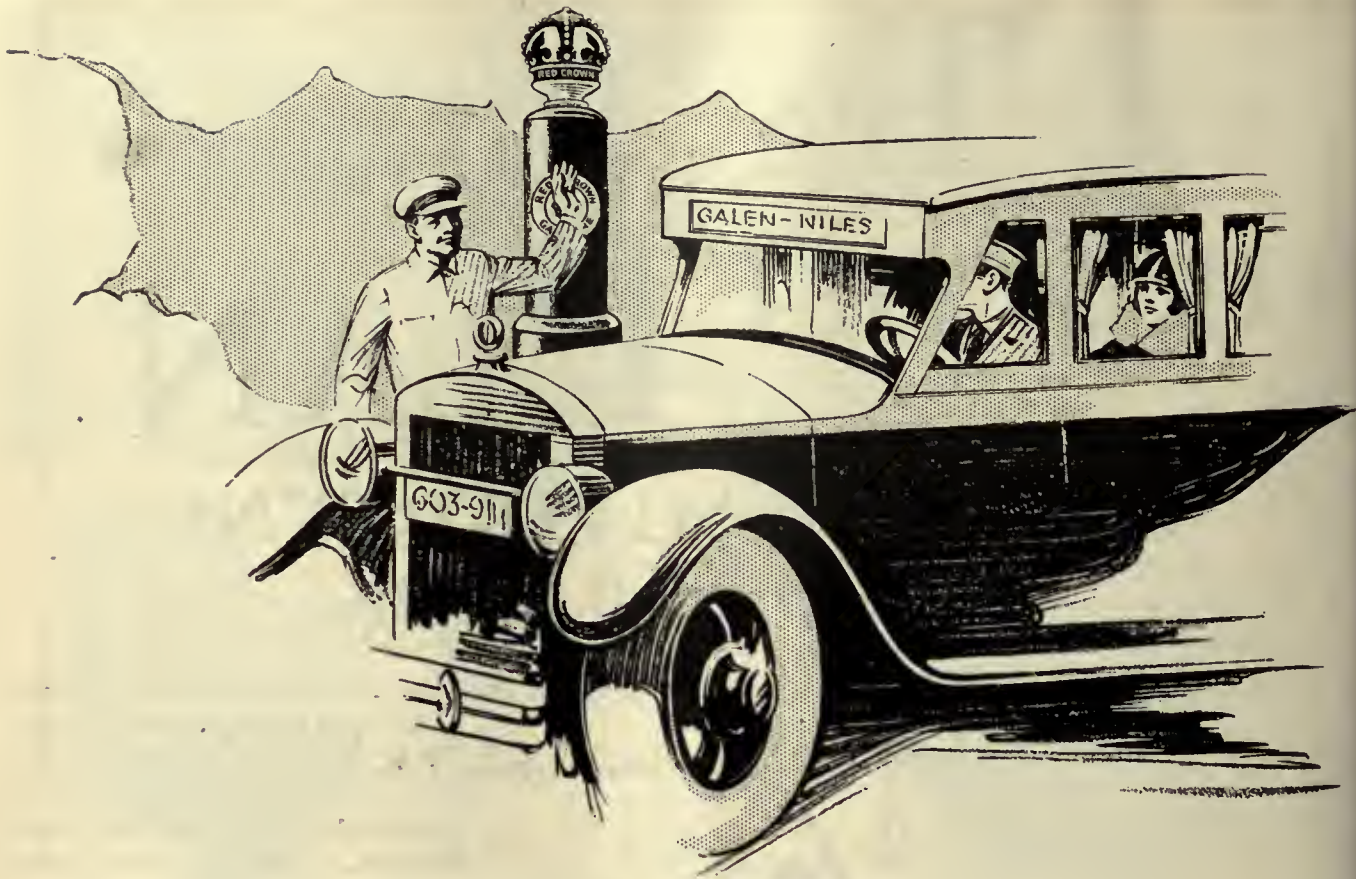
Tire Brand Number _____ Serial Number _____ Date Received _____
Size _____ THE B. F. GOODRICH RUBBER CO., Akron, Ohio

Date Applied	Car Or Truck No.	Wheel Position	Date Removed	Mileage The Application Or Month	Month	CAUSE OF REMOVAL	Disposition	Costs

Goodrich HEAVY DUTY Silvertowns

BUS & TRUCK TIRE DEPT.,
B. F. GOODRICH RUBBER CO., Akron, Ohio
I'm interested in lower tire costs. Please send your Tire Cost Plan to Goodrich dealer named below.

Name.....
Firm Name.....
Street.....
City..... State.....
Number of cars in fleet.....
Name of Goodrich Dealer.....
.....



What He Could Tell the Boss

Low cost mileage tells one story of Red Crown Gasoline. 'Most any bus driver can add another story of Red Crown satisfaction—a story that cost figures do not show.

He could tell a story of easy motor starting, saving time and battery juice. He could point to the decided advantage of Red Crown's quick pick-up, especially when driving in traffic. He could explain how the smooth, instantaneous power response with Red Crown permits even, steady speed changes—easy on the

bus—comfortable to the passengers.

Red Crown Gasoline is all that a good gasoline should be. It has proved in repeated laboratory and road tests to be the most efficient and economical motor fuel for buses, and it has proved to possess those other advantages that figures do not cover. More of it is being used by bus operators throughout the Middle West than any other brand.

To make sure that you are getting your moneys worth from gasoline, standardize on Red Crown.

STANDARD OIL COMPANY

[INDIANA]

General Offices: 910 S. Michigan Avenue

CHICAGO, ILLINOIS

ILLINOIS
Chicago
Decatur
Joliet
Peoria
Quincy

INDIANA
Evansville
Indianapolis
South Bend
KANSAS
Wichita

IOWA
Davenport
Des Moines
Mason City
Sioux City

S. DAKOTA
Huron
MICHIGAN
Detroit
Grand Rapids
Saginaw

N. DAKOTA
Fargo
Minot
WISCONSIN
La Crosse
Milwaukee
Green Bay

MINNESOTA
Duluth
Mankato
Minneapolis

MISSOURI
Kansas City
St. Joseph
St. Louis



International Model 15
 Club Coach - - 15 passenger
 Sedan Coach - - 17 passenger
 P. A. Y. E. - - - 15 passenger

International Harvester *Six-Cylinder* COACHES

THE International line of motor coaches fits the practical requirements of every community.

Backed by long experience, these modern coaches are unexcelled in mechanical design, beauty, and comfort; unequalled in safety, and in service facilities. Coach traffic men know this. They know that International Coaches are a profitable investment. Experience has shown them that when an International is put on the job it stays on the job—and does the work so well that vehicle problems and operating costs are settled for years. No wonder you see so many International



Beauty and perfection of body appointment, and merit in design and mechanical detail have built a high reputation for International Motor Coaches.

Coaches wherever you go!

Careful study and understanding of coach route requirements has resulted in the development of the Model 15, which has won the esteem of coach operators everywhere. This 6-cylinder

coach is available in three styles—Street Car Type, Club Coach, and Sedan; generously built to carry 15 or 17 persons—the practical capacity. Our new catalog will acquaint you with the many exclusive refinements offered by International Harvester *Six-Cylinder* Coaches. Copies are available by writing us direct.

The International Harvester automotive line also includes the 3/4-ton Special Delivery Truck, Speed Trucks of 1 1/4, 1 1/2, and 2-ton, Heavy-Duty Trucks up to 5-ton, and McCormick-Deering Industrial Tractors. Service is "always around the corner." There are 160 company-owned branches in the United States and Canada.

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

of AMERICA
 (Incorporated)

Chicago, Illinois



KNOWING how to properly fit the tire to the job is the first step toward assuring the greatest uninterrupted mileage. General has gained this knowledge through long experience in supplying the big share of the truck and bus tire market. This factory experience is available through the General dealer who knows how to successfully tackle the toughest jobs.

THE GENERAL TIRE AND RUBBER COMPANY, AKRON, OHIO



The

*The
Heavy Express
Special*

The one tire that will carry the load and stand up under express speed... the Heavy Express Special... specially built for the job.

GENERAL TIRE

— goes a long way to make friends

THE SIGN OF
EXPERT SERVICE
AND
GENUINE SERVICE PARTS



*Over 1400 Authorized
Service Stations
Ready to Give
Immediate Service*

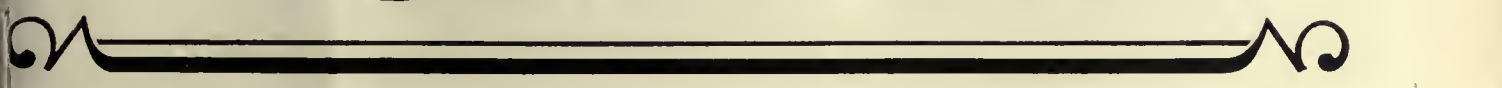
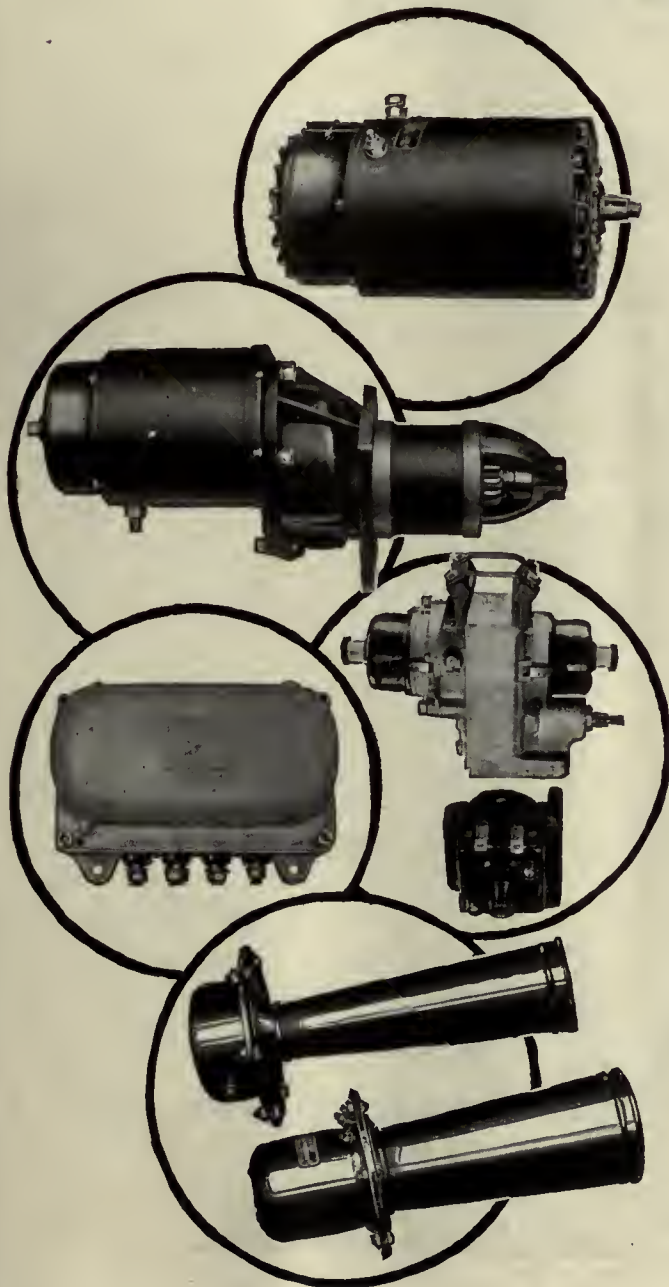
BUILT with a ruggedness and durability that have made it the standard in the bus field, North East Equipment is in itself an assurance of uninterrupted service.

But operators of North East equipped buses are still further assured of uninterrupted operation by world-wide North East Service which provides genuine parts and skilled workmen wherever North East equipped buses are in use.

NORTH EAST ELECTRIC CO.

Rochester  New York

Service Stations in principal cities throughout the world





Ready for Tomorrow

THE above bus—one of the Twin Coaches of the Egyptian Transportation System of Marion, Ill., is completely equipped with Protex Glass. It is a bus ready for tomorrow. Ready to avoid injury—ready to save thousands of dollars in possible damage suits—ready today for tomorrow's competition. The utmost in safety.

Protex Glass eliminates practically all flying glass injuries and does it *economically*. If your busses are not ready for tomorrow write *today* to the Protex Glass Company, 220 Fifth Ave., New York, for booklet and sample.

Protex
GLASS 



One way to hold the business your driver builds

*Don't let
POOR LIGHTS
tear down the business
his courtesy and skill
are building up.*

A COURTEOUS driver, keen and alert, can do much to build business. Good lights, well placed, giving reading comfort to the coach passengers, are a material aid in holding this business. On the other hand, business suffers if lights grow dim.

No ordinary power plant can keep lights at their brightest in the motor coach. Long hours of operation, heavy lamp load, gruelling day-in-

and-day-out service—call for extra power—extra stamina. Only a generator of the right capacity, in combination with a dependable battery of the proper size, can handle the job satisfactorily.

Well-paying coaches

That is why owners of well-paying coaches use the Exide Motor Coach Battery. It is specially designed for this battery job, by engineers who know how difficult that job is.

Profit two ways

Besides insuring good lights for drivers and customers, these owners are lighting their coaches at the lowest operating cost per mile. Thus they profit two ways . . . they save money by cutting operating costs—they make money by building and maintaining business.



Exide

MOTOR COACH BATTERY

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, Toronto



Let this small OHMER Register print your passenger tickets

Why incur the cost and risk of pre-printed tickets when this inexpensive OHMER Type 79 Register will manufacture tickets at the moment of sale? There's absolutely no need to carry a stock of tickets. Your ticket worries are over when you install this little machine in your stations and on your vehicles.

All the data plainly printed

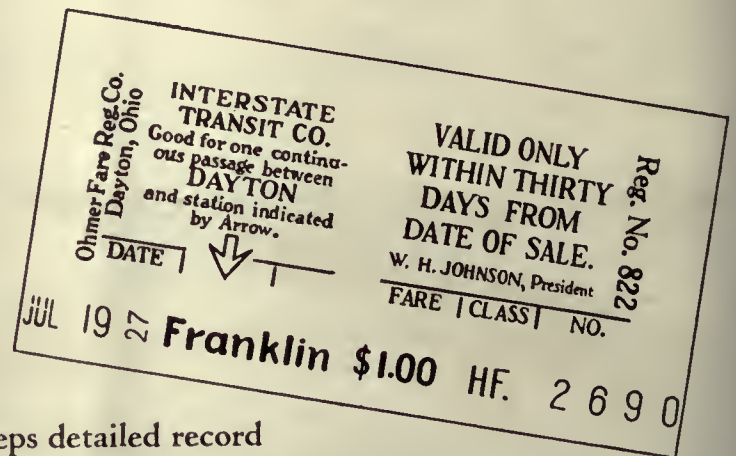
The ticket reproduced herewith in actual size was printed on an OHMER Type 79 Register. It is complete in every respect. It shows the names of the issuing station and destination spelled out in full. In addition, it gives the name of the transportation company, the conditions of sale, the date, the amount and class of fare, the register number, and the consecutive number of the ticket.

There are other styles of the Type 79 Register which print the name of the issuing station in full and abbreviate the destinations, or indicate both "from" and "to" points by number. The latter method is especially adapted for use on vehicles, while the other two methods are intended for ticket offices. Any of the machines can be had with manual or electric operation.

Also keeps detailed record

At the same time that the register prints a ticket, it also prints a duplicate record of the data on a detail strip not accessible to the ticket seller. This provides an absolute check on each transaction. And it tabulates the data in a form that greatly expedites accounting and auditing.

Thus revenue from ticket sales and cash fares is positively safeguarded through the use of OHMER Type 79 Registers. The passenger sees to it that the amount on the ticket tallies with the money collected. That prevents carelessness and mistakes. And the amount turned in by the operator must agree with the amount collected, for the transactions are all fully and unalterably itemized on the detail strip. There is no chance for discrepancies to occur without detection.



Ask for descriptive literature

Get all the facts about the OHMER Type 79 Ticket-Printing Register. We will be glad to send you interesting, fully illustrated circulars. Find out what an ingenious and capable machine it is. You will readily understand how such a register will pay for itself many times over by saving revenue, by enforcing correct accounting, and by eliminating the cost of maintaining ticket stocks. Write promptly for full information.

**OHMER FARE REGISTER
COMPANY**
Dayton, Ohio, U. S. A.

The OHMER Line

Fare Registers with various indicating, ticket-printing, and accounting features; OHMER Printing and ATCO Non-Printing Taximeters; Mileage Meters, including the Odometer, Hub-Odometer, Recordograf, and Truck Auditor; Fare Boxes; Industrial Counters. Circulars about any of these articles will be sent upon request.

OHMER

REG. U.S. PAT. OFF. AND OTHER COUNTRIES

FARE REGISTER COMPANY

The 12 Passenger Beautiful



*Luxury
Economy
Sturdiness*

FitzJohn

GRACEFUL, splendid design — handsomely appointed interior—the FitzJohn 12-Passenger Body is a beautiful, luxurious model.

Economical, too—economical in gasoline and tires—economical in the long wearing qualities which sturdy FitzJohn construction assures. Adapted to any light chassis.

FitzJohn Bodies are built in a factory which in facilities and efficiency is second to none in the industry. FitzJohn Bodies have made a name for themselves among discriminating operators.

FITZJOHN MANUFACTURING CO.

Exclusive Bus Body Builders

MUSKEGON

MICHIGAN

HOUSTON ELECTRIC GOODYEARS

HOUSTON holds a big place in the public eye this month.

Houston Electric Company is called upon to demonstrate for the benefit of guests from all over the nation, the reliable, quality service that is rendered to Houston every day.

In this extra tax upon its facilities, this well-known system is served dependably

by Goodyear Pneumatic Cord Bus Tires.

* * *

Houston Electric Company operates a fleet of 63 motor buses.

These buses last year delivered a total mileage of 1,521,441 bus miles. This year, they are expected to run in excess of 2,000,000 miles.

For four years now, Houston Electric



Street scene in Houston, Texas, showing one of the exclusively Goodyear-equipped fleet of Houston Electric Company

GOODYEAR

Copyright 1928, by The Goodyear Tire & Rubber Co., Inc.

for four years now has used EXCLUSIVELY

Company buses have been equipped with Goodyear Bus Tires *exclusively*.

* * *

That amount of service and that length of service furnish the strongest testimonial to the quality and economy of Goodyear Tires.

If there were any better tires, Houston Electric Company's policy of using the best would dictate their use.

If there were anything as good at lower cost, Houston Electric's regard for economical public service would insure their use.

Houston Electric uses Goodyears *exclusively*.

* * *

Goodyear Bus Tires have many *exclusive* features. They have the All-Weather Tread for Traction and Safety. They are made of SUPERTWIST—Goodyear's extra-elastic and extra-durable cord fabric—for long wear, for road insurance against blowouts and bruises, and for balloon-effect cushioning.

They combine these exclusive features with a low-per-mile cost that shows up on the right side of the traffic ledger.

If you want these tire advantages, at no

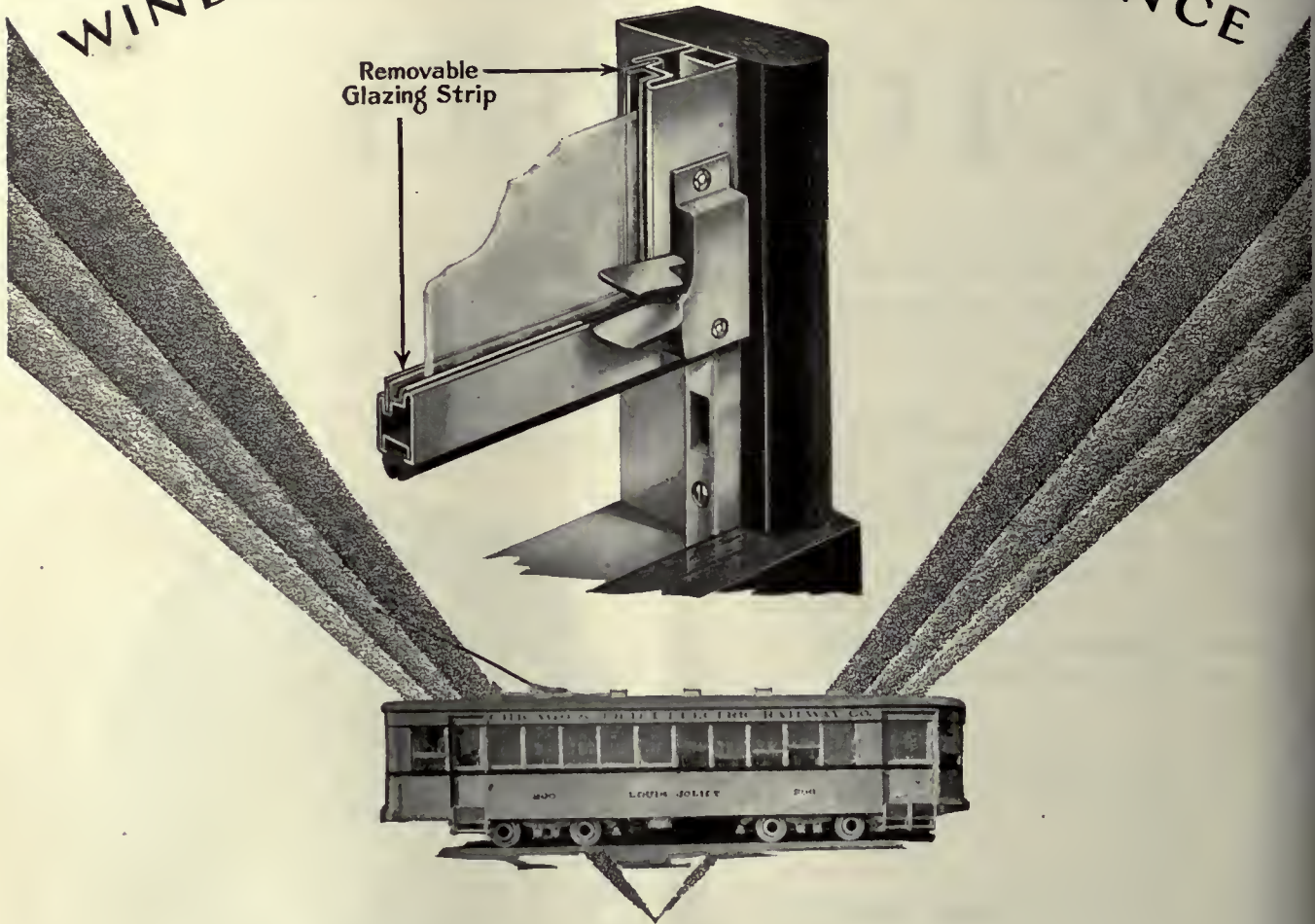
more first cost and at less final cost, equip your buses with Goodyears *exclusively*.

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



BUS TIRES

WINDOWS DO MAKE A DIFFERENCE



Reglaze this New Sash in 2½ Minutes

How much time do you lose each year in replacing broken glass?

What is the toll in inconvenience to passengers . . . costly delays . . . good will lost?

Edwards Metal Sash with Removable Glazing Strips can be reglazed in as short a time as two and one-half minutes—without removing sash from the opening. There is nothing intricate about this new feature. Brass strips are easily removed, and new glass placed in the opening. Strips are reinserted and the sash is ready for operation.

Illustrated is a new aluminum car of the Chicago and Joliet Electric Railway Company equipped with Edwards Metal Sash with Removable Glazing Strips. Cummings Car and Coach Co., builders.

No screws are used—no special tools are necessary. The construction is simple—yet it will save electric railway companies many dollars in time and labor.

Edwards quality, known thru over forty-two years' service to the transportation field, is built into this new sash.

Complete information and specifications on request.

O. M. EDWARDS CO.
New York Syracuse, N.Y. Chicago

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



Edwards Metal Sash



MODERN LIGHTS FOR MODERN TRAFFIC

Drivers whose cars are equipped with Guide Tilt Ray Headlamps possess a distinct advantage in modern night traffic. The tilted or depressed beam of light does away with dimming and glare, and makes it equally easy to see and be seen.

Such is the safety, convenience and efficiency provided by Tilt Rays they are the selection of an increasingly large number of motor truck and motor coach makers and operators. Address requests for details to the Fleet Sales Department, The Guide Motor Lamp Manufacturing Company, Cleveland, Ohio.

Guide
**TILT RAY
HEAD LAMPS**

DOME LAMPS

STOP-TAIL LAMPS

MARKER LAMPS

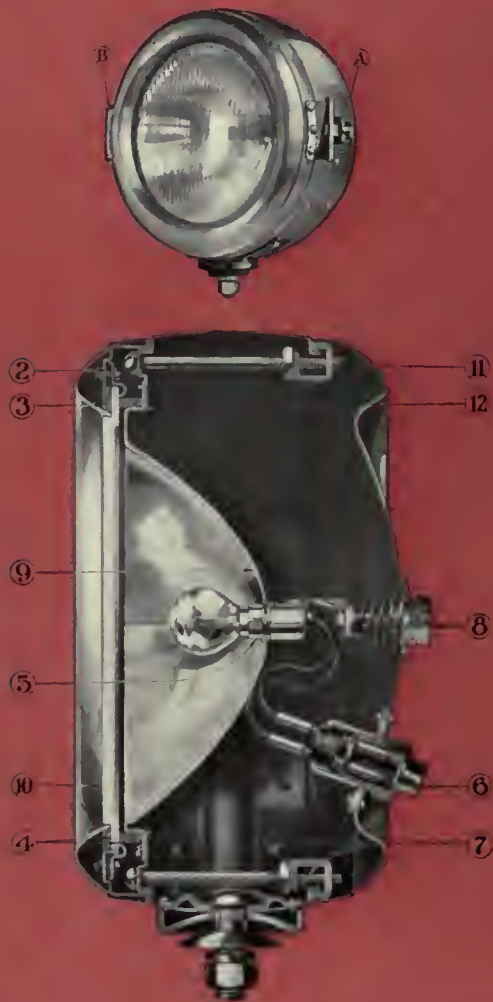
There's a **DOZEN**

REASONS

why Guide Tilt Rays merit choice

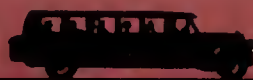
A—Thumb screw catch that makes the opening of lamp door easy, simple and positively locks door securely.

B—Hinge for door of lamp.



- 1 An upper and lower ray.
- 2 Door stiffener on inside for reinforcement purpose with glass ring that positively holds glass in place at all times. No danger of glass dropping out when the door is opened.
- 3 Felt seals for air-tight waterproof condition.
- 4 Reflector is locked to the body—sealed between body and glass ring by additional cork seal.
- 5 Bulb firmly held in place—no distortion or wobbling. A specially designed bulb socket.
- 6 Special bus connectors, proven correct by actual performance.
- 7 Bracket and body properly reinforced by heavy inside steel stiffener.
- 8 Outside ratchet adjustment for focusing bulbs.
- 9 Special reflector with four distinct sections, scientifically designed to contribute its share to an optically correct vertical distribution of light controlling upper and lower beam. Labelled with the word "Top" at the upper part to prevent incorrect installation.
- 10 Lens divided into three sections to properly distribute light where needed. A notch in the edge of lens into which a lug fits is provided to prevent the lens from rotating. Also labelled "Top" in its proper place as a guide for installation.
- 11 Four bolts for reinforcement and locking purposes.
- 12 Lamp constructed of extra heavy material. Trouble-proof.

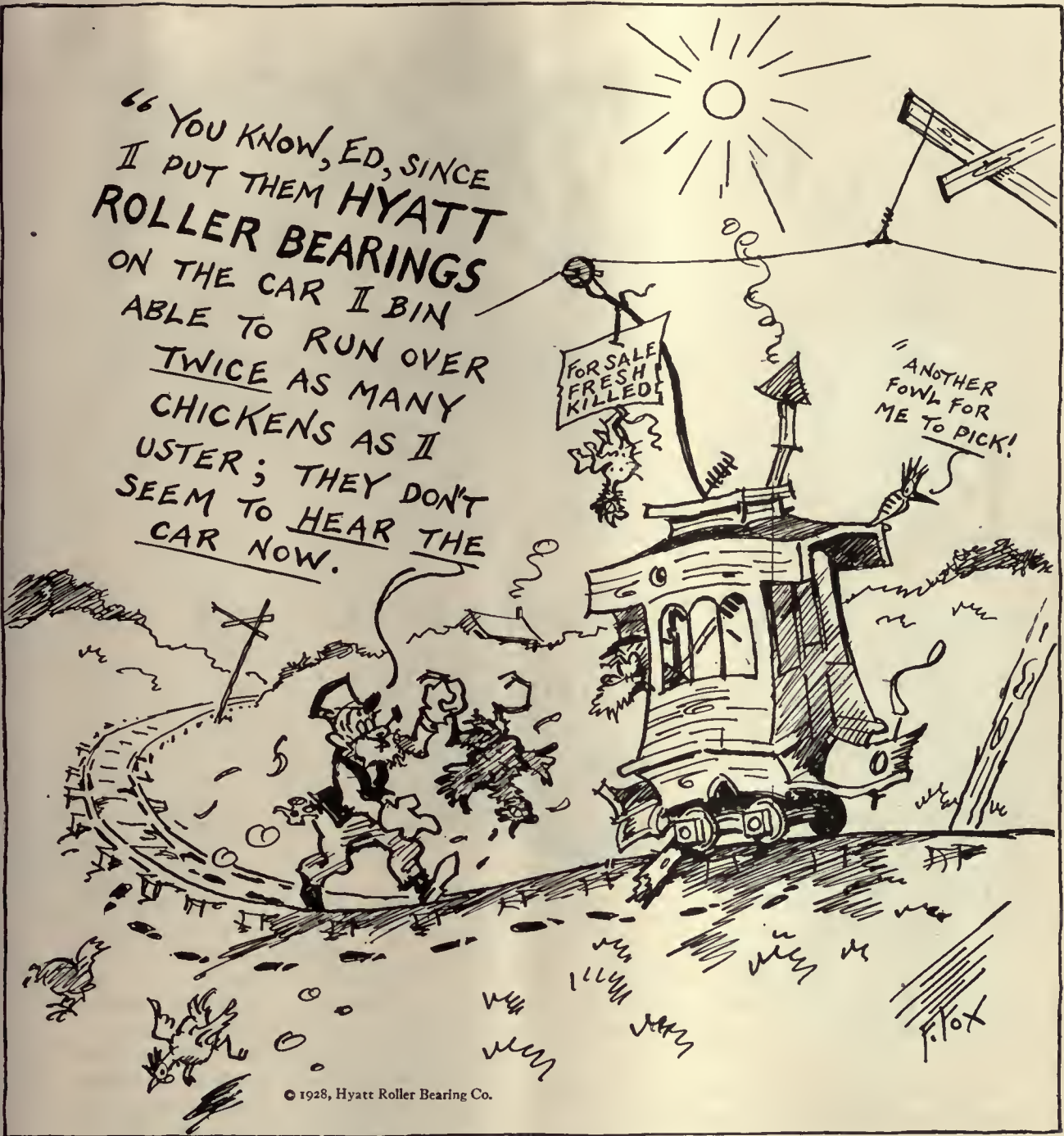
1



FOR HEAVY DUTY SERVICE

Guide

**TILT RAY
HEAD LAMPS**



Smooth starts, rapid pick-ups and steady, quiet operation are Hyatt's contributions to greater riding comfort.

Quick get-aways on Hyatts help maintain schedules. When running, too, there is practically no friction. Less power is consumed. Less attention is needed.

HYATT ROLLER BEARING COMPANY
 Newark Chicago Detroit Pittsburgh Oakland

HYATT
ROLLER BEARINGS
 PRODUCT OF GENERAL MOTORS



Carey Elastite System of Track Insulation—a guarantee of easier riding for America's city millions. Recommended by street railway officials everywhere.



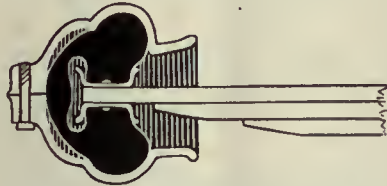
ELECTRIC transit ... a step in advance of the automobile

PASSENGER comfort!
Competition for passenger traffic!

And now the higher priced automobiles come out with rubber-set springs—spring shackles replaced by blocks of solid rubber. Today's improvement, in the automotive field.

But *today's* improvement, for the auto, is *yesterday's*, for the trolley!

For street railway companies, you know, have for years set their rails in yielding cushions of shock-absorbing asphalt. A step in advance of the automobile—a safeguard for street car supremacy.



The use of solid rubber blocks to replace spring shackles—today's improvement in the automotive field.

Carey Elastite System of Track Insulation! Easier riding for America's city millions. An un-failing means of maintaining passenger traffic. Smoother, more quiet operation—a saving in railway maintenance and a route to faster schedules.

Carey Elastite System of Track Insulation, as you know, consists of a durable, asphaltic compound substantially reinforced with asphalt-saturated fibre performed under heavy pressure. Its use is recommended by leading street railway officials in more than 150 cities, large and small. Of course you will want full information on this modern traction improvement. Write.

THE PHILIP CAREY COMPANY, Lockland, CINCINNATI, O.

Carey Elastite
SYSTEM OF TRACK INSULATION





Get the habit

LET the buying habits of big fleet operators guide you to real tire economy. Judge tires as they do, on a cost per mile basis.

This habit will lead you to worth-while savings in operating expense, when it is "Time to Re-Tire."

Especially when you form the habit of saying



"Put On Fisk"... Only a transportation specialist can advise you in the selection of the most suitable tires for commercial vehicles and the service in which they operate. Consult the nearest Fisk distributor. The Fisk Tire Company, Inc., Chicopee Falls, Massachusetts.

Listen to the "Time to Re-Tire" Boys over WEAFF and 36 stations every Monday evening

FISK TIRES

Tested at every step

NOT only are the finished National Brushes tested for their various physical and electrical characteristics, but throughout the process of manufacture there are accurate, scientific controls. Even the raw materials themselves must meet rigid specifications. The oil from which lampblack, the basic carbon, is burnt, is tested for viscosity, flash point, residue, and chemical composition. The lampblack itself is tested for volatiles and ash, only a few hundredths of one per cent of the latter being permissible. Throughout the rest of the long and intricate manufacturing process, close control is kept. Samples from each batch of materials are taken to the laboratory for determination of their characteristics. For instance, after each calcination the carbon is tested for volatiles; it is then ground into flour, and tested for fineness of grain and for resistance. Calcination temperatures are governed accurately by pyrometers.

The brush stock is tested for specific resistance, strength, hardness and density, and other factors that may determine the usefulness of the brush in service. The shunts are tested for contact resistance with the brush, and inspected for length and kind of terminal. All the shunt cable meets strict specifications, and is purchased in such large quantities that we have absolute control of its manufacture. The cable is made especially for National Brushes, as the Silver Strand (trademark registered) indicates.



NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide **UCC** and Carbon Corporation

Carbon Sales Division

Cleveland, Ohio



San Francisco, Cal.

Branch Offices and Factories

CHICAGO, ILL.

PITTSBURGH, PA.

JERSEY CITY, N. J.

BIRMINGHAM, ALA.



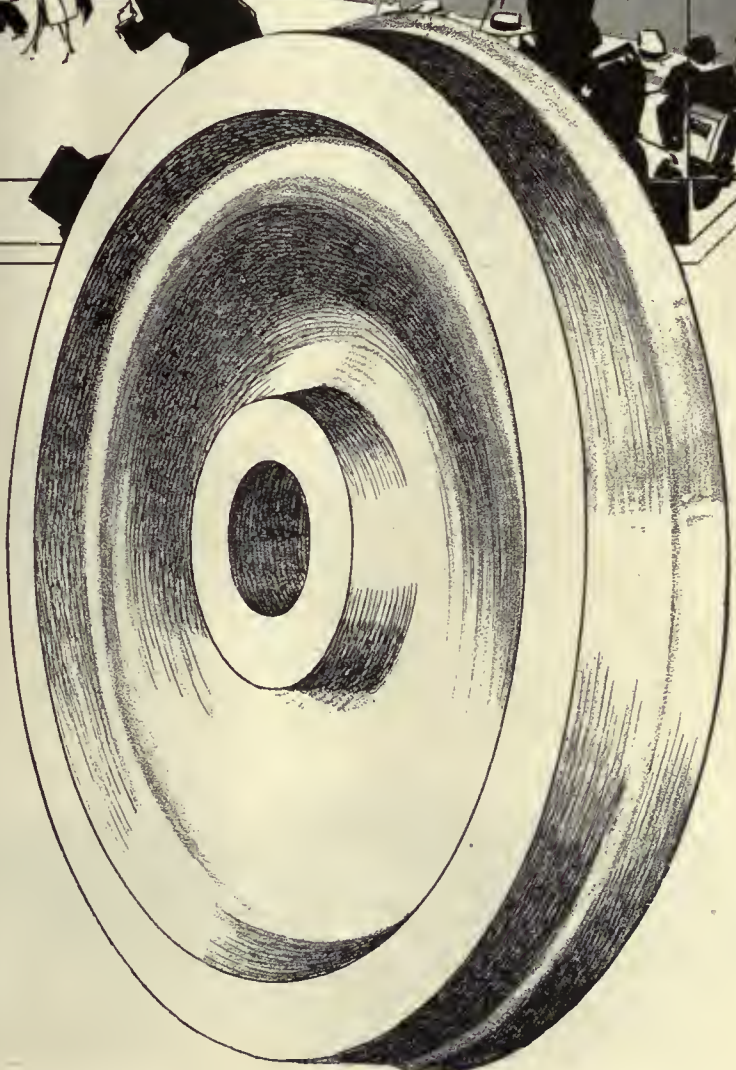
Underground, Overhead and on the Surface

Underground, overhead and on the surface the electric railway works to carry out its titanic daily task—the movement of a large portion of the city's population in the narrow confines of the rush hour.

In such circumstances *dependability* must be the first requirement of electric railway equipment. GARY WROUGHT STEEL WHEELS are designed, made and inspected with this requirement in mind. Our wheel engineers are at your service.

Illinois Steel Company

General Offices: 208 South La Salle Street
Chicago, Illinois





Mutual Service

TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



CANDLER BUILDING,
NEW YORK, N. Y.



Type
AT-R

It's Easy To Hold A Short Arc

ANY welder will tell you that a short arc makes the best weld. Erico type AT-R bonds are designed to make it easy to hold a short arc.

The arc flashes down between the round terminal and the steel rail and clings in this welding vee without sputtering. The bond cables are protected from the welding arc by means of a copper sleeve.

Only a very small amount of weld metal is necessary to deposit in order to secure a large contact area with the rail. The current path thru the arc weld metal from the bond to the rail is a minimum making a very low resistance bond. A good bond, well made, the AT-R will solve your bonding problems. These bonds and other arc weld types are shown in Circular No. 16.



Type AT-R
Applied

Write for details and prices.

The Electric Railway Improvement Co.

2070 E. 61st Place, Cleveland, Ohio

ERICO
RAIL BONDS AND BONDING OUTFITS

*Washington Blvd., Miami Beach, Fla.
Note the trim beauty of Elreco Poles.*



ELRECO

Meets All Conditions

THE only trolley pole that meets all conditions of the operating companies is the tubular steel type. Such is Elreco.

Beautiful, of course, but Elreco's real bid to fame is strength, durability, adaptability and economy.

Many Elreco Poles are in perfect condition after 30 years of severe service. Evidence of strength and durability, and they will continue to render service indefinitely if occasionally painted.

Trolley, span, lighting wires and lighting units are all supported by one pole. Evidence of adaptability.

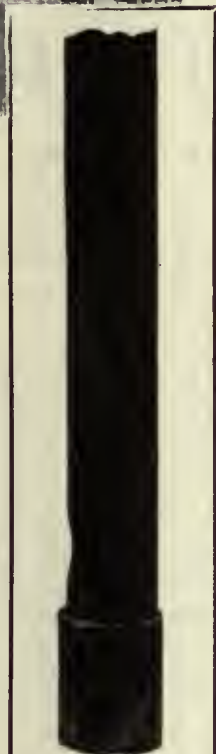
Three or four companies using the same pole reduces the cost to each of installation and upkeep. Evidence of economy.

Let us demonstrate how they can save money for you. Write.

THE ELECTRIC RAILWAY EQUIPMENT COMPANY

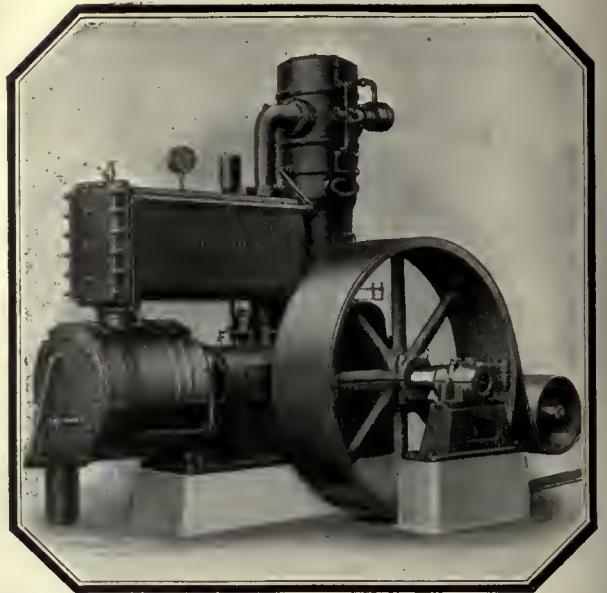
2900 Cormany Ave.
Cincinnati, Ohio

30 Church St.
New York



Strength

A huge bus was nearly demolished when it struck this Elreco Pole, which has been standing 22 years. When wreckage was cleared away the pole didn't even need straightening.



"We Need a New Air Compressor"

Say, Riley— "I see we're going to need that new air compressor right away. Give me your recommendations by Monday—will you?"

"No need to wait till Monday, Mr. Brown. I can tell you right now why we can't beat Angle Compounds."

"All this talk about efficiencies, controls, and other technical features is all right; but what we want is dependable air power at low cost."

"And cost includes power, installation, floor space and maintenance."



But Riley— "How can one compressor beat all the others on every count? That's unusual."

"Sure, it's unusual. So is the Balanced 'Angle Compound' design which saves floor space, and cuts vibration to zero."

"I've seen dozens of Angle Compounds and they run so smoothly I've often balanced a coin on the frame, under full speed and load. No wonder the first ones, installed more than fifteen years ago, are going strong today."

"As for power economy—"

"Never mind that now, Riley; you've got me interested; let's send for that Sullivan Engineer."

To Know Angle Compounds Is to
Choose Them. Why Not Send
for Catalog 83-A Today?

Sullivan
Machinery Company
150 So. Michigan Ave.
CHICAGO



SULLIVAN

Here's the Evidence

NORTHERN INDIANA POWER COMPANY
KOKOMO, IND.
March 9, 1928.

IN REPLY
REFER TO 4-7

PHIL W PALMER
Vice President and Manager

Mr. R. J. Wells, Sec. & Treas.,
Dayton Mechanical Tie Co.,
Dayton, Ohio.

Dear Sir:

I am in receipt of your letter of March 8 concerning the construction of Railway track under traffic using concrete foundation and the Dayton Mechanical Tie.

I am enclosing the manuscript describing the process of the installation. There were pictures taken of this work and the negatives are still in the possession of the photographer here in Kokomo. Your Mr. Bean secured copies of these photographs and I think has the photographer's name and address in case you are interested in any of the pictures.

I do not care to put out the detail table of cost, but I can say that the cost of these installations including new 80 pound A.S.C.E. rail, ties; concrete foundation; tearing out and removing the old track; all excavation and cleaning up; and installation of new brick paving, was about \$8.00 per lineal foot.

Yours very truly,

C. S. Head
District Engineer

C. S. Head
ES

DAYTON TIE TRACK



Cost him
\$ 8 per foot
under traffic

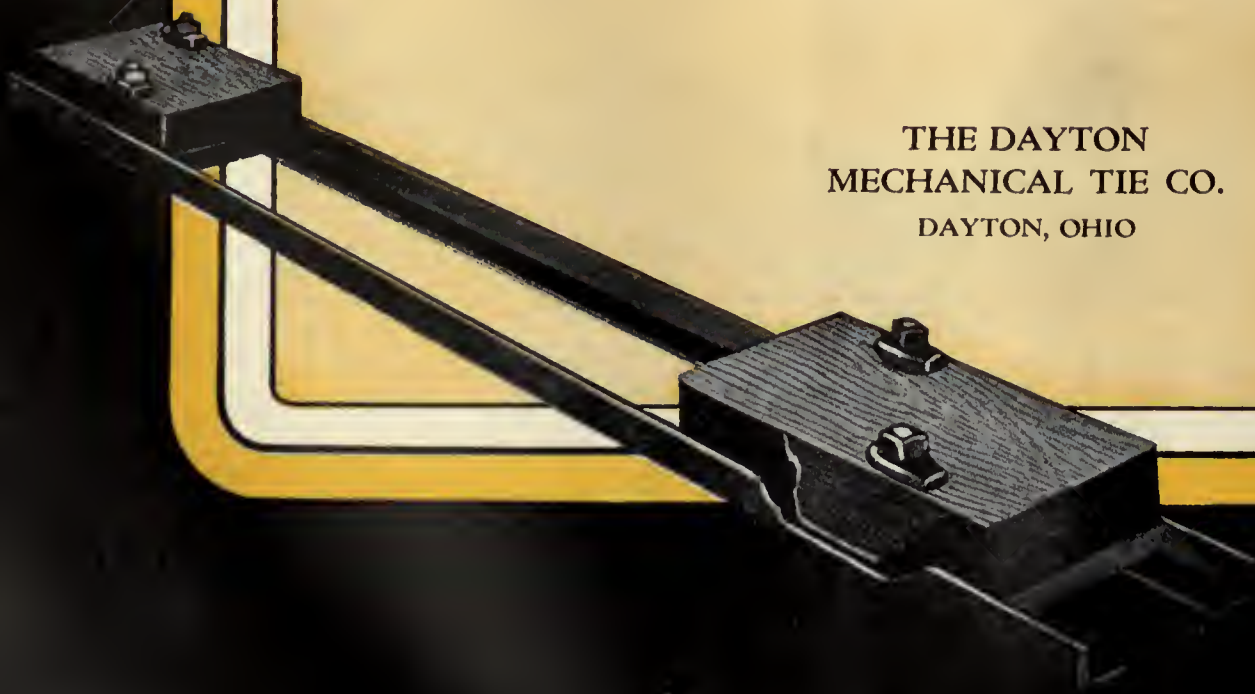
\$8 Per Foot Under Traffic

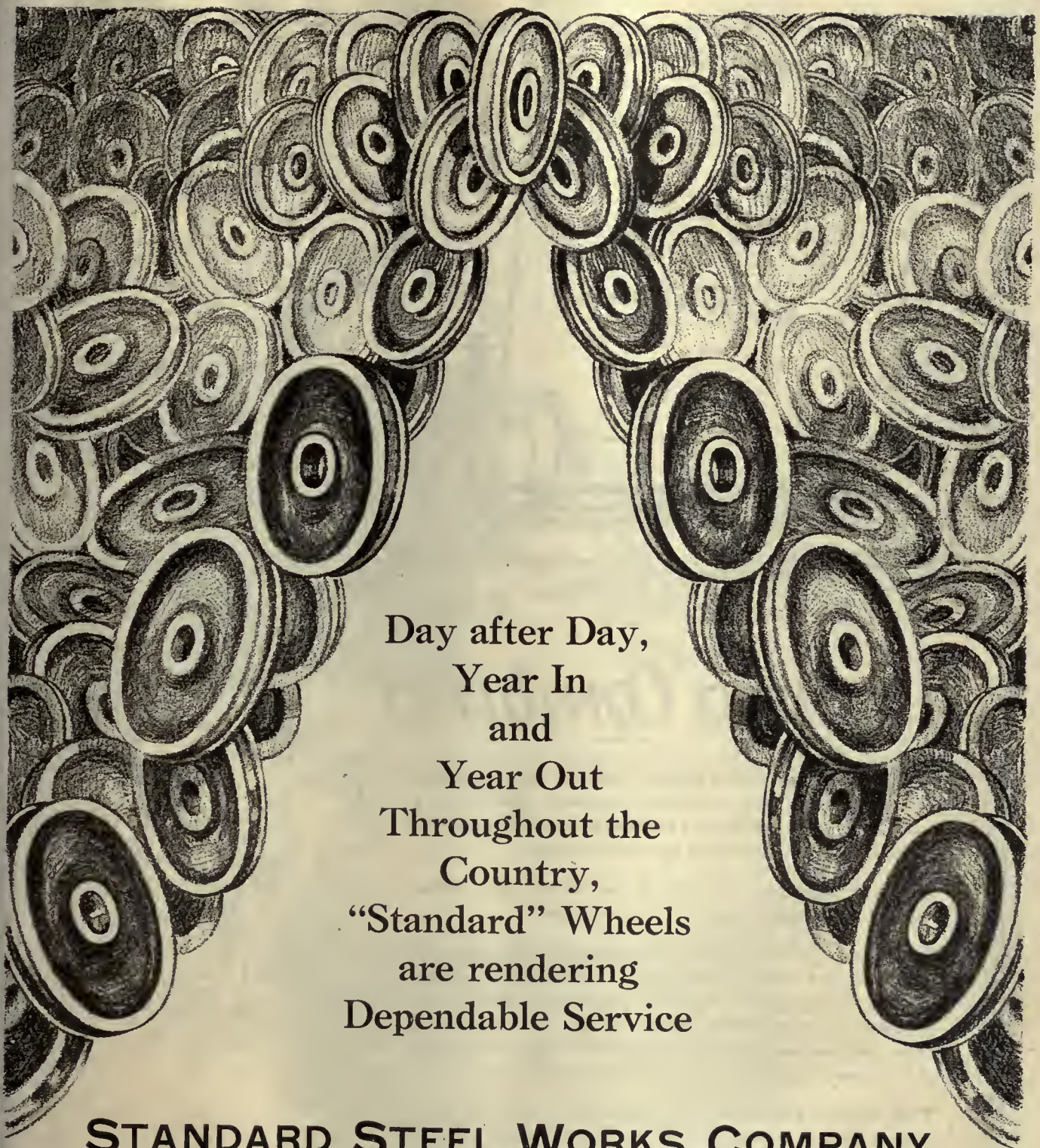
The letter on the other side of this page speaks for itself.

C. S. Head, District Engineer of The Northern Indiana Power Co. in Kokomo, Ind., says he built Dayton Tie Track for \$8 per lineal foot installed *under traffic*, including—tearing out old track excavation—rails, ties, concrete and new brick paving.

Investigate, and let us tell you why Dayton Ties made this record possible.

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO





Day after Day,
Year In
and
Year Out
Throughout the
Country,
"Standard" Wheels
are rendering
Dependable Service

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES

CHICAGO
ST. LOUIS

NEW YORK
HOUSTON

PORTLAND
RICHMOND

SAN FRANCISCO
ST. PAUL

PITTSBURGH
MEXICO CITY

WORKS: BURNHAM, PA.



The term "Combine" is applied to this labor-saving machine which combines the work of harvesting and threshing.

The Book of your
BUSINESS

Business "Combines"

Harvesting brings to the mind of most of us a laborious task with scythe and pitchfork—a method which today's demand for grain has made as obsolete as the old means of gaining business information by word of mouth.

Gigantic "combines" do today's harvesting, and verbal business information has died a natural death.

To properly gather, to sift the grain from the chaff and to present the kernel of pertinent business news requires gigantic "combines". Moreover, it demands organizations of men who are specialists in their field, who consider news from your point of view and maintain the highest standards of business ethics in all phases of their work.

This paper, a member of the Associated Business Papers, Inc., is such a "combine". It can render you invaluable service providing you read it regularly and reap full benefit from its information-laden pages.

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N. Y.

A. B. P.

An association of none but qualified publications reaching the principal fields of trade and industry.

Where other ties
might fail . . use
Prettyman
Preserved Ties
with Confidence

UNDER the pavement, deep into dank, musty earth, exposed to moisture, termites and fungi . . . What ties could you expose to such conditions, *confident* that many years would not undermine unyielding resistance to merciless mechanical grind? ¶ Several kinds *might* render such service. ¶ The South Carolina Power Co. chose Prettyman Preserved Ties for the job at the left—creosoted in the most complete and modern wood preserving plant on earth.



Creosoted
Railroad Cross-ties; Switch
Ties; Bridge Timbers; Con-
struction Timbers; Mill-
Timbers; Lumber Piling,
Poles; Posts and other
Forest Products

J.F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

BUDA
ESTABLISHED
1881

THE BUDA COMPANY
Harvey (Chicago Suburb) Illinois



RELAYS For AC or DC

And for special radio applications

TYPE SR

Reverse Current Overload, Underload, Over Voltage, Under Voltage
Constant and unfailing operation under the most severe conditions. Wide range of adjustment. Round pattern type, 7½ inches diameter.

TYPE RR Reverse Current

Small in size, low in price, certain in operation.

TYPE FR

Secondary relays for alarm and many other purposes.

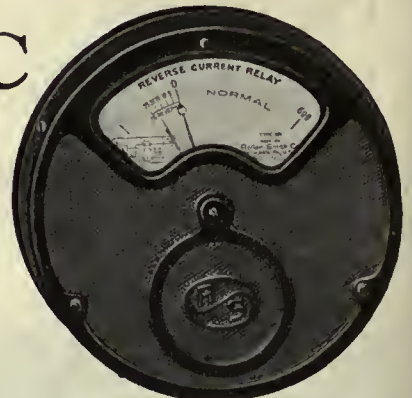


Type FR Relay

TYPE AB

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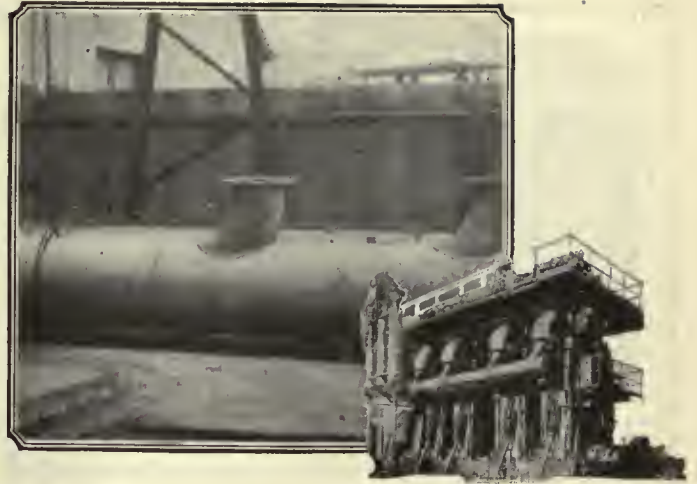
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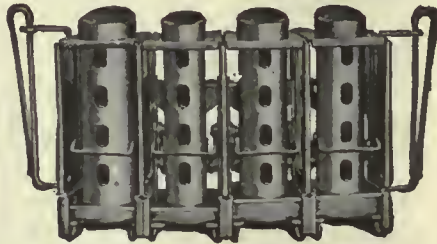
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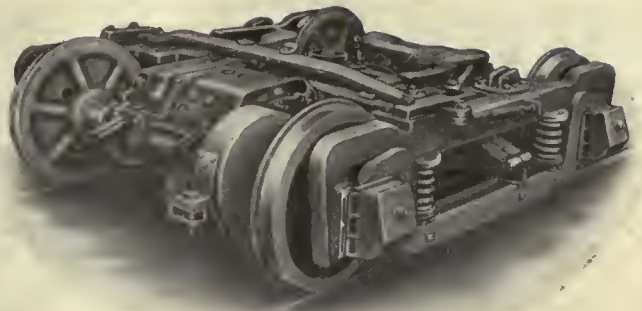
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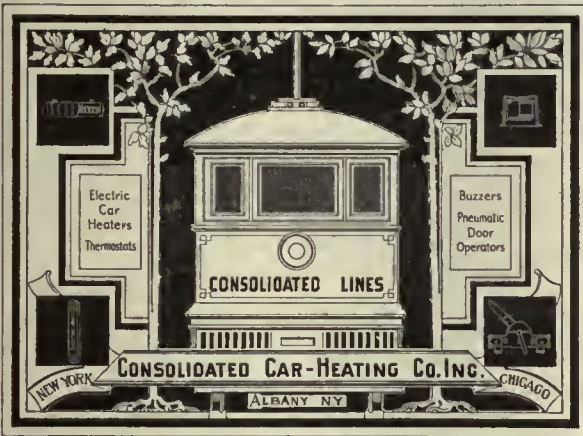
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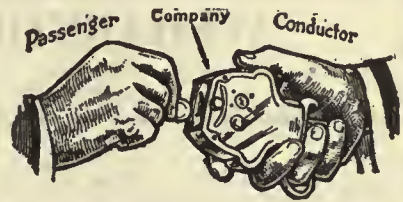
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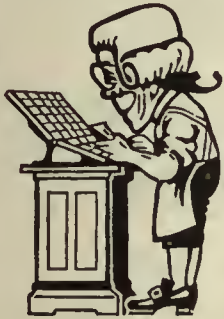


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Brill Seat No. 105 for single end cars and buses is a typical example of Brill seat construction.

The frame of the cushion and back is selected ash. An approved type spring is used which retains its shape and imparts unusually comfortable riding qualities.

Underneath the leather upholstery of the cushion one finds the following materials in the order named: cotton batting, interlaced hair, hair felt, duck, corrugated steel spring tops, wide jute webbing, steel reinforcement strips and the hour glass type springs. These materials form part of the standard construction in Brill Seats.

The pedestal is constructed of No. 14 gauge sheet steel.

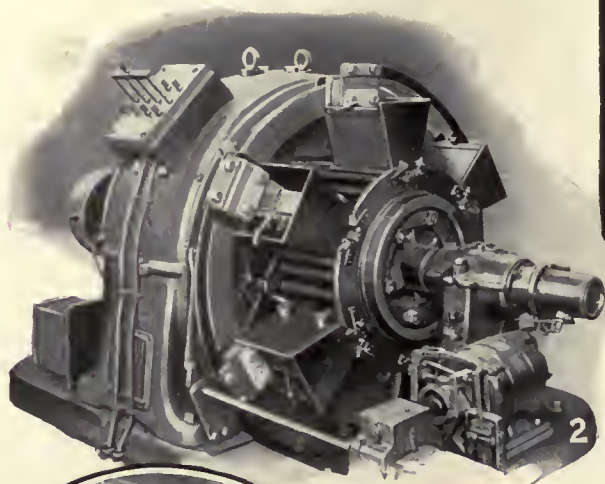
Here, then, is a seat that is attractive, comfortable and certain to withstand many years of hard service. Among the transportation companies that have placed orders for this type of Brill Seat during the past year are the Youngstown Municipal Railway Co., Detroit United and the Cincinnati Street Railway Company.

Specify Brill Seats—it pays.

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1.—Control panels, starting and running panels, and load-limiting resistance

2.—300-kw. automatically controlled synchronous converter

3.—Automatic Railway Substation — Texas Interurban Railway



Substation operation for only \$970 a year

G-E automatic equipment enabled the Texas Interurban Railway to operate and maintain its five substations at an average cost of \$969.57 in the year 1926. This includes repairs, inspection, oil, and all other incidentals except interest and depreciation, and amounts to only half a cent per car mile.

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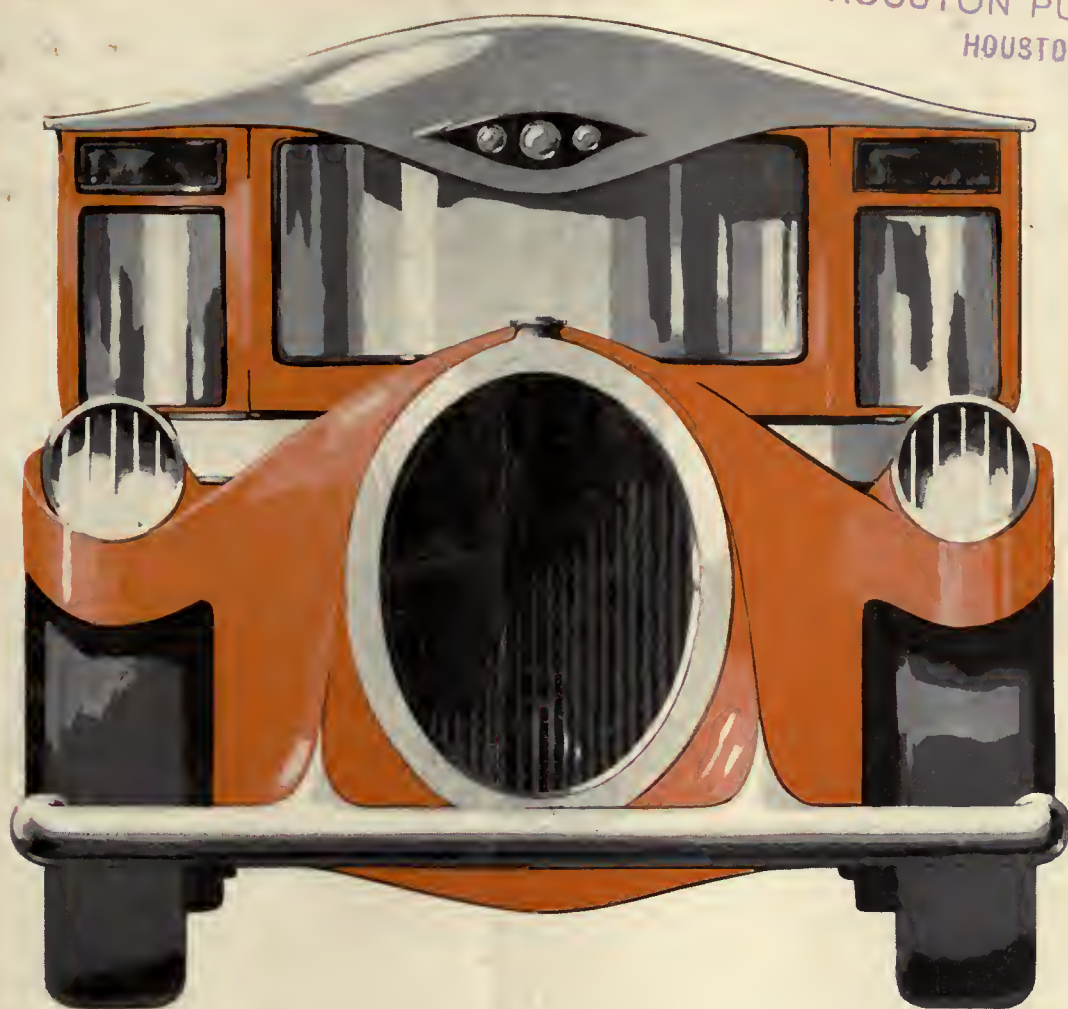
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1928



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June 23, 1928

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1928

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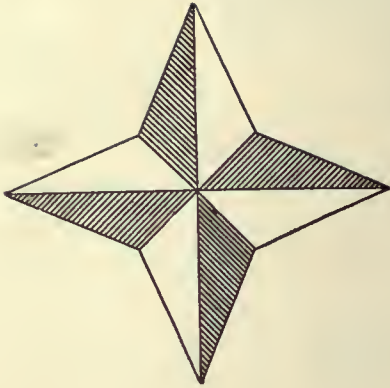
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the riders fare
buys comfort?
How much comfort
have you to sell?



Comfort is a tangible quantity in the competitive market for passenger fares. There is an obvious limit to which the effort to provide comfort may be carried. There is also a limit to the extent to which it may be neglected.

Few will be hardy enough to argue the point. May we present the standard which Cincinnati BALANCED LIGHTWEIGHT cars are maintaining on many successful systems? Then you will have a yard stick with which to measure the amount of comfort you have to meet the insistent public demand.

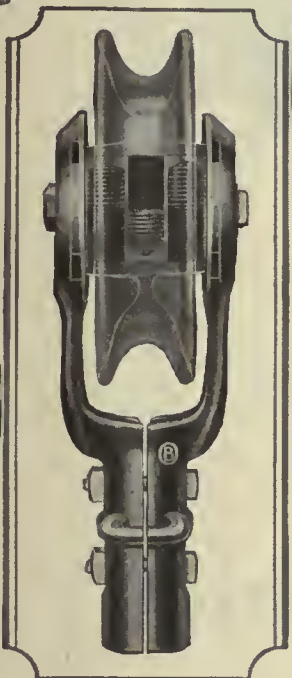
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CINCINNATI, OHIO

CINCINNATI **BALANCED
LIGHTWEIGHT** CARS

{ The Four Features of
Balanced Design are the
Cardinal Points of
today's demand }

MAINTENANCE DOLLARS AND SENSE!

It is the many possible small saving, easily made, that help most to swell the "net". Let O-B Wheels and Harps contribute their share.



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A BIG portion of ordinary trolley wheel expense is maintenance—frequent oiling and periodical replacement of contact washers and springs.

Such maintenance is *all* eliminated with the O-B Trolley Wheel and Harp (Feist Patents). There is no oiling to pay for during the life of the wheel—for the permanent automatic lubrication of the graphite plugs makes this unnecessary.

Better conductivity is provided by the large, rigid axle, which, with its closely fitted bearing, minimizes overhead wear and prevents chattering.

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A trial of O-B Wheels & Harps on your lines is a mighty good "Dollars and Sense" idea. Furnished in 5-in. and 6-in. sizes with either "U" or "V" groove.

Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Co., Limited
Niagara Falls, Canada
822 C

Phantow view showing fully automatic graphite lubricating plugs used in Improved O-B Trolley Wheel and Harp.

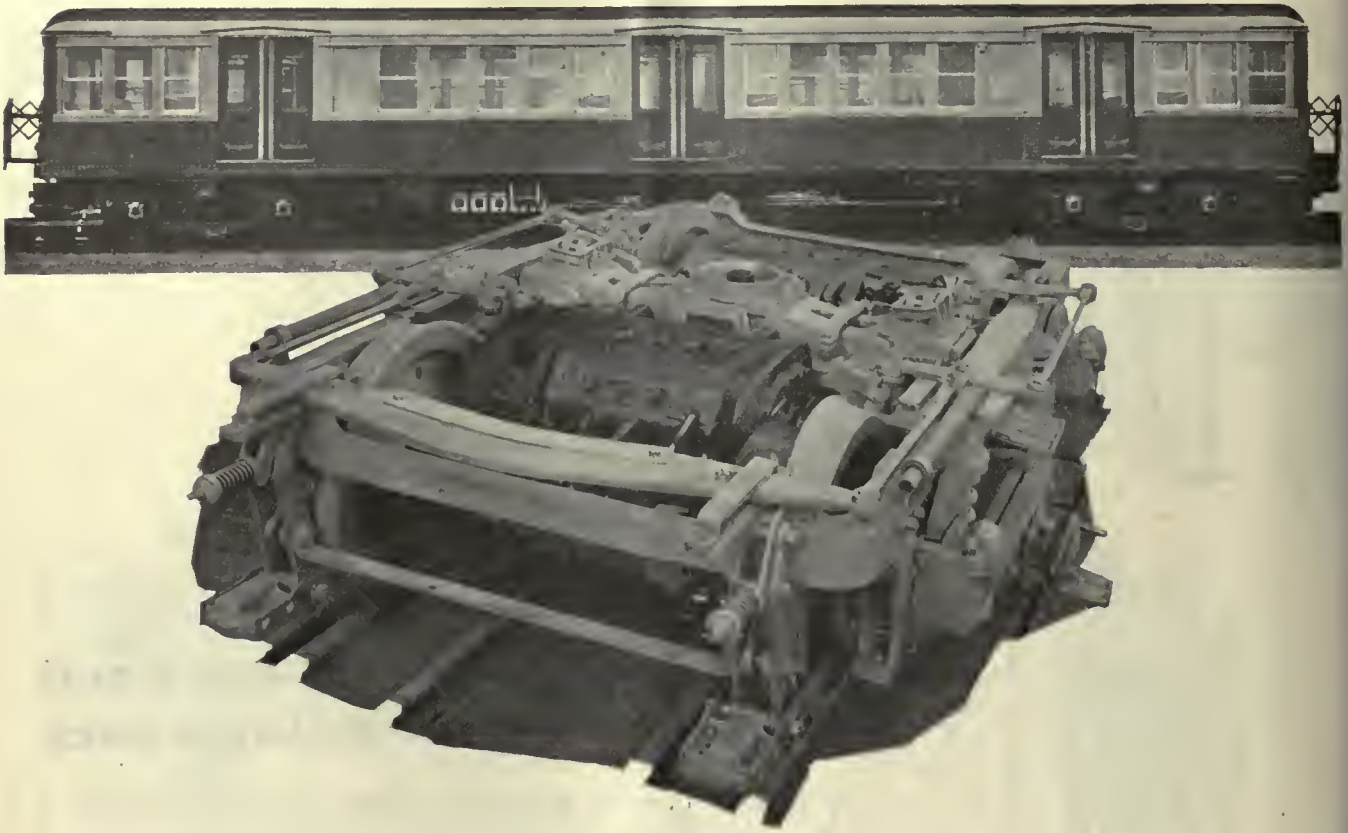
Ohio Brass Co.



NEW YORK CHICAGO PHILADELPHIA

PITTSBURGH ATLANTA CLEVELAND ST. LOUIS SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
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VALVES



Clasp Brakes Speed Subway Operation

In no other service does railroad traffic density approach that of the subways.

Trains accelerate rapidly; they must decelerate the same way. To this end Clasp Brakes are a necessity.

With two brake shoes per wheel instead of one, the Clasp Brake produces the maximum retarding effect, with minimum wear and tear on truck and journal parts.

The Simplex Multiple Unit Clasp Brake affords smoother braking with less heating of brake shoes and reduces the number of "slid flat" wheels. It is an essential part of modern electric railway equipment.

AMERICAN STEEL FOUNDRIES

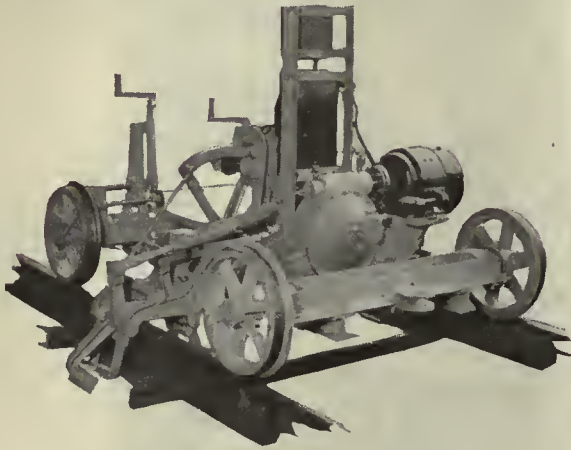
NEW YORK CHICAGO ST. LOUIS



Simplex Multiple Unit Clasp Brake
for Motor Trucks



FIGURE IT THIS WAY—



The Compression Tamper

GANG LABOR COSTS so much per man per day. If John or Tony hasn't anything to do for an hour or so he sits around and consumes Honest Scrap, and your money.

When machines are used they're only drawing pay when the juice is turned on.

A compression tamping machine and a D-S-R track layer, combined, take the place of about eight men. Figuring an average labor rate of 50 cents an hour, a nine hour day, these two machines take the place of \$36.00 worth of labor every day! That's just the *start* of the savings you get. Machines do the work *better* and *faster*.

If you're building more than 100 yards of track—you need modern machinery. If you're building fifty feet, five thousand feet or more of track you need Steel Twin Ties.

Steel Twin Ties, modern production machinery and Progress go hand in hand.

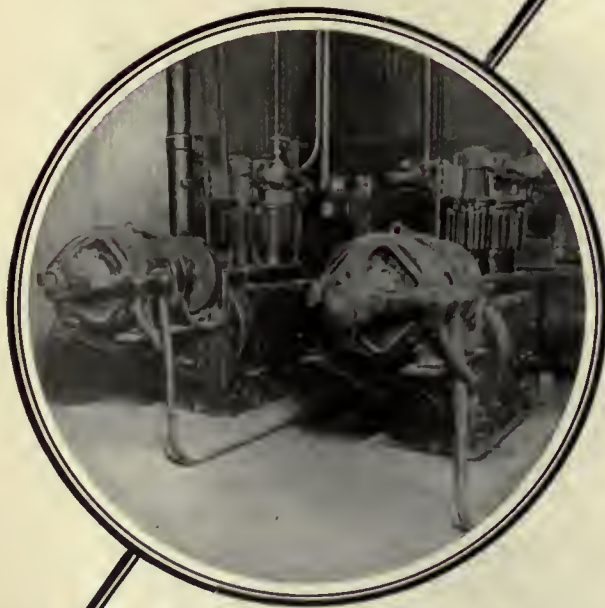


The D-S-R Track Layer

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

STEEL TWIN TIE TRACK

THE BASE OF MODERNIZATION



A typical installation of Westinghouse National Compressors, type 2VC, in railway repair shop service.

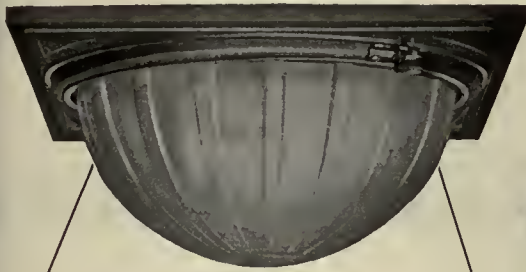
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WESTINGHOUSE National Compressors embody the same careful design and precision in manufacture that has typified Westinghouse products for the past half century. These compressors are compact, self-contained, uniquely durable, absolutely reliable in action, simple in operation, and, due to their positive control feature, assure minimum power consumption.

Built in capacity sizes, ranging from 3 to 700 cu.ft. displacement, there is a Westinghouse National Compressor particularly suited to every pneumatic requirement, in the railway shop, power house, and maintenance department.

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

WESTINGHOUSE-NATIONAL
Air Compressors



No. 27380



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Nos. 27902-03

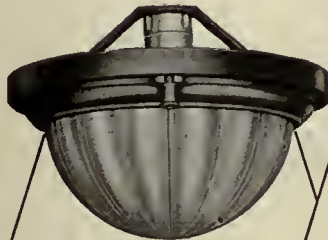
For use in conjunction with the new "20" series Lighting System



No. 27292



No. 27288 Fixture With No. 27440 Dome



No. 27084



No. 27088

Safety Dome-type Lighting Fixtures combine Beauty Durability Economy

DOME type lighting fixtures are now widely used in electric railway cars because they add greatly to the interior appearance and comfort. This single item will, practically alone, transform an ordinary car into the de luxe class.

These fixtures are highly efficient from a current consuming point of view and provide perfect diffusion of the light. The absence of glare and consequent eye-strain is, at once, noticeable and appreciated by the riding public. They practically eliminate theft of lamps.

Bowls are made of light density opal glass. Standard finish of fixture is statuary bronze, although special finishes can be supplied to order.

They are durable. Pressed steel with pressed glass of sufficient thickness to withstand extreme vibration under transportation conditions.

They permit the use of larger lamp units with consequent reduction in cost of lamp renewals, longer lamp life and simplified wiring.

Safety Dome type fixtures are made in three standard sizes accommodating 12, 10 or 8 inch glassware. No. 27902 fixture is 6½ inches overall diameter. Send for complete details.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District office at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

AND INDUSTRIAL ELECTRICAL MATERIAL



Interesting facts about

On April 30, 1928, there were 152
fleets of 5 or more

YELLOW COACHES

operating in this country



These 152 companies operate **4498**
YELLOW COACHES



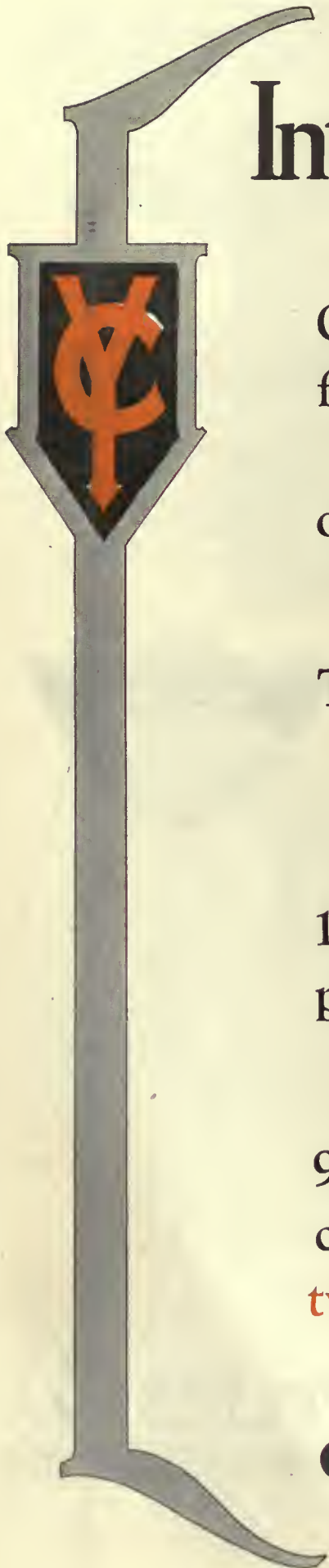
124 of these 152 companies or 82
per cent, placed **535 repeat orders**



98 of these companies, or 64½ per
cent, placed repeat orders **at least**
twice



GENERAL MOTORS TRUCK



YELLOW COACH operators

Public Service Corporation of New Jersey uses

849 YELLOW COACHES

and has **reordered 11 times**



Philadelphia Rural Transit Co. operates **573 YELLOW COACHES**

and has **reordered 6 times**



Illinois Power & Light properties operate 112 coaches, in eleven cities,

and have **reordered 23 times**



Washington Ry. and Electric . . . **15 reorders**

Los Angeles Railway **12 reorders**

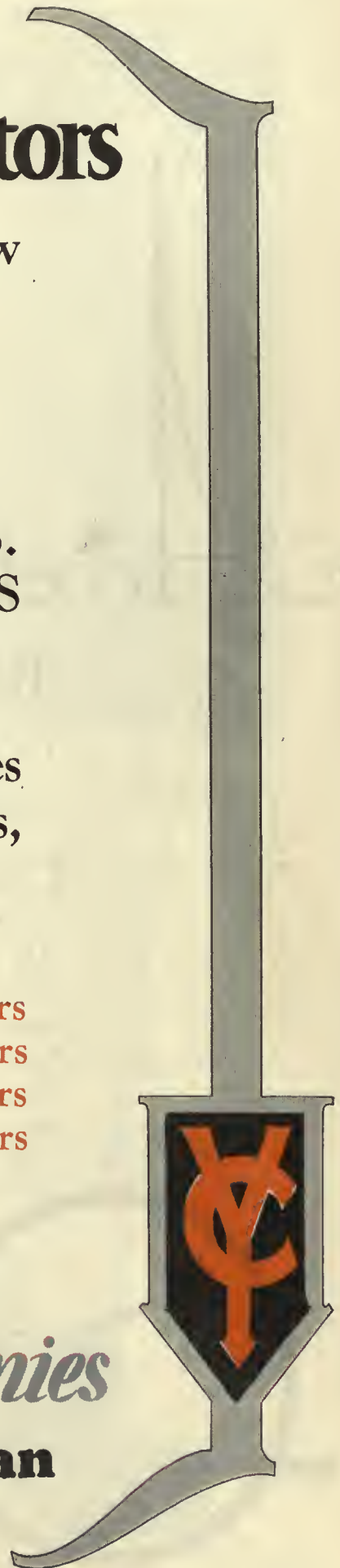
Milwaukee Electric Ry. Co. **13 reorders**

Connecticut Company **11 reorders**



*and 464 reorders
from 117 other companies*

COMPANY, Pontiac, Michigan



The Safety Car Control Equipment brings economic advantages that warrant additional cars . . . assures the quickest possible brake action . . . provides maximum convenience and flexibility in controlling entrance and exit . . . safeguards operation by interlocking power, brakes, and doors.



Accelerated Transportation must be made **SAFE**

For the sake of their patrons . . . and their profits . . . modern railways must expedite the movement of traffic.

Today there is a growing demand for more frequent service . . . shorter, quicker stops . . . less delay at entrance and exit . . . a speedier getaway.

All of these requirements are met to an efficient degree by the use of complete protective and convenience-promoting devices . . . the Safety Car Control Equipment.

Safety Cars assure accelerated transportation—properly safeguarded.



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TREADLE-IZE!



NATIONAL PNEUMATIC COMPANY

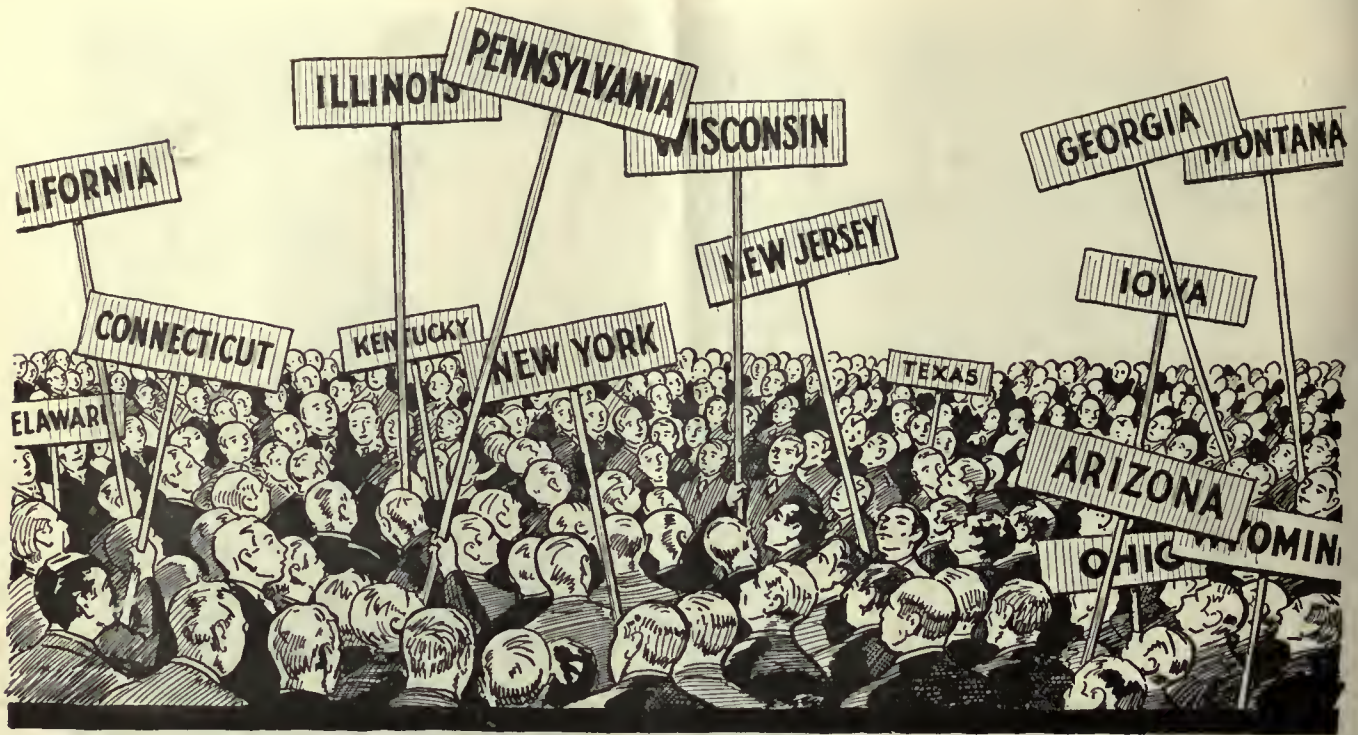
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When the political conventions gather

In Kansas City

Republican delegates who have patronized the trolley cars in this Midwestern Metropolis, have been riding over track welded with Thermit.



In Houston, Tex.

Democrats gathering in the Southwest to select their candidate, will be in another city where Thermit Welding is standard.

And in practically every other City in the Union where modern transportation methods prevail

In fact these two major political parties could scarcely have chosen an American city, large or small, where Thermit is not now used.

Thermit welding to eliminate rail joints has been accepted by engineers and managements almost everywhere, as the one permanent solution of a heretofore troublesome and costly problem. Since 1912 the use of the Thermit rail weld has been steadily increasing, until today over 60% of all the track being laid in paved streets is Thermit-welded.



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Called on him for 3 years Then, a \$5000 order by Telephone



An Advertisement for Bell Long Distance Telephone Service

THE sales manager of a West Virginia tool company made personal calls upon a Cincinnati jobber for three years—without making a sale. Then one day he learned that a large job of work was to be started. He instantly called the jobber by Long Distance. Sold him a carload of shovels. Amount of the order, \$5000. Telephone charge, \$1.30.

In the packing industry, reams of correspondence are often exchanged before specifications can be agreed upon. In a 10-minute telephone conversation, an Austin, Minnesota, firm took a 5-carload order and laid the groundwork for future shipments of 500,000 pounds. The new customer was 1500 miles away.

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THE Standard Automatic Signal-gate gives you triple protection—it carries standard crossing bell, lights and barriers, all these controlled by the track circuit.

It is automatic. The watchman is not needed. It gives you twenty-four hour protection. The efficiency and practicability of the Standard Automatic Crossing Gate are being demonstrated on the roads now using them—those roads are saving money.

Ask for our illustrated folder describing the operation of this gate.

STANDARD *Automatic Signal Corporation*
208 S. LaSalle Street Chicago



Looking under the varnish

Does the varnish hide a cloth mesh clogged with starch or is the cloth thoroughly soaked with varnish? ¶ Only in the latter case will the insulation afford protection—permanently. And that's the secret of G-E varnish-treated cloths and tapes—a good cloth saturated with a good varnish. ¶ General Electric first made insulating materials for its own use—it had to be sure. When renewing motors, it likewise pays to be sure. Before the next motor is overhauled, look into your varnish-treated cloth. You are taking no chances when you specify G-E insulating materials.

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Send for your copy to the Merchandise Department, General Electric Company, Bridgeport, Connecticut.

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GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT

Fully automatic— the G-E mercury-arc rectifier

Many G-E mercury-arc rectifiers now in service are fully automatic, and require only the supervision and inspection periods customary with the usual substation equipment.

Automatic switching is easily adapted to the control of mercury-arc rectifiers. Suitable devices have been developed for operating and protecting the rectifier so that it functions upon load demand with a reliability equal in every way to that of synchronous converters or motor-generator sets.



1000-kilowatt, 600-volt automatic mercury-arc rectifier at the Lawndale substation of the Philadelphia Rapid Transit Company



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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

LOUIS F. STOLL, General Manager
CHARLES GORDON, Editor

Volume 71

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June 23, 1928

Number 25



An Indicator of Progress

JUST as straws show which way the wind blows, so the trend of thought at electric railway association meetings reflects conditions in the industry. In the past there have been periods of despair, of doubt, of hopelessness. These have followed each other during the past ten years, and have shown unflinchingly the attitude of the leaders. It has been interesting to note the progressive change for the better as developed in this manner from meeting to meeting.

This spring there has been a series of association meetings at which there has been a new note. There has been a distinct atmosphere of cheerfulness and an exchange of ideas that show that managers and other executives have been thinking in terms of success. The tone of the papers presented has been of a different order from that of others in recent years. They have told of improvements in methods, improvements in physical property, improvements in human relations. Their dominant theme has been accomplishment. It has not been enough to say, for example, that street traffic ought to be regulated or that it must be regulated. Speakers have told how it can be regulated and how it has been regulated. So it has been with other phases of electric railway operation.

Discussions, too, have been unusually valuable. When a man has done something different from that mentioned by the principal speaker and has reached the same or a different conclusion, he has not been hesitant to give his opinion. Such discussions can come only from men who actually have been devoting their time to intensive study and who have been trying out in practice the theories they have developed.

Signs such as these are among the most definite indications seen in many months that the industry has taken hold of itself, and has thrown off the defeatist attitude that held it back for so long. May the forward movement continue—and with ever-increasing momentum.

The Code That Conquers

“PLAY the Game Square,” the vigorous title which J. N. Shannahan chose for his Mid-West paper, expresses a code that has paid in practice. He said in explanation that except in certain outstanding instances it seems to him “we ourselves have not met fast-changing situations with as much courage as we should and certainly not with the far-sighted vision needed to grasp in full the opportunities which changing conditions bring along with difficulties.”

In expressing his views, Mr. Shannahan recognized that the cynic is always just around the corner. For when he said “we must put the cards on the table face

up,” he was quick to add that he knew this would sound trite. Here, however, he probably had in mind the strong temptation which always exists to keep an ace up one’s sleeve.

This point may well be pondered in the light of what has happened in the past. True, there have been grave ills due to the play of economic forces over which the individual at best has only slight control. But that does not explain the spirit of distrust on many properties at a time when they sorely needed intelligent public understanding.

It is as true of a company and even of an industry as it is of an individual, that “As ye sow, so shall ye reap.” Of course, there are those in public councils that are unfriendly to the industry. But it is likewise true that there are sometimes divided councils within the industry. Many instances readily come to mind of situations which illustrate the inestimable harm which has been done not only to individual properties but to the industry generally, by action which smacks of sharp practice.

But it was not to find fault that Mr. Shannahan said the things he did. Rather, it may be assumed, his object was to indicate the common pitfalls that lie in the pathway of the unwary in the effort to improve the condition of a property. Public co-operation may be expected to grow only out of public confidence. When a record of straightforward dealing has been established, the interests of the public and the railways are identical. But that is true only as the character of service is satisfactory, the equipment modern and the management disposed to transportation progress. And the first two of these almost necessarily embrace the last. No code to which the electric railways might subscribe could be better conceived than that reflected in the remarks made by Mr. Shannahan.

This Fine and Unselfish Example

THUS O. H. Caldwell, federal radio commissioner, characterizes the action of the Third Avenue Railway in voluntarily relinquishing its radio broadcasting license for station WBJ, New York City. Since 1924, when radio broadcasting was expanding rapidly, this station has been operating. It has spread the gospel of safety, the proper relations between the public and a transportation company, and the mutuality of interests existing between employee and employer. It has always maintained a high degree of mechanical and electrical efficiency. Moreover, those in charge of the railway’s broadcasting have taken an active part in the scientific development of radio.

Except for the unselfish and public spirited desire of its owners to assist the larger aims of radio there is no reason for its discontinuance. This is conclusively proved by the fact that it was not on the commission’s blacklist

of 162 stations throughout the country, 25 of which were operating in the metropolitan area.

In making the offer to suspend operations, President S. W. Huff subordinated private interest to the public weal. He wrote the commission that his company realized "the purpose for which your commission was created and the difficulty of your work." In word and deed here is an "unselfish example" of citizenship; something more than a gesture on the part of a transportation company. This kind of executive thinking must ultimately win real dividends in public friendship and good will.

Another New Car Makes Its Bow

ANOTHER new car is presented for the industry's consideration in an article printed elsewhere in this issue. In this fact alone there is nothing to elicit particular comment. New designs of rolling stock are now beginning to appear in steady procession, with increasing frequency, as the present industry-wide movement to develop equipment better suited to meet present-day transportation requirements gets into full swing. Nor do the technical features of the car itself or of its equipment represent such wide departures from conventional practice as to warrant particular attention. True, in the elimination of the customary foundation brake rigging and the use of automotive type brake diaphragms at each wheel with an otherwise conventional type of truck, another novel design idea is being tried. But beyond this and the use of double reduction gearing with high-speed motors, the construction of this latest sample car is quite conventional.

But there are, nevertheless, other factors connected with the building of this car that are of outstanding interest to the entire industry as indicators of trends that may have far-reaching effects. First of all it is worth noting that this sample car is entirely the enterprise of a car builder—not an operating company. It is a complete piece of equipment built to be sold and including the manufacturer's own ideas of design and construction; not a contract job built to a customer's specifications.

In American industry generally, this is the accepted practice. — But a complete street car, built according to the manufacturer's own ideas and with the manufacturer's money, is a novelty. Two years ago at Cleveland there was shown for the first time a sample lightweight, high-speed interurban car which was entirely the design of a car builder. Last year at Cleveland there were two additional cars shown which could be put in this classification; one of them built by a bus manufacturer. Now comes another, and this year's convention will undoubtedly bring forth others. In this trend there is promise of increased initiative by the builders which should result in more consistent development than in the past and it is therefore worthy of the fullest co-operation and encouragement from operating executives.

Another feature of this latest sample car is the attention given to the matter of proportions and appearance. The merchandising appeal of sleek, graceful lines in a transportation vehicle is being recognized today as never before. Car designers are indeed beginning to take a leaf from the automotive industry's notebook. They are recognizing that ruggedness, economy, and efficiency, although of vital importance, are no longer the sole requirements for a satisfactory vehicle design. A car which attracts no passengers is unsuccessful, regardless of how efficient it may be. Just as the average auto-

mobile buyer knows little about what is under the hood, so also does the average car rider know little and care less about the structure and equipment of the street car upon which he rides. But the passenger and prospective passenger are quick to sense new features of architecture or comfort.

Even in appearance and lines, however, there is little that is particularly novel in this sample car. The sloping front window which gives a semi-automotive appearance, is used, but this arrangement has already been adopted on so many cars that it can no longer be considered an innovation. It is to the general proportions and to the details of construction that one must look for the features of greatest interest. The bottom line of the step is carried completely around the vestibule to give balance to the two sides of the car and to give the end a finished appearance. The doors are flush with the sides of the body when they are closed and the customary awkward offsets at the vestibule are eliminated. The relation between the height of the side sheets, windows, letterboard and roof was carefully considered from the standpoint of proportions. Although a side skirt was first tried, it was finally eliminated for this particular car.

It is probable that the builder would by no means consider this a final product. One hears of other plans on every side. Further radical changes from conventional practice are promised in projects that are even now under way. Faint rumors of the entrance of bus manufacturers into the field of car construction are persistent and are getting louder. From this growing activity, whetted by the stimulus of healthy competition, there may be expected rapid progress in meeting the demand for electric railway cars that will attract riders back to the use of public instead of private transportation.

A Mere Matter of \$136,000,000

PHILADELPHIA lawyers are now engaged in the pleasant pastime of trying to unscramble the Philadelphia Rapid Transit Company's underliers. It is a friendly proceeding worthy of the supernatural powers that legend lends to the Philadelphia practitioners. If they achieve their object this time, it will be for the best, but they failed before in a similar task because of inanition or exhaustion. It all came about this way. A year ago Judge C. C. McChord, special investigator for the Pennsylvania Public Service Commission, suggested that the financial eggs be made into a real omelet. Some of the eggs never have had their shells completely broken and others were slightly addled when they went in. But the omelet, such as it is, apparently awaits only the wielding of the financial wizardry of \$136,000,000 of the city's funds.

If money talks, that sum ought to make a loud noise, but the holders of the securities of the underlying companies of the P.R.T. appear to be particularly hard of hearing. For good reasons they are enamored of their possessions. Others see the underliers only as the Old Man of the Sea riding on the P.R.T.'s back. It is a situation not peculiar to Philadelphia, and one that the committee on finance of the American Electric Railway Association has suggested be corrected wherever possible.

Apparently nobody except their owners loves the companies underlying P.R.T. In one way or another they extract from the property nearly \$9,000,000 a year. Their number seems almost legion. Certainly their family tree is intricate. If his suggestion be correctly

understood Judge McChord proposes that the city purchase the underliers, lock, stock and barrel, for about \$102,000,000 plus the face value of \$33,500,000 of bonds, a total, in round figures, of \$136,000,000. This estimate of the value of the underlying stocks is figured in two ways: by capitalization of their returns at 7 per cent, and by an average of their market prices over a period of eight years. The result is approximately the same, whichever method is followed.

It has been explained that on this \$136,000,000 of landlord value, the P.R.T. as tenant pays each year besides \$9,000,000 of rent \$1,432,403 of taxes which it is said could be eliminated. The idea is that as the city could become the landlord by borrowing the \$136,000,000 at 4½ per cent for the purchase of the underliers, there would be a saving for somebody of the difference between \$10,303,138 of P.R.T. fixed charges and \$5,780,000 of interest on the city's borrowed funds, or \$4,523,138 a year in round figures.

Thus, as the Philadelphia *Record* put it some time ago, Mr. McChord has passed the magic wand over the silk hat into which have been scrambled the addled eggs of the underliers, and, rolling up his sleeve, has extracted therefrom the live rabbit. The secret, of course, seems to be the substitution of city credit for private credit. But between the apparition of the \$4,523,138 a year saved and the actuality, there stand the protective committees of the underliers. It is their attitude which is being sought at the present hearing before the Public Service Commission, a proceeding probably without precedent. To that proceeding the P.R.T. is not a party. Succinctly stated the sole duty of the commission under the legislative act of 1927 is to determine the compensation or damages to be paid by the city as a partner of the P.R.T. to the owners of the property to be condemned by it. The end sought is desirable from the standpoint of economy and simplification of the financial structure of the P.R.T., but certainly if the plan is put through on the terms suggested, Judge McChord will have done more than propound a solution. He will have opened the way to a miracle.

Tangible Rewards to Careful Trainmen in Gary

VACATION time among trainmen of the Gary Railways is imminent. When the no-accident vacation report was compiled recently it became known that 96 trainmen out of 145 were entitled to five-day vacations with pay because they had gone through the year without having had a single accident charged to them. This number of no-accident vacations—just over 66 per cent—is the highest in the history of the company. Of equal significance, 27 of the 96 men have served four years without a chargeable accident, while one man who has been with the Gary Railways during the twenty years of its existence has enjoyed the benefits of the annual vacation award every year save one.

There are some who would argue that no particular consideration or reward should be attached to what, after all, constitutes simply a record of careful performance of duties. But if we are to believe modern safety doctrines, few accidents happen which could not have been prevented. Many properties have adopted various forms of awards—some use cash bonuses; others have safety dinners or outings. The vacation idea in Gary seems to offer a happy plan.

Expenditures in the settlement of accident damage

claims constitute a very appreciable proportion of the gross revenue of a street railway. There is much evidence to show that the companies whose accident prevention campaigns have been most successful are those whose policy has been to share generously the benefits of accident reduction with their men.

The Added Responsibility of Their Separation

NO OTHER piece of recent news affecting the electric railways is in its way more significant than the reported sale by the New York Central Railroad of its holdings in the electric railway properties in Rochester, Syracuse, Utica and other cities. Pending the conclusion of the financial details, it is of course unlikely that any program for the future conduct of the railways will be laid down. That the roads will be operated separately from the power holdings, if the new owners retain them, does, however, appear to be certain. That is a good thing.

In the past these roads along with other properties of their kind have suffered from the distracting economic changes in the field of transportation. They have not, perhaps, been as militantly managed as might have been wished, but that no doubt is attributable to the owners rather than those charged with operation of the properties. It is easy to understand this. A steam railroad is a large and inflexible organization and the very magnitude of its operations tends toward the subversion of local impulses and reactions. Electric railways, on the other hand, are intimately associated with the affairs of a community, and must be sensitive to local conditions. It was not until the Connecticut Company had been separated from the New Haven Railroad that Mr. Storrs was able almost entirely to reverse the situation with respect to that property, and it was undoubtedly the example which he set that later caused the New Haven to confer on its local responsible operating officials in Worcester and Springfield the necessary detached authority which has enabled them to carry out the program which now promises so much for these properties.

All this is cited merely as pointing to the new owners the possible future of the roads in central New York. That future is theirs to make or mar. There is more in this suggestion than just a nicely turned phrase. The railways are, perhaps, doing as well as could be expected. Managerial talent of high order is in charge of the roads. On their part the new owners are in a position to make an adequate survey of the situation and to map out a program for the future that will permit the properties to be developed in the militant way that is needed. Already the bus and the trolley bus have come to play their part in these systems, but whether they are doing it to the extent that is possible and advisable only a survey of the kind suggested would show.

The Rochester road has an arrangement with the city in its modified service-at-cost plan that promises well for the future, and the situation in Syracuse, particularly in the matter of fares and public relations, appears to be satisfactory. With the inhibitions inherent in the former ownership removed, further improvement may be expected in the situation in upper New York. This holds true whether or not the so-called Phillips interests retain the roads. So far as they are concerned, their record with their other properties indicates they are thoroughly alive to the fact that the first step in successful public relations is performance.

Osgood-Bradley Develops New Model Sample Car

Car builder recognizes modern transportation requirements in sample unit intended for average size city conditions. Detailed attention given to improvements of appearance and performances



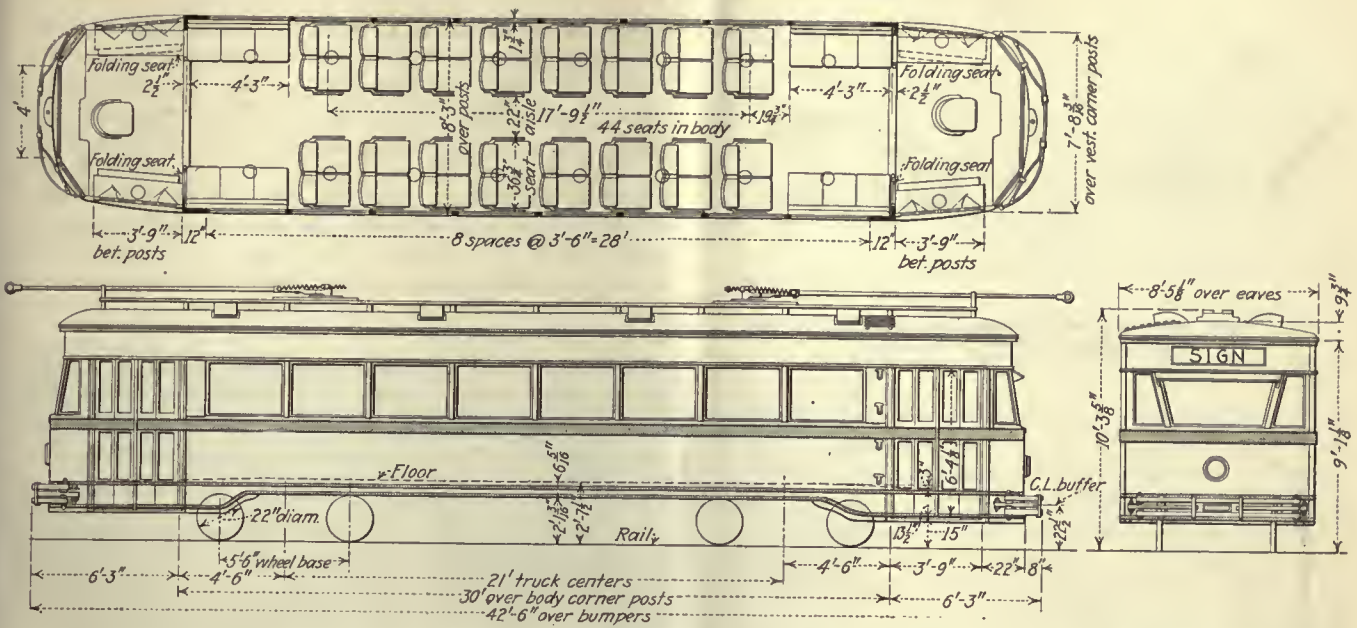
Sample car designed by Osgood-Bradley Car Company to meet 1929 transportation conditions. No attempt was made to achieve extreme light weight, but special attention was given to the proportions and appearance of the body

STUDY of recent trends in car design, and of the demand for an average-size city car with which to meet present-day automobile competition, has led the Osgood-Bradley Car Company to build a sample car representing the ideas of its own engineers. The objective in the design was to combine the pleasing appearance of balanced proportions and smooth body lines, with quiet operation, rugged construction and low maintenance cost. It is the intention of the builder, after tests of this sample car are completed, to adopt this model as a manufacturer's standard for average-size cities, and gradually to perfect the design as experience and customer demand dictate. The ultimate purpose is an attempt to develop a model which can be built on a production basis and which can be sold at an attractive price in small or large lots.

With these objectives in mind, the sample car is built for double-end operation and is of the straight side type

with rounded ends, sloping end windows and low arch roof. Careful consideration and detailed study were given to the several factors which affect the appearance of a car. The sample unit was first built with a skirt below the side sills, extending entirely around the bottom in a straight horizontal line. Further study led to the conclusion that an upward sweep of the lower line of the body between the corner posts gives a more graceful appearance than does a straight horizontal line around the bottom. Consequently, the idea of a skirt below the body was abandoned.

Accompanying illustrations show the appearance of the completed sample car. Vestibule doors are double, folding inwardly on each side. Maximum flexibility of the car is provided by arranging the controls for either one-man or two-man operation. These doors are set flush with the body and vestibule corner posts and

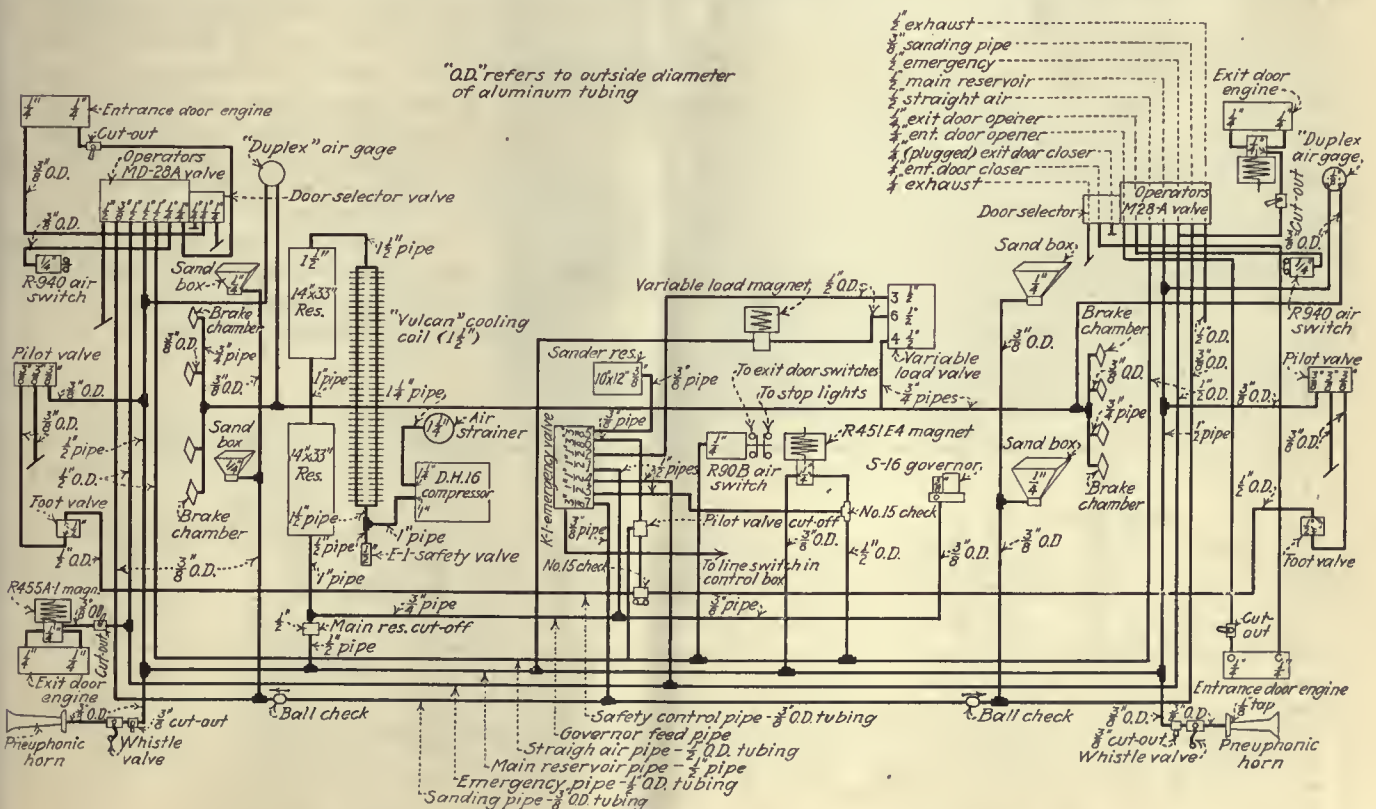


General dimensions of the Osgood-Bradley sample car are designed to meet average-size city conditions. Seating capacity in the body is 44. Folding vestibule seats increase this to 51 or 54, depending on the plan of operation

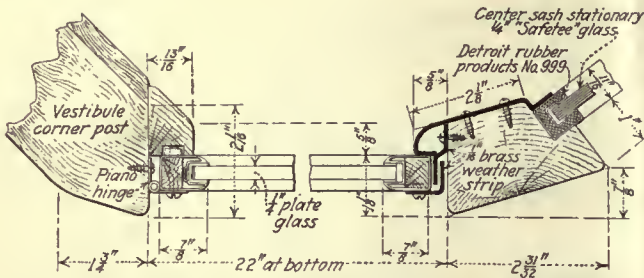
when they are closed present a smooth exterior without offsets. Horizontal lines are carried out unbroken around the body and vestibules. This is particularly noticeable around the bottom of the letterboard, at the belt rail and in the glass lines of body, doors and vestibules. Although the roof is comparatively low, there is no offset in the letterboard above the doors. Adequate headroom was obtained by careful attention to the installation of door engines and door headers, and to the arrangement of the inside step at the front and rear ends of the car.

Although no skirt is used below the sides of the body, the vestibule dash is carried down to the bottom line of the step, so that an unbroken bottom line is formed entirely around the vestibule and under the doors. This line sweeps up to meet the bottom line of the body side sheet at both ends and on both sides of the body. Thus the appearance is symmetrical on the operating side and on the blind side of the car in whichever direction it is running.

The exterior is finished in attractive, contrasting colors of Duco, above and below the belt rail, and a wide stripe



Complete piping diagram. Compressed air is conducted directly to brake chambers mounted on the trucks. The usual foundation brake rigging is eliminated



Horizontal section through hinged side sash in vestibule, showing weatherstrip arrangement

is carried entirely around the car just below the window line. Narrower stripes on the letterboard and along the bottom of the body help to accentuate the streamline effect. Although the sloping type of end vestibule window, which has been a characteristic of several recent experimental cars, is used, the vestibule belt rail and dash are curved instead of being made flat on the end as in several other recent cars.

The total length of the car is 42 ft. 6 in. over the bumpers. Extreme width over the eaves is 8 ft. 5 1/2 in., and the height from rail over trolley boards is 10 ft. 3 3/8 in. On 22-in. diameter wheels, the floor height is 31 1/2 in. above the rail. The vestibule door openings are 3 ft. 9 in. between posts. The length of the body over corner posts is 30 ft. There are seats within the body proper for 44 passengers. When the car is run as a one-man unit, the right-hand front doors being used for entrance and the rear for exit, the folding platform seats on the left side may be utilized to increase the seating capacity to 51 passengers. If only the right-hand front doors are used for both entrance and exit, the seating capacity is increased to 54 through the use of both folding seats in the rear vestibule.

No effort was made to achieve ultra light weight. Standard structural shapes have been used in framing, the desire being to produce a car as light as possible consistent with adequate strength and ruggedness to withstand the stresses of regular service, with a liberal margin of safety. The car is reported to weigh approximately 30,000 lb. complete.

The platform framing is unusual, particularly in the design of attachments to the body end sills and body side sills. There are two platform center sills, extending from the buffer to the body end sills. To these center sills there is riveted a cover plate that forms a horizontal

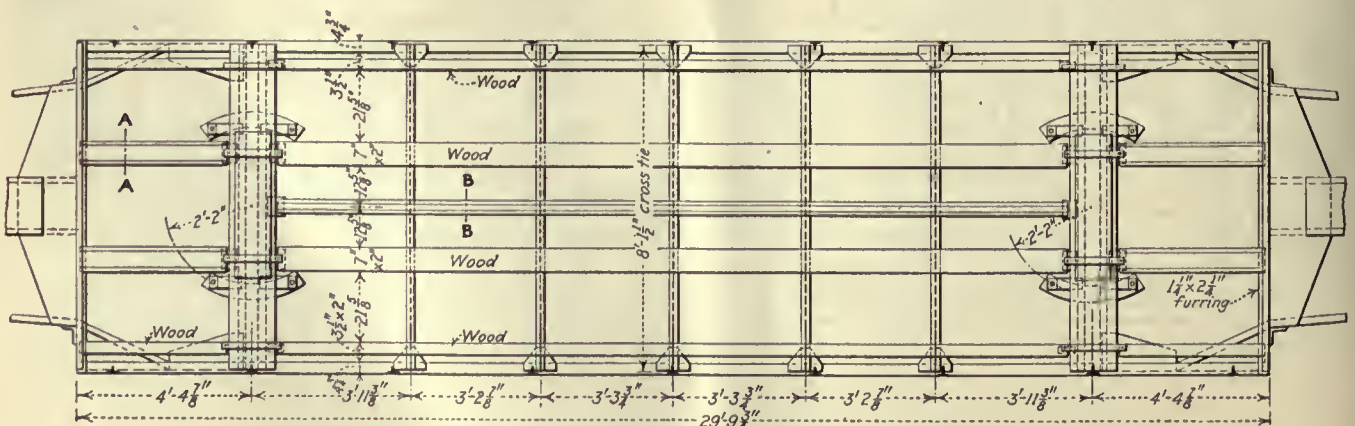
girder to provide lateral stiffness. At the bumper and the body end sill there are anti-telescoping plates designed to transmit buffing stresses through the platform side sills directly to the body side structure. The platforms are carried directly from the body side girder through the end sills and special steel corner post and gusset construction. The side sills are reinforced from the body corner posts across the second window panel at each corner of the car. The body bolsters are of an especially shallow built-up box girder design, and are of uniform depth throughout their length to keep the floor height at a minimum.

Rolled tee side posts and carlines of the body framing are not continuous. They are connected by double-riveted gussets, thus permitting the sides and roof to be built on jigs. This, it is claimed by the builder, will insure interchangeability of the various units and simplify repairs when the car has been damaged in an accident. The entire vestibule above the platform framing is of wood, the platform framing, vestibule end framing and hoods also being arranged for jig construction. In working out the details of the vestibule design, particular attention was given to ready replacement and repair in the event of collision damage.

ROOF AND FLOOR DETAILS

The body roof is built of tongued and grooved poplar boards laid longitudinally and secured to the wood carlines and steel carline furrings with cement-coated nails. The whole roof is covered with a single piece of No. 8 cotton duck. The body and vestibule floors are continuous, with a ramp of 3 in. to reduce the step heights. In the car body the floor is finished with Flexolith composition laid on Chanarch corrugated steel. The floor in the vestibules is made of fir covered with wide maple slats laid transversely.

Ceilings in the body and vestibules are continuous, and are finished with Agasote headlining. Selected mahogany, stained walnut color and finished with rubbed varnish, is used for all interior wood trim and for the vestibule doors. These doors on each side of each vestibule are operated by Consolidated Car Heating Company air engine equipment. A one-man car operator, through use of the Westinghouse M-28 brake valve and selector valve, may at will control either the front right-hand doors or the rear right-hand doors, or may operate both front and rear right-hand doors simultaneously. Valves are also installed at each end of the car so that for two-man operation the conductor at the rear of the



Structural steel shapes are used to build up a rugged underframe

car may control the rear right-hand door. This arrangement makes it also possible, if desired, for a man in the front vestibule to control the front left-hand doors with the conductor's valve at that end. All steps are of the inside stationary type covered with Kass safety treads. The sample car is not equipped with treadle mechanism control for the rear right-hand doors, but arrangements are such that this device can be installed readily, if desired.

Signal lamps are arranged to indicate to the operator

vided with Cinch Manufacturing Corporation hand-operated windshield wipers. A sun visor is also installed above the center window on the outside. An arrangement similar to that used on the Pittsburgh experimental cars prevents the formation of sleet on these center vestibule windows. This consists of a slot or duct extending through the top of the equipment cabinet so that the hot air from an electric heater in the operator's knee pocket, conducted upward against the inwardly sloping glass, maintains it at a temperature that prevents the formation of ice.

The vestibule side windows are framed in Curtain Supply Company brass sash, hinged at the vestibule corner posts by brass piano hinges, arranged to swing outwardly for ventilation, and controlled by a simple mechanism. These swing sash are also provided with weather-stripping to preclude the entrance of wind or water when the sash are closed. The body side windows are protected on the outside with window guards of aluminum rods. These are in sections which may be hinged downward to facilitate cleaning and washing windows. There are no body side window curtains.

Sixteen Heywood-Wakefield reversible cross seats are located eight on each side of a 21½-in. aisle in the body.



All control apparatus is within easy reach of the seated operator in this compactly arranged vestibule

whether the doors are open or shut, and the door control is interlocked with the motor control so that the car cannot be started until all doors are closed. Attention was given to the design of the doors to eliminate the possibility of injury to passengers, not only from becoming caught between the two sections which meet at the center of the opening, but also to obviate the possibility of pinching a passenger's fingers between the hinged sections. This protection is afforded by composition rubber strips over the joints, similar in arrangement to the installation on the two experimental Pittsburgh cars which were described in the June 2 issue of this paper.

There are eight windows on each side of the car body, with 3 ft. 6 in. center to center window post spacing. The sash are the Curtain Supply Company Rex removable brass type, arranged to lift 16 in. There are no upper sash. The vestibule center end sash are stationary and are set at an angle to prevent the reflection of light from the car body into the eyes of the operator. The conventional curtain back of the operator is thus eliminated. These center vestibule windows are glazed with Safetee Glass Company shatterproof glass and are pro-



Leather-upholstered, deep spring-cushioned seats insure passenger comfort. The car is arranged for double-end operation. Note the overhead rail handholds in the corners of the body

A longitudinal seat for three passengers is built into each corner. The cross seats have grab handles and stationary foot rests. In each vestibule is an upholstered seat for the operator which is adjustable for height. It may be swung through 180 deg. to serve as a passenger's seat when at the rear of the car.

All seats are of the full-upholstered type with extra deep spring cushions and backs, the reversible seats having individual form-fitting backs. They are covered with Radel Leather Manufacturing Company chrome retanned, monkey-grain leather. Folding seats for three passengers each are provided on each side of each vestibule.

When in use these seats are folded down across the door opening. The hinges have springs so that when not in use the seats swing up out of the way into pocket spaces at the bulkhead.

At each corner of the car body a stanchion is installed. This forms a support for a stationary overhead railing handhold over each longitudinal seat for the convenience of standing passengers. Equipment cabinets and switch

Peacock staffless brakes at each end of the car. All operating apparatus, including the controller handle, brake valve handle, windshield wiper, sign box handle, reset switch handle and register cord are within easy reach of a seated operator. An Economy energy-saving meter is mounted inside the control cabinet near the entrance door. The dial is exposed so that it may be easily read either from the platform or through the door from the outside.

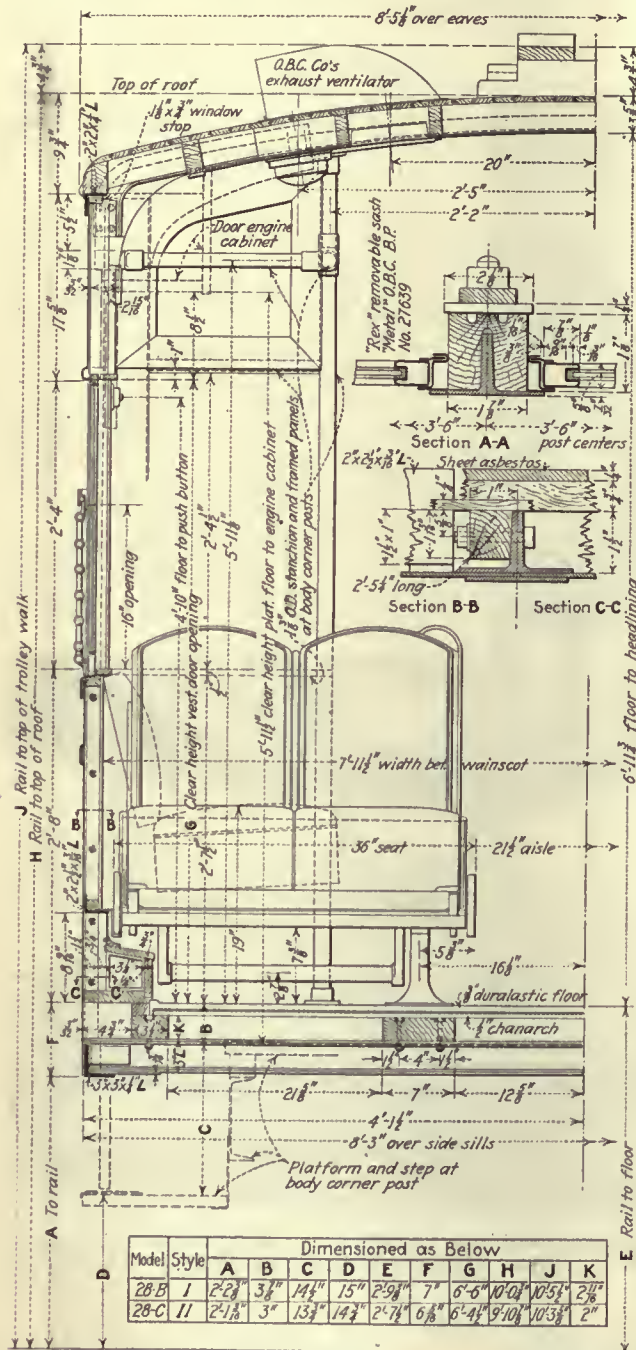
Ventilation is obtained by eight Osgood-Bradley standard type of exhaust roof ventilators, each having a grille with a lever-operated adjustable shutter. At each end of the car is an Electric Service Supplies Company illuminated destination sign with 11½x46-in. opening. This sign is of unusual size so that route numbers with 10-in. figures may be used. Each end of the car is also equipped with a specially designed trip-gate lifeguard, arranged so that the single slat gate is carried out under the bumper while the lifeguard itself is well back under the vestibule. Heavy C.-G. Spring & Bumper Company automobile-type spring bumpers, similar to those installed on the Pittsburgh experimental cars, are mounted at each end of this sample car. Under each vestibule there is an Osgood-Bradley standard foot gong and a Westinghouse Air Brake Company "Pneuphonic" warning horn. The car is equipped with the Faraday buzzer passenger signal system.

Electric heaters are Gold inclosed element type, with thermostat control. There are sixteen heaters in the body of the car; twelve under the cross seats, and four panel type mounted in the risers of the longitudinal seats. Each vestibule also has two electric heaters, one in the face of the equipment cabinet and the other in the recess in the cabinet for the operator's knees. These vestibule heaters are not controlled by the thermostat but are connected to a two-point switch so that one or both may be turned on or off as desired.

Lamps in the car body are arranged in two rows of Electric Service Supplies Company No. 1022 dome fixtures, eight on each side. Two similar fixtures, one over each step, are located in each vestibule. These lamp fixtures are all wired in series, each taking one 30-volt, 1-amp., A-19 bulb. An automatic cut-out device is part of the fixture equipment so that if any one lamp in the circuit burns out the other lamps continue to burn at normal voltage and the defective lamp can thus be identified readily and replaced. Two lamps are located in each destination sign box. These are in one circuit with the headlights and there is a three-way switch arranged so that the headlight at either end of the car may be operated as desired. The headlights are of a special shallow Crouse-Hinds design equipped with special reflectors and automobile-type lenses.

At each end of the car a stop light is controlled by the air brakes so that whenever the brakes are applied the lights at both ends are illuminated to notify an approaching vehicle from either direction that the car is either about to stop or has already stopped and may discharge passengers. Provision is made for any type of fare or transfer register equipment. If the cord-operated type is used, a special duct is built into the body so that the cord is not visible except where it extends through the vestibule finish. On the sample car, this cord extends down through the sign box where it is within convenient reach of the seated operator. Spring-mounted trolley base supports of the type described in the article on the Pittsburgh experimental cars in the June 2 issue are part of the equipment of this car.

Westinghouse Electric & Manufacturing Company



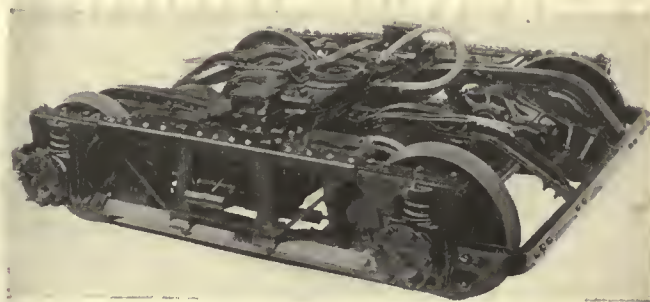
No effort was made to achieve extreme lightness in the design. This cross-section through the body shows the principal details of construction

lockers are built into the vestibules so that all miscellaneous equipment, switches, etc., are concealed, although ready access to them is provided through suitable doors and removable panels. The covers of the controllers and switches are removed and the inside of the cabinets is lined, where necessary, with heavy asbestos. The only items of equipment which are exposed are the tops of the controllers and brake valves, and the handles of the

type HL electro-pneumatic, unit-switch control, with four 35-hp., 300-volt, light-weight, high-speed motors connected in series in groups of two for operation on 600 volts, comprises the electrical equipment. The electro-pneumatic switch units are mounted underneath the car body. Instead of the customary storage battery for operation of the control switches, this equipment utilizes trolley voltage through a resistance element. Wherever possible all control cables are carried in a wiring box inside the car body, and all wiring throughout the car has been installed to meet the requirements of the National Board of Fire Underwriters. The car carries their inspection plate.

Full safety car air brake equipment, with a Westinghouse variable load adjustment, is used. The usual foundation brake rigging and brake cylinder have, however, been eliminated. Air pressure is carried directly to each truck wheel through eight Westinghouse automotive type diaphragm brake chambers, the only brake connection between the car body and the trucks being through a flexible hose used to transmit the air pressure to the brake chambers. Better equalization, simplified brake rigging, and a considerable reduction in weight and maintenance are expected from this arrangement. The general scheme is similar to that used on one of the Pittsburgh experimental cars and described in detail in the June 2 issue of the JOURNAL. Air-brake pipe, wherever possible, is located inside the car body and consists of aluminum and copper tubing except for a small amount of standard iron pipe. The use of the tubing not only reduces weight but obviates the need for elbows and other pipe fittings and eliminates trouble from rust and scale.

Most of the valves and control devices in the brake system are grouped in a special equipment box under the car, which has an electric heater to prevent freezing. These several air devices are mounted on a removable tray in the box, below which are the heating units. Special electrical connectors are used for all wiring into the box,



An unusual feature of this special Osgood-Bradley truck is the use of automotive brake diaphragms at each wheel. High-speed Westinghouse motors are coupled with W-N drive to the 22-in. diameter wheels

and air lines are all brought into unions on the outside, where they are within convenient reach. By disconnecting these unions and electrical connections, the entire valve group may be removed from the box for inspection, repair or cleaning.

The trucks under this car are similar to the Osgood-Bradley 45-66-KDA-50 trucks with Westinghouse-Nuttall double-reduction drive, used under one of the Pittsburgh experimental cars, except that these have Westinghouse 35-hp. high-speed motors and 22-in. diameter wheels instead of the 50-hp. motors and 24-in. wheels used under the Pittsburgh car. The trucks are of the truss frame, spring pedestal type, with coiled springs

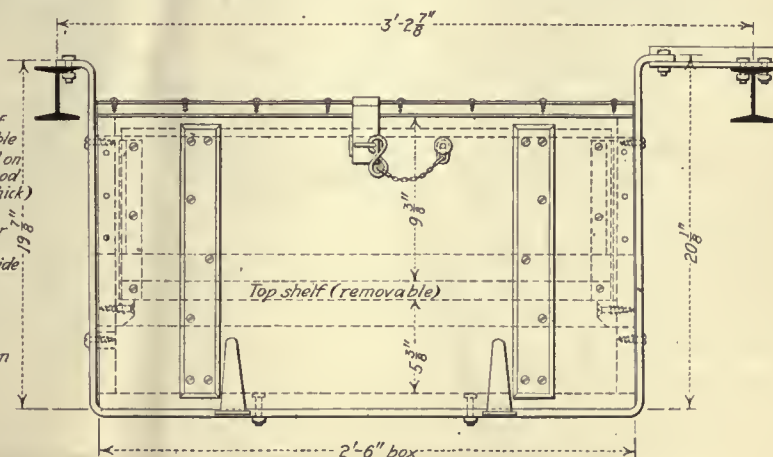
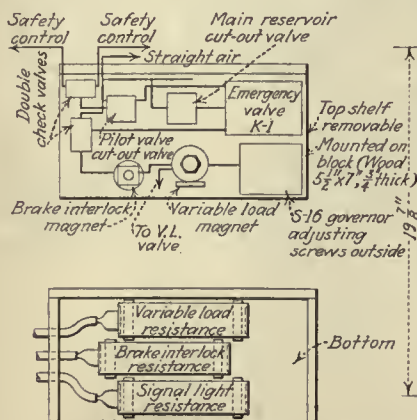
over the Hyatt roller bearing journal boxes, and with conventional, double-elliptic, spring-supported, swing type bolsters with damper attachment. The brake arrangement, as previously mentioned, is similar to that on the Pittsburgh car, in which the diaphragm type brake chambers at each wheel actuate the individual truck levers. In this way all truck levers are live levers, the connection between each pair on each side of the truck consisting of a specially designed Anderson slack adjuster.

A valuable sequel to the recent Detroit Survey and the Dayton Survey in this issue will be the presentation next week of the

STREET TRAFFIC CONTROL PROBLEM OF SAN FRANCISCO

Every phase of the problem was covered under the directorship of

DR. MILLER MCCLINTOCK
 Director Albert Russel Erskine Bureau
 Harvard University



Air valves and other apparatus are mounted in a special equipment box under the car, on a tray which can be easily removed for inspection of the entire group

Dayton Should Pay Higher Fares

This conclusion was reached by Ross W. Harris after an extended survey. His report discusses means for relieving traffic congestion and for measuring street railway track capacity and service

DAYTON has grown from a population of 61,220 people in 1890 to 184,406 in 1927. With adjacent suburbs its population in 1927 was 194,161. It is located in the midst of a rich agricultural district and industrially is highly developed. The downtown district has spacious streets and is level. The city is an important railroad center and is intersected by the Great Miami River. The industries are not confined to certain districts as in most other industrial centers. They are scattered throughout the city.

At the request of the city manager of Dayton, the four street railway companies providing urban service in the city and the five interurban electric railways connecting it

with other cities, Ross W. Harris of Madison, Wis., has been engaged in making an extended survey of the vehicular and street railway traffic situation in Dayton. It has recently been completed after nine months' work, and a report was filed with the City Commission May 1. Briefly, Mr. Harris' recommendations follow:

For general traffic, he recommends restricted parking on many streets, shortening of the traffic signal cycle, and encouragement of the construction of private parking garages immediately outside the main business section.

For the street railways, he recommends increased size of safety zones for boarding and leaving passengers, an increased fare to place the companies on a sound financial



Map showing Dayton's electric railways. Four city railways and five interurbans serve the territory

basis and permit improved service, a revision of the requirements upon the companies for paving, a reduction in the number of service stops, an increase in the number of turnbacks, installation of more electric track switches, and if possible, some corporate arrangement between the several companies supplying the city service by which there should be unified co-operative service through an operating clearing house. Earnings would then be distributed according to some equitable plan. Mr. Harris points out that such an arrangement might develop later into a service-at-cost agreement between these electric railways and the city.

ELIMINATING GRADE CROSSINGS

Progress is being made in the matter of grade separation in Dayton, and Mr. Harris says that the question will soon have to be settled as to the extent to which the electric railways should contribute to the city's portion of this expense, namely, 35 per cent of the cost. While he admits that the electric railways, like all other interests, will benefit by the change, they will also be put to considerable expense in the relocation and reconstruction of their tracks and in providing temporary facilities during the work of grade separation. This should be considered. On division of expense, he suggests:

In general, the cost should be divided in proportion to the relative width and use of the street car strip and the balance of the street. As the railway strip is used jointly by the automobile and street car, the exact basis of division as to its use should be determined by the number of cars passing and the number of vehicles passing within a normal day, giving a weight of ten to each street car and one to each vehicle. The total cost so determined, however, should not exceed a fair amount based on the net benefits to the electric railways, after an allowance has been made for the additional cost occasioned to them by the construction of grade separation facilities. It should be remembered, also, that the railways pay a general tax like the other interests or individuals, out of which the city's portion of 35 per cent will be paid. An approximate appraisal of the net benefits to the electric railways from this change has been made. It was found that the amount chargeable against the electric railways should not exceed \$1,400 per year for ten years for a single electric railway track at the intersection, and \$2,800 for two tracks.

An abstract of Mr. Harris' detailed treatment of Dayton's transportation problem is of particular interest to operators in other cities owing to the possibility of applying in their localities the remedies suggested for Dayton. The remainder of this article will therefore be given up to an abstract of those portions of the report.

THE PARKING PROBLEM IN DAYTON

Public investment in the improvement of streets has been primarily for the accommodation of moving traffic. The extent to which the streets should provide storage space for automobiles depends on what is the greatest benefit to the public. While, superficially, the parking of automobiles in front of a certain store may seem advantageous to the particular merchant, yet such private gains, if any, from this source, may react against his interest by increasing congestion and creating a measure of inaccessibility, thus encouraging the development of business elsewhere in more easily accessible locations.

A count at 10 a.m. on Aug. 4, 1927, showed 1,651 automobiles parked within the area bounded by Monument Avenue, St. Clair Street, Pitt Street and Wilkins

Street (the business district). This number is 4 per cent of the total passenger automobiles licensed in Dayton. At 2 p.m. and 5 p.m., 3.9 per cent and 3.7 per cent, respectively, were parked in this area.

Even now the general street congestion caused by parking in the downtown area, and the continued movement into and out of the parking spaces there, is so serious that steps should be taken to relieve the situation. Parking should be prohibited on certain streets between 7 a.m. and 7 p.m. on all days except Sundays and holidays. It should also be prohibited between safety zones and curbs or within the 25 ft. next in rear of a safety zone and the curb. Diagonal parking should be permitted only on certain streets.

Many of the street railway safety zones in the downtown district should be extended so that they can accommodate at least three cars. The maximum length now is for two cars only.

STREET AREA OCCUPIED BY AUTOMOBILE AND STREET CAR RIDERS

In Dayton the average automobile, when still, occupies 133.76 sq.ft., including an allowance of 1 ft. on each side and 1.5 ft. front and rear for clearances. The average number of passengers per automobile, determined by count, is 1.56. This amounts to an average of 85.8 sq.ft. of street area per auto passenger.

The Dayton street car, when still, occupies an average of 458.54 sq.ft., including an allowance of 1 ft. on each side and 2.5 ft. front and rear for clearance. During the evening rush the average load per hour for all cars outbound, past the point of maximum loading, is 49.8 passengers. Thus the average still area required per passenger is 9.2 sq.ft.

With an additional allowance of 20 ft. per auto for safe spacing when running at a reasonable speed, 183.2 sq.ft. of street space is required per passenger. To serve the average street car load of 49.8 passengers, the automobile would require 563.2 lin.ft. of street when still, and 1,203.2 ft. when running. The average length of the Dayton closed street car over all is 40.4 ft.

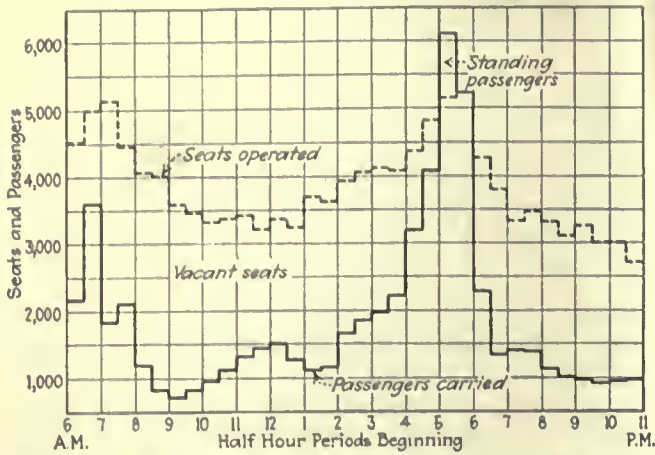
A four-day check was made of the patrons of four leading retail stores on Jan. 9-12, 1928, to determine the means of transit used by them in reaching the stores. The results follow:

7,466 customers or	28 per cent used automobiles.
14,287 customers or	54 per cent used street cars.
4,148 customers or	15 per cent walked.
164 customers or	1 per cent came by interurban cars.
556 customers or	2 per cent came by bus.
118 customers or	0 per cent came by miscellaneous means.
26,739	100

SPEED AND SERVICE OF DAYTON STREET RAILWAYS

The average annual speed in miles per hour in Dayton of the City Railway, Peoples' Railway, Oakwood Street Railway, and Dayton Street Railway for 1922 to 1926, inclusive, has been compiled. In 1922 the figure was 9.04 m.p.h. In 1926 it was 8.66 m.p.h. The corresponding speed in Memphis is about 10.3 m.p.h. As the tendency in Dayton has been downward in recent years, special effort should be made to permit faster speed. An average speed of slightly better than 10 m.p.h. is attainable in Dayton, but this will require careful supervision of service by the company and constructive co-operation on the part of the city authorities.

Dayton street car riders receive 0.89 seats per outbound passenger during the heaviest hour of travel at the



Seats and passengers when passing points of maximum loading on typical week day, Dayton city lines only

point of maximum loading, when the entire system is considered. From 9 a.m. to 2 p.m., the non-rush hours, the car riders receive 2.70 seats per passenger at points of maximum loading. This service fully equals that given in other cities the size of Dayton.

DURATION OF SIGNAL CYCLE IN DOWNTOWN DISTRICT

The traffic signals in the downtown district at present are synchronized and alternate, that is to say, signals will change at the same time at all corners, but where green shows in a certain direction at one intersection, red shows in the same direction at the next intersection. The duration of one cycle is as follows: green (north and south), twenty-one seconds; amber, five seconds; red, twenty seconds; amber, five seconds; total 51 seconds.

This period does not synchronize well with the speed of pedestrians, street cars or automobiles, so that their through movement cannot be continuous. Observations showed that their average speeds in the downtown districts were: Pedestrians 3.05 m.p.h.; street cars 4.04 m.p.h.; automobiles 15 m.p.h. The length of the signal cycle should be determined for one of these means of travel, with the speeds of the others bearing a definite relation to it. Thus, on the basis of figures quoted, the time allotted to the street cars to pass between two intersections should be five times the total of one red and one amber light, and for the average speed of the pedestrian seven times. The duration of the cycle for an automobile should be twice the time required by it to travel from one intersection to the next. If an automobile requires eighteen seconds to travel the length of the average block in the downtown district (508.3 ft.), 36 seconds is the proper duration of a cycle properly to fit automobile traffic. This establishes 90 seconds and 126 seconds as the time required for street cars and pedestrians to travel the same distance at their respective speeds. The 36-second cycle would then be made up: Green, fourteen seconds; amber, four seconds; red, fourteen seconds; amber, four seconds. Observation of the time required for the average pedestrian to cross intersections between curbs in the downtown district is 14.5 seconds. As he can use the duration of one green and one amber signal, he would have eighteen seconds to clear the intersection.

It may be suggested that a short signal cycle might be satisfactory for light traffic and unsatisfactory for heavy traffic. This is true theoretically. Practically, however,

the longer cycle is of but little additional advantage to heavy traffic, and makes much less efficient use of street capacity.

CHARACTERISTIC ZONES OF TRAVEL

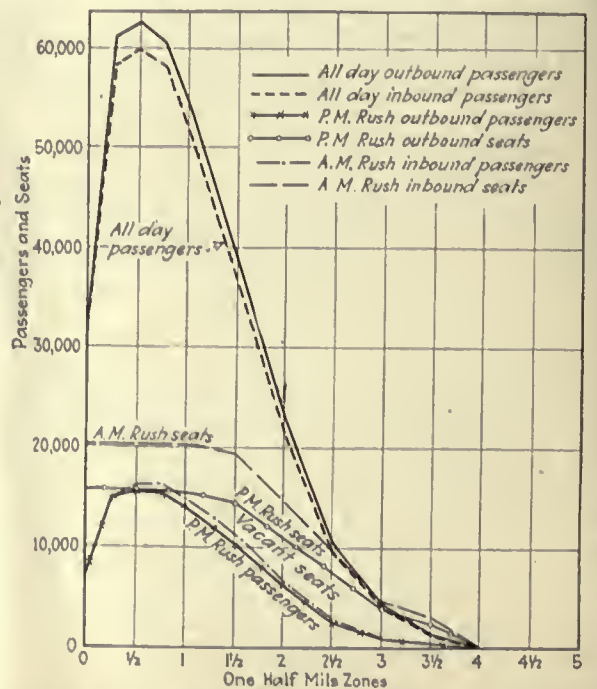
Every route from the center of the city of Dayton into its outlying districts has three distinct zones; a central zone, a transmission or neutral zone, and an outer zone. The central zone is located in the downtown business district. The transmission, or neutral zone, is just beyond the central zone and most passengers ride completely through it. It contributes less revenue than the other zones, and in it, during the peak hours of travel, there are usually more passengers than seats. The outer zone includes the residential district. Most of the rush-hour vacant seat-miles are found in this zone.

An accompanying chart shows the ratio of passengers and seats for all city lines in Dayton. Another gives the seat distribution by half-hour periods for week-day service.

An analysis of the data relating to standing passengers and vacant seats in Dayton during 1927 shows there are 15.28 vacant seat-miles for each standing passenger-mile. This is a large proportion.

It was also found that the average passenger ride is 1.83 miles, which is approximately equal to 54 per cent of the average one-way car trip.

Free movement of cars requires that the time spacings between consecutive cars be not less than the average length of service stop. The average service stop in the Dayton downtown district is 36.75 seconds with traffic signals and 22.69 seconds without traffic signals. With this figure, an assumed rate for acceleration and braking of 1.5 m.p.h.p.s. and at least 5 ft. of free space between cars when standing on main-line track, the normal carrying capacity of track in the downtown district in Dayton can be calculated. It must be borne in mind, however, that such a calculation assumes that there will be no interference with the free movement of cars from sources other than those involved in the length of service stop and factor of safety. If the track between consecutive



Ratio between seats and passengers in different zones on typical week day, city lines only

cars is used by vehicles, for example, the extent to which the full theoretical track capacity may be utilized is materially affected.

CAR SEATING CAPACITY

The seating capacities of the various city cars in Dayton range from 28 to 70, depending on the type. In all, there are 27 types of cars and, with but a few exceptions, they are one-man cars. They average 47 seats each. Observations of the average normal standing load, which may be taken as 22 passengers, show that they will arrange themselves on city cars under average conditions as follows:

Average Area per Standing Passenger (Normal Standing Load)	
Front vestibule.....	One passenger for each 3.30 sq.ft.
Aisle.....	One passenger for each 4.01 sq.ft.
Rear vestibule.....	One passenger for each 5.94 sq.ft.
Car as a whole.....	One passenger for each 4.08 sq.ft.

The minimum space per passenger observed at various times under voluntary election of standing space in different crowded cars was as follows:

Average Area per Standing Passenger (Crowded Cars)	
Front vestibule.....	One passenger for each 1.03 sq.ft.
Aisle.....	One passenger for each 1.47 sq.ft.
Rear vestibule.....	One passenger for each 1.08 sq.ft.
Car as a whole.....	One passenger for each 1.50 sq.ft.

The average city car has 86.9 sq.ft. available for standing passengers, and on the basis of 1.5 sq.ft. per passenger, will accommodate 58 standing passengers in an emergency, or 123 per cent of its average seating capacity.

UNIT FOR MEASURING SERVICE

No one unit for measuring service in all its phases has been devised. Many have been suggested, but they are not entirely adequate. On the basis of pure transportation, however, the unit "Car-Mile Per Revenue Passenger" may be used. Actually, this has been decreasing in Dayton, as shown by the table on page 1030, representing the car-miles per revenue passenger on the Dayton city lines of the City Railway, Oakwood Street Railway, Dayton-Xenia Railway, Peoples' Railway, Dayton Street Railway and Cincinnati, Hamilton & Dayton Railway.

A car rider has a right to expect satisfactory service, but it is difficult to decide what service is satisfactory. Some may want speed, others reliability, others vacant seats, or it may be that property or business interests may be the deciding factor.

Attempts have been made to establish a standard of service based on an average load or the number of seats per 100 passengers over a given period of time. These efforts have not proved successful because they are not conducive to efficient operation nor do they guarantee an equitable relation between service, fare and cost.

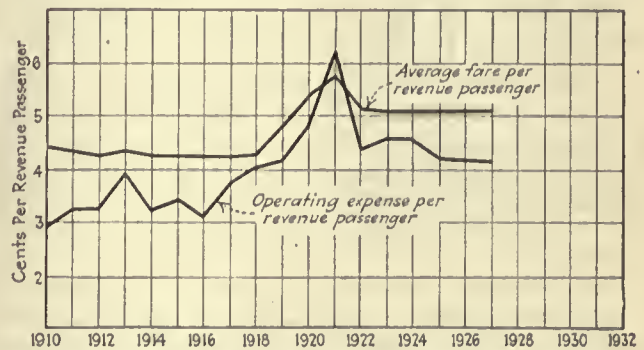
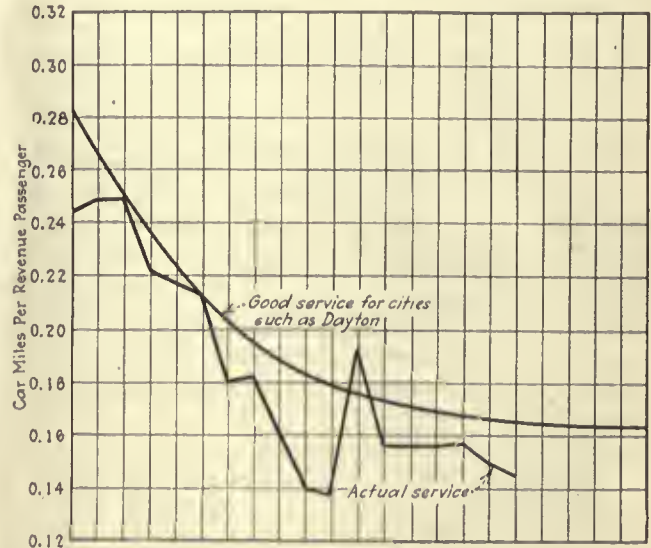
A standard of service based in such a way as to maintain an equitable relation between revenue and cost could be developed somewhat as follows: Estimate the future revenue for several months, preferably a year; then deduct an amount required to maintain the integrity of the money invested, i.e., return, renewals and replacements, maintenance, and a small margin for profit and loss. The balance, after deducting an amount to cover taxes, comprises all the money which is available for service.

Next, determine the aggregate mileage that this amount of money will pay for at the prevailing rate of cost, then distribute it to the various months according to seasonal conditions and requirements; then to the various routes, and then to the various days of the month. Then, from

somewhat similar estimates of earnings for each route a continued measure of service may be evolved in the form of "Earnings Per Car-Mile" by lines for each month and each day. Such a standard may be designated "Daily Line Standard."

Division of the earnings in service of each of the routes by the unit "Earnings Per Car-Mile" will then give the largest amount of mileage which should be operated on a given date. With this determined, the next problem is to distribute this mileage along the line and throughout the day. This is a matter of schedule design.

A diagram included in the report gives the car-miles per revenue passenger since 1910 for the City Rail-



Trend between actual service and suggested good service as well as between expenses and fare per passenger, Dayton city lines only

way, Peoples' Railway, Oakwood Street Railway and Dayton Street Railway. Other companies rendering city service were not included because a complete separation of operating expenses between their city and interurban services was not available.

The curve representing good service is drawn in as a matter of judgment. The actual service is below this curve except in 1921, when there were abnormal conditions, due to a strike. The lower curve shows that during these years there was only a narrow margin between operating costs per revenue passenger and the fare. This margin was too small to be conducive to rendering good service. As a result, the city as a whole paid through a reduction of service below normal good service.

If the proposed standard should be adopted, it is believed that it would distribute service equitably and give

to the public all the service a given fare will permit, and to the company assurance that the integrity of its investment will be protected. All of this lends itself to furthering the development of the community.

With such an arrangement there should also be a limit to the size of load to be carried. Thus, subject to the limitations of service already discussed, the loads carried past the point of maximum loading, averaged over a period of twenty minutes, should not regularly exceed the normal capacity of the car, or seating capacity plus one standing passenger for each 4 sq.ft. of standing area. Further, no regularly occurring maximum load should exceed the emergency capacity of the car, which is seated capacity, plus one passenger for each 1.5 sq.ft. of available standing area.

The fare required in Dayton to provide good service there under present operating conditions can be determined as follows:

AVERAGE FARE PER REVENUE PASSENGER REQUIRED TO PROVIDE GOOD SERVICE IN DAYTON UNDER PRESENT CONDITIONS	
Average length of one-way car trip, miles.....	5.43
Operating expenses per car-mile in cents (normal for Dayton).....	21.7
Operating expenses per one-way car trip.....	\$1.1783
Ratio of operating expenses to gross revenue, per cent.....	55.4
Gross revenue required.....	\$2.1269
Car-miles per revenue passenger.....	0.1650
Revenue passengers per average one-way car trip.....	32.9091
Average fare required per revenue passenger in cents.....	6.46

This average fare could be obtained from the following rates.

Half-fare tickets.....	3 cents
Full-fare tickets.....	Four for 25 cents
Transient fare in cash.....	8 cents
Extra charge for transfers.....	1 cent

The division of these fares paid would probably be approximated as follows:

	Fare in Cents	Per Cent	Product
Half-fare tickets, no transfer.....	3	3.7	11.1
Half-fare tickets, with transfer.....	1	0.8	3.2
Four tickets for 25 cents, no transfer.....	64	70.0	437.5
Four tickets for 25 cents, with transfer.....	74	15.5	112.4
Cash fare, no transfer.....	8	8.2	65.6
Cash fare, with transfer.....	9	1.8	16.2
Total (average).....	6.46	100.0	646.0

Increased operating expenses would change the fare required. Thus a 5 per cent increase in wages would make necessary an increase in receipts of 0.06 cent per revenue passenger, and a 10 per cent increase in wages would mean a necessary increase of 0.13 cent per revenue passenger.

To insure adequate service to the public and ability to keep abreast of the city's development, new capital is constantly required for electric railway facilities. Electric railway securities should be made as attractive as other corresponding forms of investment, both for income and security. Certain rules have been set down which, if complied with, will establish the electric railway securities of Dayton on a proper basis. Briefly, these rules are:

1. Net earnings should not be less than 2.5 times fixed charges.
2. Fixed charges should not be greater than 4.24 per cent of rate base (or amount on which the company is allowed to earn a return).
3. Fixed charges should not be greater than 16.112 per cent of gross revenue from all sources.

SERVICE: CAR-MILES PER REVENUE PASSENGER, ON DAYTON CITY LINES OF CITY RAILWAY, OAKWOOD STREET RAILWAY, DAYTON-XENIA RAILWAY, PEOPLES RAILWAY, DAYTON STREET RAILWAY, AND CINCINNATI, HAMILTON & DAYTON RAILWAY

Year	Car-Miles	Revenue Passengers	Car-Miles per Revenue Passenger
1910.....	7,372,408	30,041,325	0.2454
1912.....	7,849,434	30,848,534	0.2544
1914.....	7,532,742	33,441,835	0.2252
1916.....	7,447,799	39,503,027	0.1885
1918.....	6,878,142	41,568,427	0.1655
1920.....	6,376,661	44,933,105	0.1419
1922.....	6,767,156	42,697,635	0.1585
1924.....	6,884,446	43,227,938	0.1593
1926.....	6,830,366	44,438,428	0.1537
1927*.....	3,430,400	22,981,478	0.1493

*Estimate for first six months.

4. Net earnings should not be less than 40.28 per cent of gross revenue from all sources.
5. Face value of bonds should not exceed 6.667 times net earnings.
6. Face value of bonds should not exceed 2.6853 times gross revenue from all sources.
7. Face value of bonds should not exceed 70.6658 per cent of rate base.

In the above, net earnings are taken to be gross revenues, less operating expenses and taxes; gross revenues mean revenues from all sources; fixed charges equal annual interest charges or bonds; rate base is the recognized amount on which a return is allowed to be earned. In this method of calculation prudent management and sustained earnings are assumed.

Under present conditions a full compliance with rule 4 is not probable for any of the companies in Dayton, except by greatly reduced operating expenses. With that exception they come through with a pretty clean slate.

New Bus Seating Plan



Seats over the wheel housings in this Twin Coach are a departure from the ordinary type

SEATS over the wheel housings of buses ordinarily are of little utility. F. C. Miller, manager of the Cleveland-Akron-Canton Bus Company, has devised an arrangement to obviate the difficulty and seats of his design are installed in the six Twin Coaches just put in service on the Cleveland-Akron-Canton run. The seats directly over the housing are longitudinal, and are combined with transverse seats immediately behind. A continuous padded back sweeps in a quadrant behind the seats, as shown in the illustration. The plan has increased the total capacity of the coach from 37 to 40 passengers.

Are We Merely Running Cars?

Modern standards of public transportation must be created to meet the relentless pressure for improved facilities. Readjustment in thinking, planning and managing can retain the position of prosperous leadership for each management

By E. J. McIlraith

Staff Engineer Chicago Surface Lines, Chicago, Ill.

PUBLIC transportation is necessary in all cities and some organization must operate each system, but the relentless pressure of the last ten years for improved facilities is not slackening. There is no chance of dodging the issue. Each management is being forced to the defensive and only the active, aggressive and progressive will survive. The railway business is in a state of change, and only readjustment in methods, in modernization of equipment, in thinking, planning and managing can retain for each management the position of prosperous leadership.

All business customs and procedure are changing. As Merle Thorpe says, in *The Nation's Business* for April:

Change is the immutable law. Eternal adaptability is the price of survival. Competition and change march together as one.

Together they plan new things to supplant old things, to dominate new markets, and to wrest the patronage from old-time customers and customs. Together they see to it that a commercial house of a century's standing may be destroyed with bewildering suddenness. At the same time an infant enterprise becomes overnight a national institution. . . .

Competition never rests. Competition may be the life of trade but it is also the death of traders. . . .

Out of the flux and ferment emerge the victors. Men clear-eyed, alert, resourceful, they win that all of us may live more fully. It is the law.

The world steps aside to let any man pass who can see a year ahead.

Railways are no exception to this general rule. Present-day standards must be served. The public should be surprised by a better quality and comfort of public service than it has yet grown to want.

The purchaser doesn't buy merely what is necessary any more; he is sold something better, bigger and more luxurious than he had wanted. He cheerfully pays for newer, better automobiles, lives in newer, better homes, wears more expensive clothes, changes even his furniture to suit the prevailing vogue. But the electric railways are not modernized in sales practices. The people are not even getting what they timidly hope for; much less are they surprised by what is offered.

Here and there someone is showing either a new idea or a better adaptation of an old one. Scattered efforts are building for us the nucleus of the modernized scheme of transportation that will serve the public well. The alert management is searching for these, and will develop them so as to deserve public commendation and

Speaking at the recent annual convention of the Canadian Electric Railway Association, Mr. McIlraith brought out that the railway business is in a state of change and that to meet the present-day competition a complete readjustment is necessary. As a foundation for planning and supervising a readjustment he listed and discussed fourteen items that hold many possibilities for individual operators.—EDITOR.

secure favorable operating conditions from the city government.

Many competent minds have been active in trying to determine the ultimate or best development for public transportation. It is idle to think now of some unexpected panacea or some drastically different development that will revolutionize our business. Electric railways will continue for an indefinitely long period to be the most effective form of public transportation. It does not follow that present electric railways are operating at their best. None even ap-

proaches a condition which might be considered completely satisfactory, and most of them are very far short of the standard. Successful management and operation call for intimate attention to much detail and great improvement on many existing practices. Circumstances often prevent the attainment of the management's dreams. Often the obstacles are more fancied than real. Often the ideal set is far short of being appropriate to the circumstances. But whatever the condition and in all circumstances, the quality of the service and the success of the business is a direct measure of the ability of the management to follow through in planning and in supervising, so as to insure intelligent and competent attention to all the details involved.

There are a few outstanding items that are being done here and there and that should be given complete attention by each property. These fourteen items may serve as a foundation:

1. Traffic regulation and improvement of street use.
2. Promoting an active, competent committee of representatives of influential and interested industries or organizations to study and develop planning for street betterments.
3. Reducing time wastage in operation.
4. Building appropriate comfort into cars.
5. Building high-powered cars.
6. Building attractive cars.
7. Building high-grade machinery principles into the car equipment.
8. Scheduling service that is suited to the different districts served.
9. Providing express service by suitable buses.
10. Using well the possible auxiliary equipment such as buses of various types, or trackless trolleys.
11. Scheduling service with thorough technical skill after careful analysis of the necessary traffic data.
12. Thorough training of the operating force in good principles of safe, and yet fast, operation.

13. Active and effective supervision of the operation to insure performance of the standard set.
14. Planning for better and bigger city growth.

A brief discussion of some of these items will illustrate the possibilities.

REGULATION OF TRAFFIC REQUIRES CO-OPERATION

Traffic regulation in its broadest sense is a definite problem on which railway managements should be the best informed specialists and most effective workers. It involves not only signal control and traffic routing or segregation, but also all the basic principles of street use such as proper regulation of all movements, parking, street obstructions (including manhole openings and street repairs), routing of cars or buses, operation of taxicabs or sightseeing buses, loading or unloading of goods or materials, operation of service vehicles and the creation of special streets, boulevards and heavy traffic thoroughfares.

Traffic planning of this sort is not a police job, nor one for consulting engineers alone. The local organizations should be intelligently led through a study of the details so as to create traffic conditions that are appropriate to the best public welfare. Full sympathy can be obtained from all interested business organizations if the data are carefully collected, are thoroughly discussed and the conclusions reached are based on what is clearly for the greatest good to the greatest number. The notable success in the development of traffic regulation in Chicago has been due to the complete understanding reached in the street traffic committee of the Association of Commerce.

FAST OPERATION APPRECIATED

Much time is wasted in ordinary street railway operation. Speed is a very essential element of good service and has much to do with the growth in business. Reckless speed is not wanted, but faster operation can be attained by reduction of delays to a minimum and by alertness on the part of the train crew. The Chicago Surface Lines is operating with an average speed of 11.26 m.p.h., in spite of the intensity of street use along car lines.

The failure to increase the average speed of operation is one of the major factors in preventing an increase in business in most cities. Our customers are severely critical of service that hints of inefficiency, but respond to an alert crew that hurries without rushing.

In order to maintain a high average speed it is necessary to have adequate motor capacity. High accelerating rate and high free running speed are needed if the street car is to compete successfully with any vehicle in the street. With the faster car the standard of service on a line can be maintained with a smaller number of cars and consequently a lower cost for housing, and the cost of operation in trainmen's hours also is reduced.

COMFORTABLE AND ATTRACTIVE CARS ARE NEEDED

Many railway organizations have been trying to build comfort into street cars and much has been accomplished, but all too slowly. Cars should be renovated more rapidly. Most of those now in use are a product of the age when people had to ride street cars. Managements should have moved faster in meeting the competition of comfortable seats in private automobiles. Public conveyances cannot be quite so comfortable, but there is too great a difference. The noise and rattle, insufficient ventilation, width of aisle, the width and convenience of

the doors and platforms, and the method of using doors are all subject to severe criticism.

The new car on trial in St. Louis looks like a good type for most lines. It has individual seats arranged along the sides, each at an angle of about 45 deg. from the line of the side of the car. There are 43 seats and a very wide aisle. This arrangement affords unusual accessibility, prevents all jostling during non-rush hours, and enables each passenger to enjoy a degree of luxury and exclusive comfort not possible when two persons are crowded on one seat. The ordinary street car or bus subjects passengers to an undesirable degree of personal contact.

The attractiveness of the car too often has been largely overlooked in the desire to secure minimum maintenance cost; but the railway can well afford higher cost if by doing so it attracts riders. Only a few added riders will pay for the slight additional expense of providing pleasing interiors.

Some of the interiors exhibited at last year's American Electric Railway Association convention in Cleveland were surprising departures from the older types, and simplicity of arrangement may result in reduced costs of construction.

POSSIBILITIES WITH SPECIAL SERVICE

In Detroit a so-called jitney service is operating. Bus service of both local and express type is also given by competing companies. It is very interesting to note the apparent demand for the comfort of the express jitney service and of satisfactory express bus service without concern as to price. There is no doubt that many people resent the jostling within a street car and are willing to pay a higher fare for specialized express service. Comfort and convenience are quite in demand, and will be paid for cheerfully at any rate in keeping with the comparative exclusiveness of the patronage. The possibilities of such auxiliary express service have been very incompletely explored to date, even though several cities are giving a few sample runs of this type.

A special division of a company's organization established to build up express service would make possible the elimination of much private automobile use and should fill a recognized need as an auxiliary of the public transportation business. No doubt this service can be made profitable, because it can be rendered only at the price and where the business can be done profitably. The use of buses as supplementary equipment offers broad possibilities.

IMPORTANCE OF SCHEDULING

The department handling the traffic and schedule analysis is responsible for the number of cars owned and operated, for the car-miles covered, and for the quality of service rendered. The operating schedules may include useless car mileage that is not apparent nor suspected. Much of the cost, therefore, of the electrical, of the way and of the equipment departments is controlled by the skill with which the schedule department does its work. The cost of trainmen's wages is usually greater than the cost of these three maintenance departments put together. The accuracy with which the schedules may be maintained on the street is dependent upon the care with which the schedule department has analyzed the problem, has established the running time and the standard of car loading, and has worked out the solution in car-hours of operation. The effectiveness of each car-hour schedule is controlled by the schedule maker.

It is impossible to judge the quality of schedule making without intimate analysis of the detail. This is rarely discussed outside the schedule department, and in some cities not even the schedule makers are trained to interpret the problem. Too often schedule making is treated abstractly as a sort of puzzle. It is a very live problem involving the satisfaction of thousands of travelers, the living conditions of the trainmen and their families, as well as the development of income and most of the expense of the company. It is not a casual job for unsympathetic or less careful handling than that of the most skilled men. In fact, the prosperity of the company rests principally with the skill and ability of those in charge of the schedule and traffic department. Of course, the manager may be sufficiently active and so thoroughly informed as to provide for the schedule department the necessary judgment; but is sufficient recognition of the importance of scheduling really given?

Millions of dollars per year may be wasted in a large company without any suspicion being raised as to that waste. It is time more railway organizations were employing the highest technical skill to reorganize this most important planning and production department.

TRAINING OF THE OPERATING FORCE

No matter how good scheduling may be, the result on the street will be disappointing unless the operating force is trained in sound principles of safe and fast operation. The safety organization, together with the regular trainmen's school force, can instruct the men in safe practices that provide alert efficiency in saving moments of needless delay. The training of the motorman and conductor and the use of care to get them working in sympathy with a sound, well-planned viewpoint is a major portion of the problem of obtaining higher speed and lower accident costs.

The supervisory force, including all from the superintendent of transportation through to the supervisors and starters, must be alert, active, well-organized and constantly applying pressure. They must have the respect and assistance of the train force. The trainmen must be well instructed in the details of their work, and like all human beings must be constantly followed up to see that they do that which is laid out for them. Irregularities in operation will develop. Effective methods must be produced to restore good service. The public must be assured of regularity of operation, regardless of the handicaps that come from operation in streets. The supervisory force must try to keep operation as closely as possible to the schedule, but in small or large emergencies the principal emphasis in adjusting cars to make up for delays should always be to provide the best possible service adjustments regardless of the inconvenience to the train crew or of the overtime pay required. A record for dependability of service and for care in avoiding delays and inconvenience to the public can produce the good will that is so invaluable.

RAILWAY MANAGEMENT'S OBLIGATION IN CITY PLANNING

There is an outstanding obligation upon the railway management to be planning long in advance for the growth and development of the city it serves. The pressure of the modern density of traffic on the streets is producing new ideas on city planning. The old theory of a beautiful city plan involving noble architecture and magnificent geometrical arrangement for streets is quite

incomplete in meeting the actual needs for regional planning of a city's transportation and traffic system. A true plan involves much more. The Regional Plan of New York is building towards the establishment of correct, scientific investigation of the reasons for the present types of city growth and development, the purpose of cities and the desirable layout that will fit best with the true economics involved.

Predictions of the future cannot be made with absolute accuracy, but foresight will prepare a general plan that will be quite adaptable to the future, and can stabilize the growth of the city, the land values and the business prominence of the city, because it can provide for continuous convenience of accessibility. Cities must establish a confidence of sound management in order that industry and commerce may expand, or that new industry or more business organizations may be willing to locate within them.

The railway organization is involved to an unusual degree in this city planning work. It is involved also in the detailed day-by-day job of fitting regulation to the needs of the users of the city streets. The managements must take the broadest possible point of view in meeting these problems. By becoming thoroughly competent to take leadership, and then showing an absolute impartiality in point of view in working out the very best results for all users of the street, the railway management can produce tremendous benefits for the community it serves.

Most railway managements are working on what is equivalent to a service-at-cost plan, because of commission rule and commission control. The management is, then, in reality representing the people as an agent in providing for public use one of the major necessities of a city. It owes a definite obligation to serve in the most complete way the needs of these citizens. Nearly all patrons served use both automobiles and public carriers, and practically all of the citizens of the city are in some way directly benefited by street railway service, although some use street cars only occasionally. The elected representatives of the people are elected by only a small majority of voters and are holding office only for a short term. The railway management's responsibility is continuous. Its interest in the city welfare is more vital than that of the elected officials because of the continuous commercial responsibility. It is more critical because of the absolute necessity of providing a continuing facility that grows more and more essential to the life of the community. The railway management is, then, entitled to assume the position of the most interested spokesman and best qualified agent with an obligation to all those using the streets.

These outstanding obligations rest upon the railway management's shoulders: It must first put its own house in order by intimate attention to the details of its own business, so that city transportation may become of maximum service to the community, affording the highest possible degree of comfort. It must help control the traffic problems of the moment, which are frequently embarrassing, and it must assume a major part of the burden of the development of a city plan that will be appropriate to the best comfort and prosperity of the citizens.

Each of us should ask himself critically, whether he is doing his part towards leadership in his community. Are we merely running cars, or are we planning, thinking, developing and giving the best service that the conditions of our city will support?

Instruction Panel Explains Treadle Door Operation

By J. W. WEIR

Assistant to General Superintendent of Maintenance Kansas City Public Service Company, Kansas City, Mo.

INSTALLATION of rear door control equipment representing a departure from previous standards, necessitated the training and instructing of carhouse and shop employees of the Kansas City Public Service Company in its proper adjustment, inspection and maintenance. A "general order," or maintenance instruction bulletin, explaining the adjustment and maintenance of the equipment, was issued and a portable panel with the various units comprising the treadle control was built.

The panel was taken to each carhouse by a representative of the engineering department thoroughly familiar with the equipment, and the operation of each unit explained to the workmen. The men were shown how the switches, valves, controls and other parts functioned, and how possible troubles could be cleared. Short circuits in wiring, poorly adjusted contactors, stuck valves and other troubles were duplicated on the panel.

Kansas City will have 746 one-man cars when its rehabilitation program is completed, and of this number 621 will be equipped with special rear doors, electro-pneumatically operated. Two separate doors are used for the rear platform of each car, one for exit and the other for loading. The forward or exit door is actuated by a treadle, while the rear door is opened

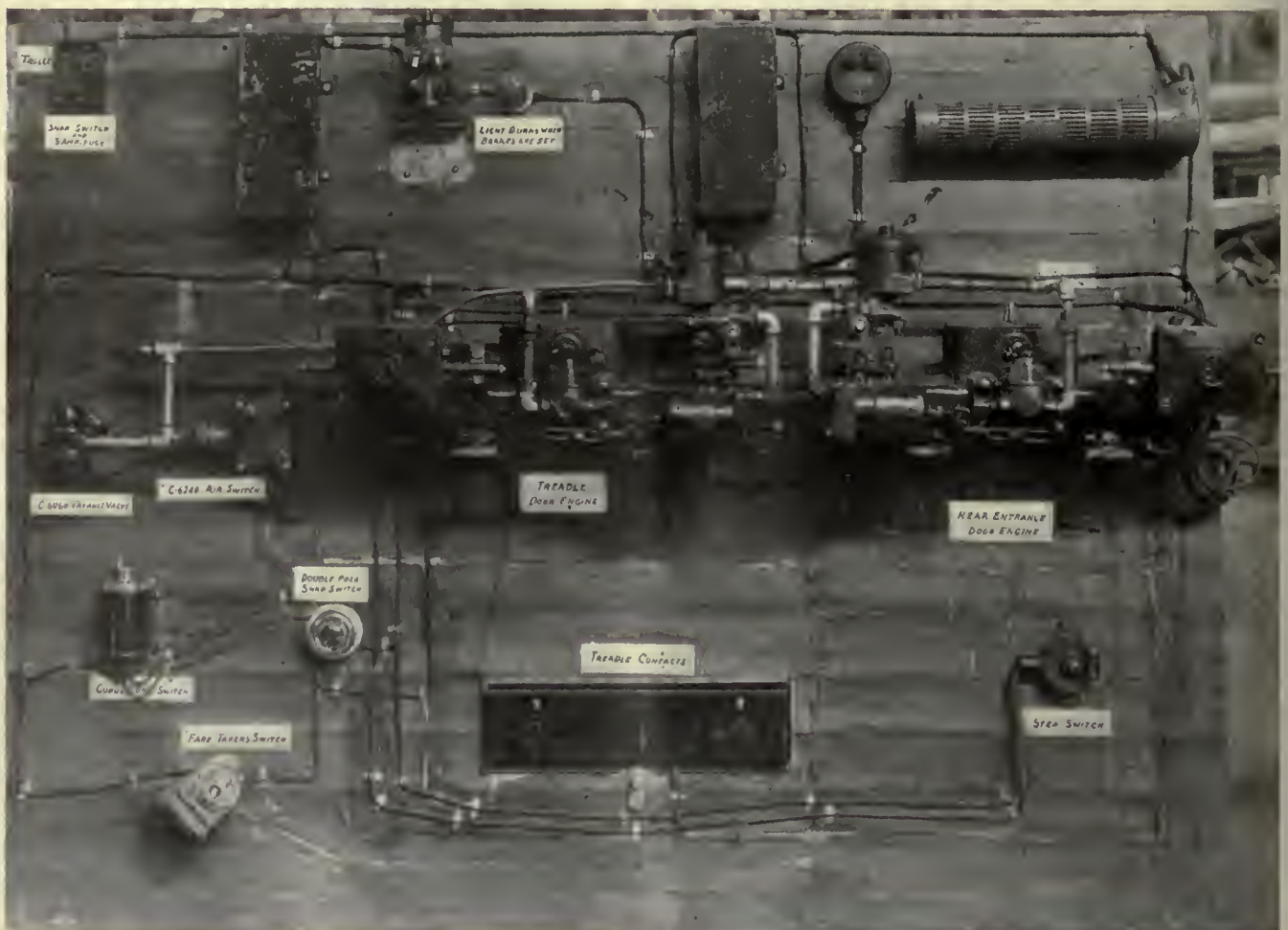
and closed by a street fare collector and is used for loading at points of heavy traffic. Since the cars also are designed for two-man operation, provision has been made for the control of both rear doors from the conductor's position. The switches used by the conductor and fare collector also are mounted on the panel.

The operator cannot release the treadle door until a predetermined pressure exists in the brake cylinder, and once the treadle door is opened the air brakes cannot be released until the door has closed. Also, if the rear doors for any reason are opened while the car is in motion, the brakes are immediately set with full reservoir air pressure.

Baltimore Employees Save \$9,000

FIVE years ago the United Railways & Electric Company of Baltimore told its employees that if they would place their orders for domestic coal with it, they could get the benefit of the minimum rate for coal which the company is able to obtain by buying in large quantities and by paying cash. The employees are permitted to repay the company for their coal at the rate of 75 cents a ton each pay day until the account is settled.

On this basis, employees have been purchasing each year from 6,000 to 8,000 tons of coal. The coal purchased for the winter which has just passed amounted to 7,800 tons, and for the previous winter 8,189 tons. On the basis of the 25 cents cash discount per ton which the company gets and passes on to its employees, their aggregate saving during the five years has been \$9,140.50.



Treadle door control units are mounted on a portable panel in Kansas City for the instruction of maintenance men and car operators

Maintenance Methods *and* Devices

Bus Wheel Aligning Gage*

By CHARLES HERMS

General Foreman San Diego Electric Railway, San Diego, Cal.

WHEELS of the San Diego Electric Railway's buses are aligned by the gage shown in the accompanying sketch. This was built of odds and ends of pipe and fittings in the shops. Previously a standard alignment gage was used, but it was found unsatisfactory.

To check the bus front wheels they first are jacked up until they are clear of the floor, and the vertical $\frac{3}{4}$ -in. pipe is adjusted so the sharp-edged disk

the periphery of the tire tread. Sometimes it is necessary to chalk the treads in order to get a clear mark.

The next checking is with the wheels lowered so that they support the bus weight as in normal operation. The disks *A* are readjusted until they register with the marks on the treads of the two wheels. By tightening the thumb screws securely, and without moving the wheels, the gage is taken to the rear side of the front wheels and registered with the marks on the tire. By measuring the variation between the opposite disk and the

decrease the tire life 40 per cent, and anything over that will cause all kinds of complications. Experience has shown that the best way to check wheel alignment accurately is to make the measurements directly on the tread and as near as possible at the center line of the wheel.

Truck for Handling Car Wheels and Axles*

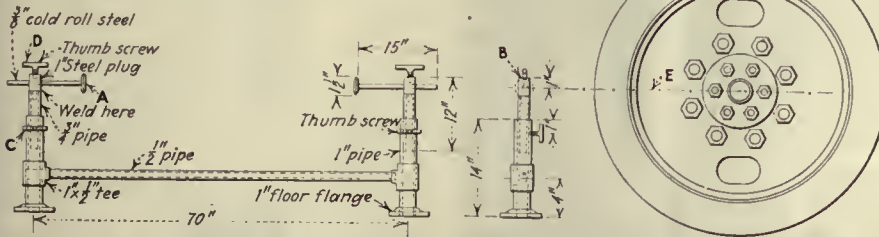
By ED. C. KELLY

Shop Foreman Eastern Division, Virginia Public Service Company, Hampton, Va.

PARTICULAR value attaches to a small truck for handling car wheels or axles in the shops of the Virginia Public Service Company, Hampton, Va. The usual method of rolling wheels on the flange requires considerable skill and is sometimes attended with danger or injury to the worker. This has been eliminated and the time of handling has been reduced greatly through the use of the truck. The wheels of the truck are mounted wide enough to straddle a car wheel. When the handle is raised the lower member of the frame engages the hub of the wheel to be handled and a hook from the upper member is placed over the rim. With the handle in its lower position the wheel is drawn upward and rests in a balanced position so that very little effort is required to push the truck.

With the addition of tongs or hooks as shown in one of the accompanying illustrations a man can handle axles very easily. Previously, three or more men were needed.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

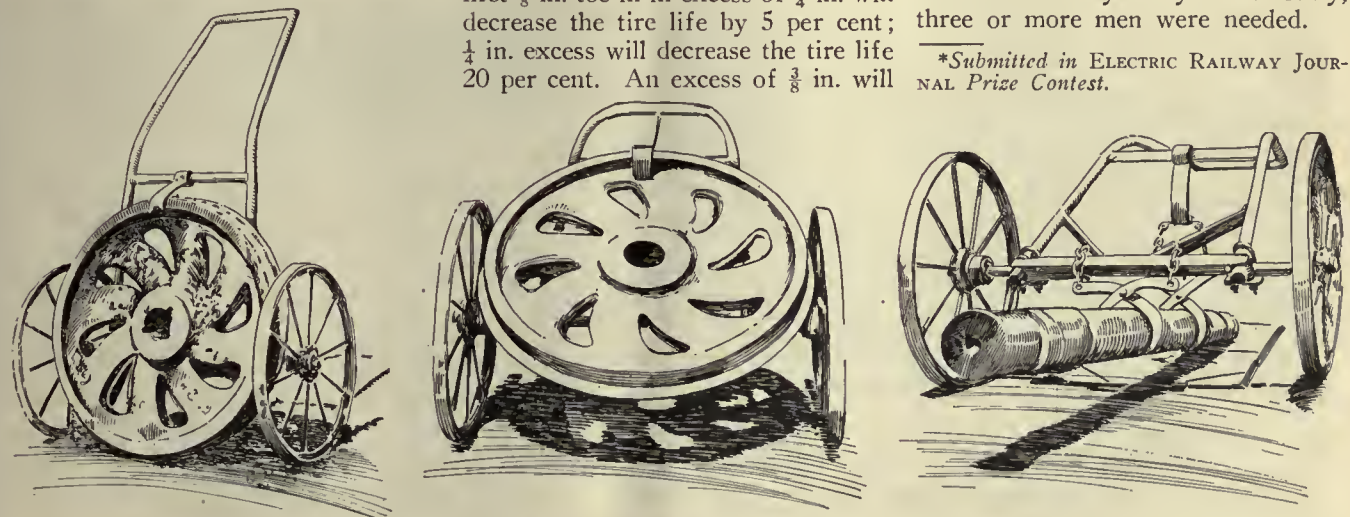


Bus wheel alignment gage used by the San Diego Electric Railway

A is even with the wheel center line *E*. The disk *A* should then be adjusted until it strikes the tire as near the center of the tread as possible. The disk *A* is mounted firmly on the $\frac{3}{8}$ -in. cold rolled steel rod. With the disk bearing lightly against the tire the latter is revolved slowly. When a complete revolution has been made a dark line will be noticed on

mark on the tire an indication as to the correctness of the wheel gage is obtained. If the marks are closer together than the setting of the gage it indicates that the wheels are toed out and should be readjusted. This can be done by adjusting the cross-carrier rod wheels.

Wheels should always toe in, and the correct setting is between $\frac{1}{8}$ and $\frac{1}{4}$ in. toe-in on practically all types of buses. It is safe to assume that the first $\frac{1}{8}$ in. toe-in in excess of $\frac{1}{4}$ in. will decrease the tire life by 5 per cent; $\frac{1}{4}$ in. excess will decrease the tire life 20 per cent. An excess of $\frac{3}{8}$ in. will



The first and second views show how a car wheel is handled by means of the truck, while in the third view a car axle is in position

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Adjustable Pit Light*

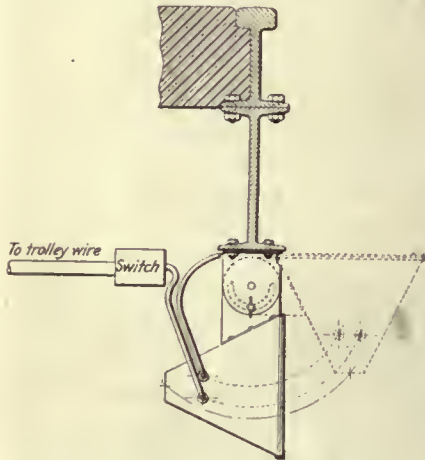
By H. S. WILLIAMS

Assistant Superintendent of Equipment
Department of Street Railways,
Detroit, Mich.

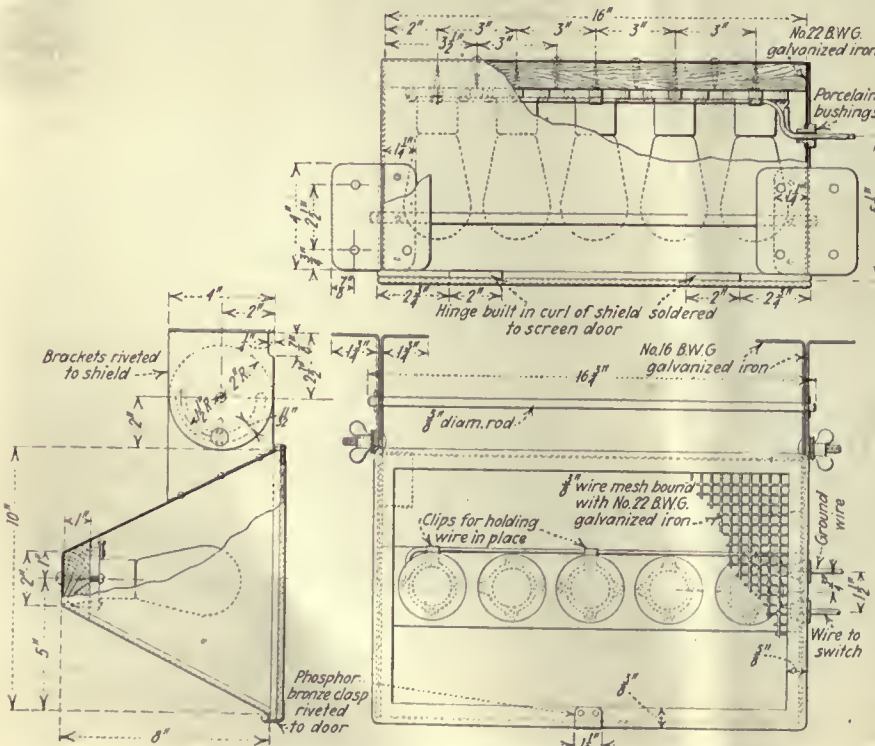
PIT lighting has always been a vexing problem. The scheme presented herewith has good points. Its object is to throw a flood of light upward to illuminate the underside of the car and at other times to provide the usual form of pit lighting.

It consists of a series of five lamps with a control switch placed conveniently. The lamps are mounted in a reflector which is guarded on the open side by a wire-mesh screen door. The reflector is mounted on suitable brackets and arranged to rotate upon

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



Connections for adjustable pit light



Details of adjustable pit light

a horizontal axis. This allows the fixture to be turned so that it is entirely out of the way when not needed and may be pulled out as desired to throw its light upward. Two such fixtures will completely illuminate the underside of a double-truck car.

Better Method of Lubricating Brake Rigging Needed

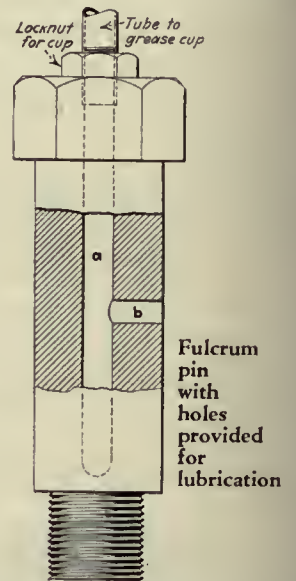
By ALBERT M. THOMAS
New York, N. Y.

IMPROVEMENTS have been made in the material and construction of the many joints, pins, levers, rods and brackets used in the brake rigging of electric cars. Hardened steel bushings and pins are quite generally used, but when these parts are dismantled at a general truck overhauling, it is usually found that the method of lubrication has not proved effective. Insides of joints are worn badly, pins are grooved and cut beyond the point for further usefulness, and the wearing surfaces are perfectly dry and show no trace of the lavish distribution of grease which smears the outside of the joints.

There are two important reasons for this dryness. First, the grease used is usually heavy and sluggish and lacks the penetrating quality necessary to reach the parts to be lubricated, and, secondly, the heavy, sticky grease smeared on the outside of the joint accumulates much dust, dirt and grit which is harmful to the joints.

The heavy lubricant used is necessary, due to the design of the joint, and the thick coating mixed with dirt forms a grinding compound rather than a lubricating material. This also forms a thick coating through which additional lubricant cannot penetrate to get to the vital parts.

A method which has proved satisfactory, and which I believe merits wider use, is illustrated herewith. The broken cross-section shows a hole drilled along the longitudinal



center of a fulcrum pin. Another hole, or several, if needed, is drilled so as to lead from the central hole to the circumference of the pin. These holes are used for supplying lubricant to the wearing surfaces. One end of the pin is arranged to take some standard form of grease fitting or is threaded to take an oil or grease cup. Where the grease cup is used, the cover is screwed on and fastened with a spring clip so that jarring when the car is in motion will not cause it to fall off. A locknut also keeps the end nut in place.

With this arrangement, oiling of the various parts is simplified and a thinner type of lubricant can be used to advantage. The tendency of the oil is to work from the inside of the joint to the outside, and this is of particular value in connection with the type of joint found in electric car brake rigging, as the forcing of the lubricant out also clears the wearing surface of any dirt or grit which may accumulate, keeping the surface clean as well as lubricated. It insures that the oils reach the points where they are needed most and so adds greatly to the life of the pins, rods, brackets, and other vital parts of the present brake rigging system.

New Equipment Available

Reciprocating Grinder Car for Baltimore

RAIL corrugations on the United Railways & Electric Company, Baltimore, Md., are being removed with a heavy-duty reciprocating grinder installed in a car. The grinder, furnished by the Railway Track-Work Company, Philadelphia, Pa., consists of two units, one on each rail. Each unit operates four abrasive bricks 4 in. long, 10 in. high and 3 in. wide. The grinding bricks reciprocate on the rail at the rate of 570 4-in. strokes per minute. Each unit is driven by a 10-hp., 1,200 r.p.m. motor connected by a silent chain to the crankshaft of the grinder.

The reciprocating grinder was installed in an old type car. All seats were taken out except one for the workmen. The floor was removed at the center of the car and lowered to form seats for the two operators, who sit back to back, one in charge of each grinding unit. Within reach of each man are all controls for his unit. These include switch, starting rheostat, lever for adjusting water supply and a megaphone for communicating with the motorman. A handwheel controls the pressure of the bricks on the rail to compensate for brick wear. There is also a handwheel for controlling the wedge which clamps the bricks together.

An improved feature of this heavy-duty reciprocating grinder is that the handwheels are stationary, that is, they do not reciprocate with the unit.

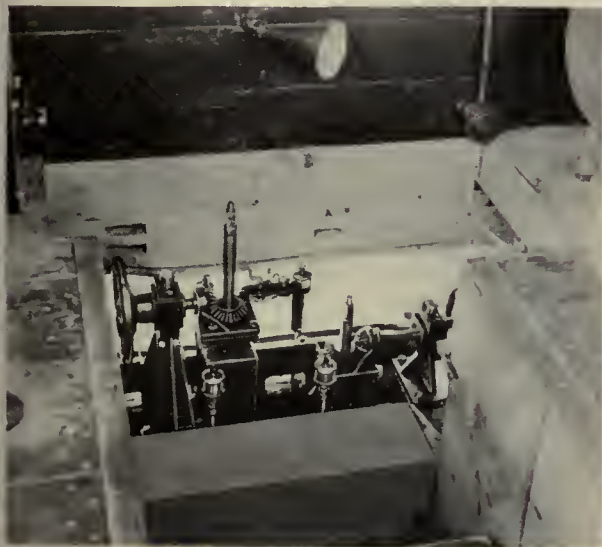
This makes it easier for the operators in handling the work. Provision is made in the car for carrying the supply of water necessary for reciprocating grinding, 500-gal. having been installed.

The great advantage of reciprocating the bricks of a grinder car instead of merely dragging them over the track has been shown conclusively in a comparison of both methods made by the United Railways & Electric Company. In addition to a very considerable saving in energy the reciprocating method also does its work with a thoroughness not obtained without reciprocation. If corrugations are not eradicated completely they will return very soon. The reciprocating grinders in the car may be operated as slowly as may be required to finish its work as it proceeds, or speeded up to accommodate schedules of passenger cars running on the same track.

If necessary to slow down or stop, in order to grind out heavily corrugated spots, this car can do it, whereas the drag car type of grinder cannot stop and work at the same time. Standard light-weight railway motors propel this car even when the grinders are under maximum load.



Interior arrangement of grinder car



At left—An operating pit is devised in the floor for convenience of the operator. At right—Exterior of the car showing method of installing grinding equipment

Association Activities

Making More Efficient Use of Existing Streets*

By JOHN A. MILLER, JR.

Editor "Aera," Associate Editor, ELECTRIC RAILWAY JOURNAL

DELAYS to traffic caused by street congestion in Greater New York are resulting in an annual loss of more than \$540,000,000, according to recent reliable estimates. This sum is \$28,000,000 more than the city's budget in 1927. Everybody knows that traffic congestion is an extremely serious problem but perhaps not all of you have had time to analyze the causes of congestion and the merits of various plans proposed to relieve the present situation.

To get down to fundamentals. What causes traffic congestion? Are there more vehicles in the streets than the present roadway area can accommodate, or is there something wrong with the way that these vehicles are being operated—that is to say, something wrong with the way the operation is being regulated?

From numerous personal observations in various cities I am thoroughly convinced that existing roadways are ample to take care of the present traffic if its operation is properly regulated. In no instance that I know of, has the actual capacity of an existing street been reached. Fifth Avenue, New York City, is generally considered an example of extraordinarily severe congestion. Nevertheless, it would be entirely possible to move four or five times as many vehicles through this street as are now using it.

At present in the afternoon rush hour the north-bound private automobiles move in two lanes at an average speed of about 4 miles per hour. There is no good reason why they should not move in three lanes at an average speed of about 12 miles an hour. This has been found to be approximately the speed which gives a maximum capacity. When the speed is increased beyond this the spacing between vehicles is also increased so that no gain in capacity results. A similar increase of several hundred per cent in the traffic capacity of other streets could easily be accomplished.

ENTIRE ROADWAY NEEDED FOR MOVING TRAFFIC

The first thing that is needed is to use all the available roadway for moving traffic. This is seldom done at present. Parking along the curb, dumping of building material in the roadway, open-

ing up of pavement and other similar obstructions are common in every city.

Many retail merchants are opposed to any restrictions of automobile parking because they fear it will injure their business. This attitude is based on the misapprehension concerning the means of transportation used by customers to reach their stores. Careful checks made of nearly 500,000 customers at 76 big stores in New York, Chicago, Detroit, Cleveland, Los Angeles, Baltimore and other cities show that less than 15 per cent of the customers came by private automobile. The proportion was about the same in each one of these cities where a count was made.

The no-parking restriction in the loop district of Chicago is working extremely well. Two of the largest retail stores state that without question they have many more people coming to their stores by private automobile today than before the restriction. Checks made during May of this year compared with previous counts show a marked increase in the number of automobiles entering the loop district; the increase being 14.1 per cent while the increase in automobile registration was 10.6 per cent. This is in spite of some reduction in business activity in general. Thus it is evident that elimination of parking does not decrease the usefulness of the streets but actually increases it.

The average automobilist appears to believe that he has an inherent right to park his automobile in the public street. This is a fallacy. The streets were created primarily to permit movement of persons and vehicles. This has been pointed out clearly in the convincing window posters of the New York Railways. The legal principle involved was settled more than 100 years ago when Lord Ellenborough, Chief Justice of England, stated that "No one can make a stable-yard of the king's highway."

While parking is undoubtedly the largest single factor in obstructing a free movement of vehicles in the streets, other factors are by no means negligible. Loading and unloading of merchandise is a serious obstacle to moving traffic. Vans used for this purpose ordinarily back perpendicular to the curb, or at a slight angle, and thus create a worse obstruction than does a parked automobile. They usually remain for considerable periods. The cure for this is to require that such loading and unloading be done at night or that it be done within the property lines of the build-

ings. Either of these plans would be more expensive than the present practice. The seriousness of the present situation must be recognized, however, and people must be willing to pay a considerable price to cure it.

Building construction is a serious obstruction. Competent engineers have stated that there is no real reason why building materials cannot be stored within the property lines during construction. It would be more expensive and less convenient than to store them in the street but it is perfectly possible and should be done.

The public utilities themselves are not without blame in the matter of creating obstructions. They appear to have little or no compunction about opening manholes, or even the pavement itself, on the busiest streets during the busiest hours. Electric railways sometimes choose such occasion to repair their tracks. In these instances, too, it would cost more money to do the work in some other way, but so long as these practices continue the railways are in the position of "the pot calling the kettle black" when they criticize the obstruction to traffic created by others.

TRAFFIC SHOULD MOVE FASTER

While the use of the entire roadway area of existing streets will contribute substantially to the relief of congestion, it is equally important that advantage be taken of every possible means of moving the traffic as expeditiously as possible. Since the establishment of traffic control lights on Fifth Avenue in 1918 the craze for signals of this kind has spread all over the country. Undoubtedly such signals are a good thing when properly used. Unfortunately, however, a large number of them are entirely unsuited to the conditions on the street where they have been installed. A study of the proper kind of lights and the best way to operate them is an imperative need at the present time.

To begin with, the real purpose of installing these lights should be determined. They are variously credited with speeding up traffic, saving policemen's wages, and preventing accidents. Under certain circumstances they may do any of these things, but it is expecting too much to think that all three can be successfully accomplished by one set of signals.

Much emphasis has been laid on the thousands of dollars saved in New York City by replacing traffic policemen with automatic lights. It has been stated by the deputy police commissioner in charge of traffic that when the program now under way is completed, traffic will be controlled mechanically at 2,243 intersections in the city, doing the work of 4,486 policemen. He is optimistic enough to believe that traffic will be

*Abstract of a paper presented at a meeting of the New York State Electric Railway Association, Coney Island, N. Y., June 14-15, 1928.

speeded up by the operation of these lights. Drivers of automobiles, however, make every effort to avoid using the streets on which these lights have been installed. This was admitted when the city authorities asked for an appropriation to increase the number of installations. It was stated that the purpose of extending the system was to prevent drivers from escaping to streets not so controlled.

The situation was well described in a recent editorial in the *Detroit News* which said that when a senseless mechanical contrivance winks its illuminated eye and brings to a halt several hundred vehicles and keeps a thousand or more people waiting while the clock ticks off the allotted time, but no one wants to use the cross street, there is reasonable doubt of the economy of automatic signals. In the course of a year, millions of people are inconvenienced and minutes totaling the equivalent years are wasted. Is it worth while to save the wages of a few policemen and produce this result?

The matter of accident prevention is more difficult to analyze. It has been stated that accidents are fewer on streets where traffic is controlled by automatic lights. Probably that is true. To what extent the result may be influenced by the tendency of automobile drivers to use other streets is difficult to determine. In any event there is no reason to suppose that unsatisfactory lights will prevent accidents more effectively than would a system of efficient lights. On the contrary, an inefficient system breeds contempt and lack of observance whereas a good system is likely to find favor with the drivers of vehicles and will encourage observance of regulations. The first consideration in the installation of signal lights, therefore, should be to expedite traffic.

Three kinds of control are now in general use. These are: (1) Synchronized signals whereby all lights show green for a given period and then red for a given period, (2) the wave or platoon system whereby all lights change at the same time but alternate signals or groups of signals give different indications—when properly arranged this permits continuous movement along the street—and, also, (3) the co-ordinated lights, such as have been installed on certain streets in Chicago and Cleveland, carefully adjusted to the needs of each intersection.

Engineering opinion is practically unanimous that the co-ordinated system is the most efficient and that the synchronous system is the least satisfactory. Apparently the chief reason for the continued use of synchronous lights is a kind of local pride which refuses to profit by the experience of other cities. Co-ordinated lights are expensive to install and some cities cannot afford them. Excellent results, however, can be obtained with the platoon system, as shown by the experience of Sixteenth Street in Washington, D. C., where the average speed of vehicles is somewhat more than 20 miles per hour. No general rule can be laid down for the installation of traffic signals, but it is of the highest impor-

tance that the system used be adapted to the needs of the particular situation. Municipal authorities must not think when they have installed traffic control lights that they have done everything possible to relieve congestion. They must install the right kind of lights, something that a great many cities, including New York, have failed to do.

Despite all the measures that may be adopted to increase the efficiency of traffic movement, however, the capacity

of the streets will never be sufficient to accommodate everybody in his own private automobile. As a matter of fact there are many people, even today, who do not own automobiles, and there are many who do own them, but do not want to use them. Public transportation is, and will remain, a vital necessity in every urban community. The agencies which furnish public transportation will benefit by anything that improves general traffic conditions.

Increasing the Capacity of a Street System*

By HAWLEY S. SIMPSON

Traffic Engineer, Essex County, N. J.

PASSENGER-CARRYING capacity of a street system may be increased by two general methods; that is, by actual adding to (1) the street area, and (2) by making the most efficient use of existing facilities.

The first, and obvious way, is the plan on which the attention of the public can be most easily focused, and visionary schemes of multi-level cities of the future have become the vogue in Sunday supplements. It is extremely doubtful that such plans provide the ultimate solution, and in congested centers are economically prohibitive except in very exceptional cases.

Experience has shown that construction of new roadways, whether elevated or otherwise, rather than relieving congestion has the effect of attracting additional motor vehicles, until a balance point of equal congestion is again reached. Jefferson Avenue in Detroit is the heaviest traffic street entering the business district. Two parallel streets were narrow and poorly paved in 1924. One was widened and repaved between 1924 and 1925. Traffic in and out of the central business district increased about 11 per cent in 1925 over 1924. Traffic on Jefferson Avenue decreased 3 per cent, indicating a net decrease from the normal expected traffic of about 13½ per cent. Traffic on the repaved street increased 670 per cent, and the net increase on the three streets was 27 per cent, almost 2½ times the increase for the entire district. Following the improvement 2,600 more motor vehicles were driven into the downtown district and, instead of relieving congestion, actually made a bad condition worse.

Realizing that construction of elevated roadways and new highways in business centers is in general of questionable economic value, attention must then be directed towards the second and more immediately available method of relief, that of using to maximum capacity that which we now possess. The city of Chicago probably presents as good an example of the two methods of attack as exists anywhere. Wacker Drive, costing \$22,000,000 for less than ½ mile of construction, will probably not have

the beneficial effect that the co-ordinated signal system and no-parking regulations in the downtown district have had. Yet the latter two improvements cost comparatively little and are little known, while the former is known the world over.

Of all the unnecessary street obstructions probably none is so detrimental to a fluid movement of traffic as curb parking, although terminals of some sort are a necessity in fulfilling the act of transportation.

To analyze better the parking problem, vehicles stopped at the curb may be divided into three general classes, defined as follows:

1. Loading vehicle—A standing vehicle engaged in the process of expeditiously receiving or discharging passengers or merchandise.
2. Parked vehicle—A vehicle (excepting loading vehicles) standing not longer than a reasonable period.
3. Stored vehicle—A vehicle (excepting loading vehicles) standing longer than a reasonable period.

What constitutes a "reasonable period" has been quite definitely fixed at one hour for the average business district. Surveys have been made by the United States Department of Commerce which indicate that more than 90 per cent of all retail shopping trips can be concluded within one hour, which fixes quite definitely the dividing line between parked and stored vehicles. Shorter periods are difficult of enforcement, longer periods are proved unnecessary and, eliminating consideration of exceptional conditions, when and where parking is to be allowed it should not be for a period exceeding one hour.

Surveys of business districts will reveal areas in which parking is no detriment to traffic and may be a benefit to business, and again, there certainly are areas in which I would absolutely prohibit even stopping for loading and unloading during morning and evening rush hours.

The street is primarily designed for moving traffic, but where loading and parking do not interfere, they both become legitimate uses of street space. Upon the most heavily traveled arteries it is becoming necessary during rush hours to absolutely prohibit loading and unloading of both passengers and merchandise. Passengers may use side

*Discussion of a paper presented at a meeting of the New York Electric Railway Association, Coney Island, N. Y., June 14-15, 1928.

streets during these hours, merchandise delivery schedules must be arranged for other hours, heavy freight may be more economically handled at night, and light deliveries may be made during slack daytime hours. During the remainder of the business day, loading or unloading may be allowed in the center of the block, the no-stopping provision remaining in effect for a distance sufficiently far from the intersection to permit full use of the street at the critical point.

Rush hour regulations on medium traffic streets would be similar to slack hour regulations on the first mentioned street, no stopping being permitted near intersections and loading and unloading allowed only in the center of the block. During the base period of the day, when traffic does not require the full paved width of the street, one-hour parking could be allowed in the block, loading and unloading being allowed only near intersections.

There are few really light-traffic streets in present-day business districts, but *cul-de-sacs*, streets only one or two blocks in length, and similar streets having none of the characteristics of through or major feeder streets, do not require as stringent treatment as do streets carrying heavy traffic, and no-parking restrictions are neither necessary, obeyed, nor enforced. On such streets it is permissible to allow one-hour parking, reserving, however, a certain space, either near the intersection or in the center of the block, for loading and unloading.

Street storage in any business district should never be permitted, and this, rather than legitimate parking, is largely responsible for double parking. Although the connection is not at first apparent, storing, as defined herein, is responsible for much unnecessary street traffic. In a survey of Detroit's business district, 22 per cent of all curb cars were stored, and by virtue of their longer time at the curb (averaging three hours and four minutes) pre-empted over 60 per cent of the curb space. Parked cars (averaging 37 minutes) never exceeded 50 per cent of the available parking space. But the maximum momentary curb load was 25 per cent in excess of available curb spaces and standing cars exceeded curb space $6\frac{1}{2}$ hours of the nine hours from 8 a.m. to 5 p.m. It is this 25 per cent shortage in curb space that was responsible for the illegal and double parking, when the number of cars actually parked at any one time would have occupied but half the available space.

In two locations in Detroit, one in the hotel and one in the retail shopping district, in one case 20 per cent, and in the other case 35 per cent of all traffic consisted of empty private cars passing the same point twice or more, the maximum being reached by one empty car which passed the same point 24 times in 33 minutes. At one of the locations ten private cars averaged 131 trips past the same point, producing thirteen times the traffic that would have resulted if curb parking space had been available.

All of this is due mainly to street storage, elimination of which requires first that enforcement be made more rigid, and second that sufficient storage garages be constructed to handle the long-time parker. Construction of storage garages will follow as a natural sequence to rigid enforcement and not before. Free street space is like a colored fly to a hungry trout, it may hurt if caught, but the chance seems worth the try.

If traffic surveys prove as they did in Detroit that street storage is a contributory cause of congestion, then such a city can well afford to employ sufficient police to rigidly and impartially enforce these regulations. When this is accomplished it is certain that no-parking areas can be extended to include all the heavy and secondary arteries. Such parking space as remains will not be a deterrent to moving traffic, but will be sufficient for the normal needs of the city.

SIGNALS OFTEN HINDER TRAFFIC MOVEMENT

It may seem strange to class electric traffic signals under the head of obstructions to traffic flow, but in many cases they may be described as "nothing

else but." The use of automatic traffic signals is becoming more and more prevalent among congestion-gripped cities in an attempt to remedy existing conditions, and to relieve a top-heavy budget.

At their best, traffic signals are not remedies, but only palliatives, and in many instances have failed to be of any benefit, having even further obstructed already impeded traffic. Unfortunately for traffic signalling, saving in policemen's salaries has in many cases been the prime objective to be attained, all considerations of increased safety and expedition of traffic movement being relegated to the discard. Four-way overhead installations using synchronous control were at one time standard practice and because of their prevalence many communities continue to erect such signals without having given the subject of a great deal of attention. The layout, construction and operation of a modern traffic signal system is not a job for which the average police official is fitted. Resort is had to the advice of an engineer employed by a signal manufacturer who, because of his connections, is not fitted to give impartial advice, nor does he have the facilities to make the necessary field surveys. No traffic signal system should ever be installed without an intensive survey to determine its necessity, and when this is done signals can be of real value.

It can be shown that for an average street layout the synchronous system of control will pass less than 50 per cent of the capacity of the street provided all grades were separate. "Wave" or "staggered" systems are little better and will pass no more traffic, but because traffic can be kept moving have a higher efficiency in the motorist's mind. However, this type of installation has been abused, and because of its inherent inability to allow more than one-half of the total cycle to the heavier traveled street, severely penalizes the major portion of traffic, while allowing unnecessary time for relatively unimportant cross streets. Where cross street and main street traffic are about equal, such a system is fairly valuable. But it must be remembered that this type of control is actually progressive only for a portion of the vehicles passing a given signal. If signal colors are reversed every two blocks, only the first half of a group of vehicles can pass the system without stopping, when three signals are tied together only one-third can pass, with four only one-quarter, and so on. It is such a simple operation to transform a synchronous system to the wave type that the change is often overdone. Wherever more than two signals show similar colors, I fully believe synchronous would be preferable, although in a large area where both north and south and east and west streets are controlled by the "stagger" system, a three-block "stagger" might be better than synchronous operation over the whole area.

There is no question but that on practically all street systems, a co-ordinated or "flexible progressive" system has advantages which no other control has,

COMING MEETINGS OF

Electric Railway and Allied Associations

June 25-29—American Institute of Electrical Engineers, summer convention, Cosmopolitan Hotel, Denver, Col.

June 27-28—Motor Bus Division, American Automobile Association, annual meeting, Hotel Gibson, Cincinnati, Ohio.

June 28-29—Central Electric Railway Association, Cedar Point, Ohio.

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 12—New York Railroad Club, annual outing, Indian Point, N. Y.

July 13—A.E.R.A. Executive Committee on yacht "Florida," New York, N. Y.

July 18-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sbeboygan, Wis.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

and such installations as now exist are ample proof of this conclusion. During the past year it has become possible to install a co-ordinated system, using apparatus manufactured by at least four reputable concerns, at a cost exceeding by little, if any, the simplest kind of a synchronous system. This is not the type used in the loop district in Chicago which involves a complicated central station, but an installation with timers at every intersection controlled by a simple impulse timer at a central point. The latter does not have the instantaneous flexibility of the Chicago installation, but it provides a reasonable flexibility to the extent actually used in Chicago.

Beyond this point, a co-ordinated sys-

tem of somewhat less flexibility not quite so easily controlled nor so fool-proof in operation, is available at less cost than the synchronous, and experimental work has been completed on a control apparatus superior to any now existent and which promises to be less expensive.

If you railway men, who are vitally concerned in the type of signal system which is adopted, are confronted with the "can't afford it" story, you should be in a position to call the bluff and to prove the economic superiority of the best. What is most important of all, insist upon having the best of engineering study given to the local problem, rather than be content with opinions of manufacturers who are both the consulting engineers and the contractors.

Selection of Men As It Affects Service*

BY DR. C. P. SEGARD

Assistant Secretary Third Avenue Railway
New York, N. Y.

LIKE many other of our industries, the street railway has given more of its attention to equipment and operation than it has to the most important factor in its growth and success, man power. In the first place man power is the most expensive part of any organization. Steam railroads pay out 41 per cent of their income in wages, street railways around 50 per cent. This fact, if no other existed, should show how important man power really is.

A purchasing agent recently told me how he selected the galvanized buckets for his company. There were twenty to thirty points about a bucket that he considered important. Before making a selection the sample bucket was thoroughly inspected. Do we pay that much attention to the selection of men? Some companies have purchased more than one make of bus for there are different conditions under which they must be operated. In making a selection, every expert of any one particular part of the bus equipment passed judgment. Hours were spent in determining the type and kind. Yet it was, in the last analysis, worthless without the human element selected to run it.

MAN POWER DETERMINES PRODUCTION AND SERVICE

Machine production is a predetermined amount and it runs close, whereas man power is not so certain. A man is selective with regard to tools, material and action, whereas a machine has no such function. But there is another point of likeness and a point of difference that is even more important. Before you buy a \$5,000 piece of machinery you look over the entire competitive field before you make your selection. The choice finally rests on the one that you and your associates, who professionally know that particular line, believe to be best suited to the purpose.

Delivery is effected, the machine protected, foundations laid, machine tried out and watched for weeks. Frequently it is polished and dusted, oiled more frequently than necessary and shown to visitors as class A exhibit of the company. Not one quarter of this attention is usually given to an employee who renders more service, if efficient; costs more, if inefficient, and may be replaced by another individual about whom we know nothing.

There have been changes in the growth and development of the study of human beings. There have been discoveries in the sciences of medicine, psychology, sociology and economics. Just as we have kept abreast of the new in the electrical, mechanical and operating field, so we must keep abreast of the new in the study of man at work. There is much that is new in this field not being used generally. While the industry has had 40 years of growth and improvement, only the last ten have been used in improving the human relations. Not that we are 30 years behind, but rather that we have been slow to use the improvements offered in this field. Too often have we been content with the present. It is characteristic that the fads we knew so well 30 years ago are but tradition and opinion today. Some continue to live, yet the reason for their living has been lost or died of old age.

In the field of human relations policy must change because of other changes. Production requirements and machinery have so split up and simplified jobs that the semi-skilled learn in a few weeks a part of a job formerly done by journeymen. For that mass production job he earns greater economic independence and more leisure. Regardless of what is preferred you must adapt yourself to the present situation. Public policy and the public have changed.

To adapt ourselves to this situation we must know something of the human being himself. For it is just repeating the trial and error method to do something

because some one else does or because it sounds well. Reasoning is required in the field of human activities as elsewhere. There is a great deal of research available. Medical science has shown how to prevent disease and increase our vitality. Sociology has shown us the close relation between the home conditions and the employee's work. Psychology has shown us better methods of selection and training. We should be in touch with these improvements in man power just as much as we are in touch with the electrical, mechanical and operation improvements.

In the field of human relations, both industrial and public, there should be co-operation for the reason that all departments are involved. Public relations are absolutely and definitely dependent on your industrial or employee relations.

Methods in the selection of men for a specific purpose are becoming more scientific because we know more about them. One of the first problems we face is modern selection of employees and 1900 reception. In other words, though selection may be modern, the supervisory force may still be using methods of twenty-odd years ago in fitting the employee into the job. Both should improve equally.

CHOOSING EMPLOYEES

The selection of an employee for any job, from unskilled to skilled, should not rest on the decision of any one person. This has been proved very often. No one individual, whether he be physician, psychologist, instructor or employment superintendent should ever alone make the rejection in cases of doubt. The physician can reject the weak heart, the psychologist the idiot, the superintendent the ignorant, but in doubtful cases, weight should be given to each factor. For it is from that doubtful group that the semi-skilled are found and in that group are the permanently loyal, with its corresponding low labor turnover.

We are selecting men with three points in clear view: (1) Those we believe are capable of doing the job of operating a trolley or bus; (2) those we believe will appreciate the necessity of service with safety; and (3) those that will make pleasing contacts with passengers.

As to the first, physical ability to do the particular job is easily determined. As to mental ability, it is just as well to pause a moment and take stock. Selection on this point has been a matter of decision by interview. It is today in many quarters wholly governed by one interview. In many cases it is sufficient, but some believe that one interview is not enough. In addition, the free use of such material as various sciences have to offer in selection is slowly being adopted.

As to the second, we have tried to determine what human factors lead to accidents in order not to select men with those factors. These factors are emotional instability, certain physical defects and age. Fisher groups eight

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types of minds of the average individual as causes of accidents. These are puzzled, misguided, stubborn, involuntary, diverted, physical, tired, and troubled. To these we may add those types that are obviously abnormal. If these types are permanent in the individual, the interview or the interview plus the period of training, may reveal the condition. To find them in a group of applicants is not always easy and requires experience, observation and cooperation with other interviewers. I may as well admit here as anywhere that I favor the training, no matter how brief, of all new employees in this industry.

IMPORTANCE OF COURTESY NOT ALWAYS APPRECIATED

The third point—that of courtesy in contacts with the passenger—is more important than we recognize. Your conductors, motormen and bus operators are each in daily contact with hundreds of passengers. Most passengers will not notice particularly a courteous, thoughtful agent of the public utility—but let him become crabbed, disgruntled, or in the slightest degree disagreeable, and every passenger will immediately side against him. Not only against him but against every employee of that utility and sometimes it reflects on every employee of every utility concerned. Good contact men are an asset to any business and this is especially true of the street railway industry. Facing a rubber competition, by individual car, as well as bus, it must not

only preserve its customers but secure new ones.

In cities of any size it must go after the short-haul group. In my opinion this group is not only essential but it is there for the asking. Just as the five and ten-cent store entered a field where all the wise ones predicted failure, so the trolley can continue to serve as the economic mode of transportation. Just as the five and ten have made it easy to shop in their store, so the contact men must make it easy and pleasant for the short-haul riders. It must be remembered that the short haul has a wide variety of choice and you want him to be your customer. Why do I go to one store in preference to another when the goods and prices are almost the same? Service and the attitude of those who serve. We do not lose the short haul because of inconvenience, waiting, or lack of comfort; not at all. He has to put up with inconveniences when he walks or taxis. If he is treated as though he were a necessary inconvenience by the company's representatives, he walks. If the contact man of the public utility is going to make the prospective customer feel as though he were being favored, he will not want to ride. He does not wish to be irritated, spoken to in a disrespectful manner or treated in a way that interferes with his customer attitude. I am fully convinced that the short-haul business belongs to the steel or steel mode of transportation if the customer-salesman attitude of new business is present on our lines.

played, along with plenty of elbow grease on the part of the car washer. Many properties today use the same methods. About 30 years ago solutions of soap containing varying amounts of alkali or solutions containing acid or abrasives were in more or less general use, it having been found that water and mild soap would not remove the greasy grime. The use of such solutions resulted in decided damage to the finish unless quickly applied and very thoroughly rinsed off. The abrasives scratched the surfaces, causing more grime to stick. During these times labor was cheap, the urge for speed in all operations was not so strong, and there was no competition from bright, shiny and clean automobiles.

During later years the problem of cleaning cars has in general received more attention and some efforts have been made to approach the subject in a more scientific manner. Competent chemists have studied the character of the deposits of dirt, grime, etc. As a result, cleaning compounds are now available which give a maximum of cleaning action with a minimum of injury to the varnished or enameled surfaces. In general they are of a slow drying nature and in liquid form, which makes the necessary thorough rinsing easier.

SEAT MAINTENANCE IMPORTANT

Cleaning, dyeing and refinishing materials are also being produced for use in cleaning, coloring and refinishing plush or cane covered seats, and for cleaning curtain materials. These compounds will remove grease and stains on seats or curtains. The coloring compounds will restore or color materials, making badly discolored seats and curtains look comparatively new.

The demand for cleaner cars, and such studies as have been made as to how to obtain them, have called attention to the antiquated methods and appliances used. During the past few years there has been some development along the lines of labor-saving devices with which to clean cars quickly, thoroughly and cheaply. The trend today is toward vacuum cleaners for cleaning the inside of cars and power washers using a spray and revolving brushes for cleaning the outside of cars.

Vacuum cleaners have been a common household article for years and there are many large buildings cleaned by this system, but the number of railways using anything but the old sprinkling pot and the stubby broom can be counted on a very few fingers. The situation today is that there has been so little interest displayed on the part of railways that there is not available on the market apparatus suitable for this work which can be used where 600-volt d.c. is the only power available, neither have suitable outfits for use in unpaved storage yards been developed. There is little doubt that if there is sufficient interest, manufacturers will develop adequate apparatus and cars can be cleaned inside and outside more frequently and at less cost.

Lack of Progress in Car Cleaning*

By HUGH SAVAGE

Superintendent of Equipment Brooklyn City Railroad, Brooklyn, N. Y.

VEHICLES must be kept well painted in attractive colors, and unless they are kept exceptionally clean both inside and out they will cease to attract patrons. It is necessary to provide for daily washing of the exterior, thorough sweeping and dusting the interior, cleaning the windows and lamp globes each day and giving the inside of cars a general cleaning at regular and frequent intervals before we can say that we are not lacking of progress in car cleaning methods. After all this is done we still lack perfect methods.

There is no more effective form of advertising, nothing which will do more to create a desire to ride, than clean cars. All the fancy upholstery, bucket seats, swivel chairs, mosaic floors and fancy trimmings that can be installed cannot compensate for dirty floors, dusty and dirty walls and window capping, dirty windows and lighting fixtures or an accumulation of gum and candy wrappings, newspapers, transfers, etc., in the car.

In order to have clean and inviting cars during the off-peak hours, which

is the time during which we all are trying to encourage more people to ride, it is necessary that cars be given some cleaning after the morning rush hour. In addition to this, cars should receive a daily cleaning inside and outside and have all glass cleaned. This should be done at night to insure cars being clean on the first trip out in the morning. Car crews should make more effort to keep cars clean. To clean cars more frequently will cost money. Expenses will increase. This is admitted without argument if car cleaning continues to be done with the facilities and under the conditions existing on most of our properties now.

In general, properties are doing about all that can be done with the facilities provided, and it seems that it is high time the industry as a whole began to look the situation squarely in the face and for the managements to ask themselves "are we really sincere when we say we are doing all that we can to build up our business by giving better service and creating better public opinion?"

In the early days street car cleaning was done in a very simple manner. A pail of water and a long-handled brush were the material and equipment em-

*Abstract of a paper presented at a meeting of the New York State Railway Association, Coney Island, N. Y., June 14-15, 1928.

To obtain the full benefit of a power washer for car exteriors it is necessary that tracks be so located as to permit of rapid and easy movement of cars to and from the wash house or wash track, so that extra car movements will be reduced to a minimum. To do this work properly the car should first enter a heated room in the winter, and after washing should be dried thoroughly, either in winter or summer, before being put in service or stored.

There has been developed recently a power washer outfit which is claimed to

be almost entirely automatic, requiring only one man, whose duties are to operate the car slowly through the washing apparatus. It is to be hoped that this apparatus will be developed fully along with a real vacuum sweeping outfit, and adequate trackage and housing facilities made available to those of us who wrestle with this problem, so that when we are asked, "Are you lacking of progress in car cleaning methods?" we can answer "No," we preach and practice that cleanliness is next to godliness.

Modernizing Car Equipment Maintenance*

BY NILES PERSONS

Superintendent Surface Line Shops Brooklyn-Manhattan Transit Corporation

RAILWAY equipment men today must resort to every conceivable means known to maintain the equipment at the high standard demanded and at the same time keep the costs down. Labor cost is the big item in maintaining car equipment. We have learned a great lesson from our brothers in the automotive industry and are gradually purchasing modern machinery and tools to perform the work.

Our company has spent in the past three years, for the surface division, an amount approximating \$1,500,000 on new shops and machinery. As a result car failures are reduced to a minimum. The company has also expended for machines and shop equipment for the rapid transit lines approximately \$2,000,000. These are installed in shop buildings constructed by the city of New York at a cost of approximately \$4,000,000, exclusive of grounds and yards.

Owing to the large territory covered by our system, cars are assigned to various inspection shops and storage yards conveniently located for economical operation. Each inspection shop has a storeroom where sufficient repair parts and supplies are kept to make the necessary minor repairs to cars. These materials and repair parts are stored in steel bins, neatly lettered and cataloged so as to make replacement easy.

All these shops are equipped with automatic air compressors. Pipe lines lead to various locations about the buildings supplying compressed air for blowing out of motors, for control and for the operation of pneumatic tools. In each inspection shop there is a small machine shop, which is provided with lathe, drill press, grinder, bearing boring machine and blacksmith shop equipment. Overhead electric-operated traveling cranes facilitate the quick and easy handling of the heavy parts.

Special attention has been paid to the lighting of these shops and in all cases where possible, skylights have been in-

stalled. The concrete pits where adjustments and repairs to trucks and motors are made have been equipped with lamps evenly distributed along both sides so as to furnish adequate light for the workmen under the cars. In winter, these pits are heated. Throughout all our shops special efforts are made to keep them clean. Steel racks are available to hold spare armatures, iron, lumber, extra draw bars, etc., to keep them off the floor and permit easy cleaning. Plenty of large galvanized cans are distributed about for holding waste and scrap material, and these are emptied every night. In the clean and attractive locker rooms each man is furnished with a steel locker large enough to hold his personal belongings. Large circular sanitary wash basins with hot running water are provided for employees.

BETTER CAR CLEANING EQUIPMENT NEEDED

Car cleaning is one of the important duties assigned to the inspection shops. A concrete wash track at one of our inspection shops is installed in a bay with Kinnear roller doors and heated so that washing can be carried on regardless of the weather. The wash bay has two concrete troughs, one on either side of the track. The troughs are 10 in. wide, 10 in. deep, and 65 ft. long. The floor has sufficient slope and is connected to the sewer so as to carry off the surplus water. The two long troughs are filled with a continual flow of clean fresh water, hot or cold, as desired. Car washers stand on either side of the car bodies with long handled soft brushes which they dip in the troughs of clean water to wash the windows and also the sides of the cars. At the same time that the outside is being cleaned, men are working inside.

When one car is finished, it is moved up and another one immediately takes its place on the stand. By this method, we have been able to concentrate all the cleaning of one carhouse at one point, which makes supervision easy and at the same time, by the adoption of piece work, we have speeded things

up. Results obtained by this installation are so satisfactory that plans have been completed and work is under way to equip all our inspection shops. Paint and varnish on the cars stand up much better under this method of cleaning because plenty of water, free from dirt and grit, is used.

All heavy repairs, overhauling, rebuilding and construction work is handled at the main surface repair shop, which is known as DeKalb shop. Here we have a large, modern plant, which was finished in 1926 and equipped with everything to facilitate the speedy repairs to surface cars. Here, also, large windows and skylights are placed so that plenty of daylight is furnished to every location. Artificial light is also provided by a well distributed system.

Tracks where the car bodies are repaired are spaced far apart so that plenty of room is available about the cars for scaffolds, etc., also allowing plenty of aisle room for the unobstructed passage of electric trucks handling materials. Large traveling cranes pick up the car bodies, trucks and other heavy parts, and deposit them where desired. All departments also have small traveling electric cranes for the speedy handling of heavy units. Machines are all independently motor-driven, with push-button control. This eliminates all overhead shafting and belts.

National Bus Association Completes Program

PRACTICALLY all phases of bus transportation will be discussed at the second annual meeting of the Motor Bus Division, American Automobile Association, to be held in Cincinnati, Ohio, June 27-28, at the Hotel Gibson. The following program has been announced:

WEDNESDAY, JUNE 27—10 A.M.

Address of Welcome, followed by reports of chairman, secretary, and special and standing committees.

1 P.M.

"The Motor Bus—A Specialistic Transportation Unit," by F. R. Fageol, president Twin Coach Corporation.

"How Motor Bus and Railroad Service Should Be Co-ordinated," by H. P. Fritch, president Boston & Maine Transportation Company.

"Bus Terminals and How They Should Be Established and Operated," by W. E. Travis, president American Motor Transportation Company, Oakland, Cal.

"Equipment Maintenance and Its Importance in Bus Operation," by A. E. Hutt, Vacuum Oil Company.

THURSDAY, JUNE 28.

"System in Motor Bus Operation," by Guy Huguélet, president Consolidated Coach Company.

"Commission Control Over the Certificate of Convenience and Necessity," by E. Blythe Stason, professor of law University of Michigan.

"Merchandising the Bus Business," by Edward A. Keenan, advertising manager Philadelphia Rapid Transit Company.

Thursday afternoon will be devoted to a business session of the association, including the appointment of special and standing committees.

*Abstract of a paper presented at a meeting of the New York State Electric Railway Association, Coney Island, N. Y., June 14-15, 1928.

News of the Industry

Seven Cents Sought in Harrisburg

New rate will go into effect on July 17 unless commission suspends the revised tariff

THE Harrisburg Railways, Harrisburg, Pa., has filed with the Public Service Commission a new tariff, to become effective as soon as legally permissible. It provides an increase of one cent in the rate of fare. According to the company the new fare of 7 cents, is the minimum which the railway can charge and continue to give satisfactory service to the public.

Since its organization, the street railway system of Harrisburg has made only one increase in the fare. That was in 1918, when the 5-cent fare was increased to the present fare, 6 cents.

The company explains that compared with the rate of fare charged in other cities, Harrisburg will continue to be among the communities where the lowest rates are charged. In this connection it says:

The fare which the Harrisburg Railways proposed therefore is less than the average cash fare in the country, and lower than the rate of fare charged in the majority of Pennsylvania communities. It is lower than the ticket rates in Philadelphia and Pittsburgh, and in many other communities.

This is how the company see it:

The change in fare is made necessary by the condition the company faces. It must continue to render good service at all times of the year and under all conditions, for its service is recognized to be necessary to the continued prosperity and convenience of the city and its people. The increased use of private automobiles has caused a decrease in the number of passengers carried, without making possible any decrease in expenses. The company has been compelled to discontinue paying dividends. It faces heavy expenditures for paving and other public improvements. It is economically managed, and strives to render not only good service but courteous service to the public.

To continue rendering efficient service, it must have revenues adequate to meet the cost of the service and to earn a reasonable return upon the value of the property. The situation compels an increase in the rate of fare.

Faced with a curtailment of service or an increase in fare, the company is working upon the theory that the public is willing to pay for continued good service. The feeling of the company is that it can at least maintain its present service under the new rate.

The April 1 payment of dividend was passed because it was not earned, company officials said. Dividends immediately previous had been paid, but several others in late years have been missed.

Levies against the railway for several public improvements, including a paving program, the Market Street subway and the Paxton Street cut-off, have made inroads into the net earnings, it was declared, while necessary construction work on the company's own lines has required a large sum. Track replacements and new equipment for 1928 demand an outlay of \$180,000.

The fund of approximately \$300,000,

which the company recently obtained from the sale of majority holdings in the People's Bridge Company will be applied to the debts for improvements, and cannot be diverted to dividends, according to the company's spokesmen.

Notice of the proposed new rate will be supplied interested parties by the Public Service Commission, and a date for hearing set, following the filing of protests, if any are filed.

Revision of Detroit Finances Suggested

Report to Mayor says that unless Municipal Railway's annual debt maturities can be rearranged fares should go up to meet spirit of city charter, if not its letter

IN A REPORT on the Detroit Municipal Street Railway Department, Ralph Stone, chairman of the board of the Detroit Trust Company, pointed out that unless the Street Railway Commission refinances the debt of the D.S.R. so as to extend it over a longer period of years than is provided under the present scheme, an increase in fares is necessary to comply, at least, with the spirit of the Detroit charter.

Two months ago Mr. Stone was requested by the Mayor to make the report for the purpose of reconciling the two separate audits for the year ended June 30, 1927, rendered by Price, Waterhouse & Company and by William M. Hauser, former auditor of the D.S.R. According to Mr. Stone's report the controversy arose over the matter of depreciation and the different ways in which it was considered.

Mr. Stone reported that no attempt was made to discuss in the precise professional language of accounting the questions that seem to be at issue be-

tween the auditor and the public accountants, but the report has been rendered as it would be stated by a business man experienced in dealing with public utilities and in analyzing financial statements.

In the report no attempt was made to define depreciation. Mr. Stone merely says, in terms that are not intended to be technically accurate or inclusive, that "it (depreciation) is a sum taken out of earnings (revenue from fares in the case of street railways) and set aside, either in cash or a credit to a depreciation reserve which is merely a bookkeeping account, to represent or care for the wearing out or obsolescence of property."

It is pointed out that Price, Waterhouse & Company set the depreciation for the fiscal year ended June 30, 1927, at \$1,568,255, computed, "at the rate of 3 per cent per annum on the book value of depreciable property, excluding motor coaches." Mr. Hauser arrived at the figure \$1,223,380 as the depreciation, using two methods, one being a balance in the income and profit and loss accounts, and the other by computing 3 per cent on an amount which he said was the depreciable cost of the properties. This cost Mr. Hauser stated as \$31,718,463, but he fails, according to Mr. Stone, to explain how he arrived at that sum. Mr. Stone prefers the Price, Waterhouse & Company method of computing the depreciation. That company's figure is \$344,874 in excess of Mr. Hauser's.

The Price, Waterhouse & Company report stated that it was to be regretted that a more specific statement as to what was intended to be contained in the expression "fixed charges" was not set forth in the charter especially with regard to the element of depreciation.

"From an accounting standpoint, depreciation is generally a fixed charge, so that from that standpoint the city charter requires that the rate of fare shall be sufficient to cover both the ele-

RALPH STONE, chairman of the board of the Detroit Trust Company, stated in a report Mayor John C. Lodge made public on June 16 that an increase in fares on the Detroit Municipal Railway is necessary, barring a possibility that the problems of the D.S.R. can be met by rearranging annual debt maturities.

After referring to the matter of extending the time for the debt payments, Mr. Stone said:

"Unless this is done, it looks from such information as we have that a raise in fares will be needed to comply with at least the spirit of the city charter, if not its letter. It is not possible to say that an adjustment of the existing rates of fare could be avoided by a rearrangement of the debt maturities."

ments of debt, retirement and depreciation," the accountants stated in their audit. "On that basis and accepting as adequate the depreciation provisions made in the accounts, the net income for the year under review (1927) was insufficient to the extent of \$687,329." By using Mr. Hauser's figures and deducting depreciation from the gross income, the net income was \$609,425 short of meeting sinking fund requirements, according to Mr. Stone.

It is pointed out that Mr. Hauser objected to deducting the depreciation, saying in a communication to the Mayor and Council on Feb. 10, 1928, that "it is impossible to pay for two plants at the same time, and that is, in effect, what is being done when depreciation and sinking funds are both established." Mr. Hauser obtained a figure of \$613,955 excess of income by excluding depreciation except depreciation on motor coaches. This he charged as an operating expense.

Mr. Stone states that the difference in viewpoints of the auditor and the public accountants raises a question of construction of Section 14 of the city charter which he understands has been submitted to Corporation Counsel Clarence E. Wilcox. He further says that it seems to him that "sound public policy contemplates that the property should be paid for out of earnings and at the same time be kept in good operating condition. Keeping it in good operating condition means not only expenditures for maintenance, upkeep and repairs, which are items of operating expense, but also for replacing property worn out or become obsolete, which is depreciation." Mr. Stone continues:

If this is true, then depreciation should be included in the rate of fare, and if the corporation counsel determines that as a matter of law depreciation is not a fixed charge, the city charter should be amended to include it.

Naturally the charter should provide that the railways, through their operation, should pay the expense of operating them, taxes, interest on their debt, expense of keeping them up in good operating condition by repairs and replacements (depreciation), and the principal of their debt—and all that must be done out of revenues and fares.

Obviously, a charter is only a statement of principle and if it does not state it clearly it should be so amended that it does. It should not specifically and in detail instruct the Mayor, Council and Railway Commission how to do these things, because conditions change. It should be flexible in its terms.

I am not qualified to interpret the charter, but it seems to me that Section 14 of the charter is sufficiently flexible in its terms to permit depreciation to be included as a fixed charge, and if, after doing that, the existing rate of fare results in a deficit, the city authorities have it in their power to ameliorate the situation.

In other words, if including both depreciation and sinking fund charges results in a depreciation so that the rate of fare must be raised to comply with the charter, the authorities have power to reduce the sinking fund charges by refinancing so as to extend the maturities of the bonds to be paid in each year out of revenue from fares. If the phrase in Section 14 of the charter—"in the sound discretion of the

board"—does not mean this, it would seem to be true that the board would have power anyway to refinance so as to rearrange the maturities of its existing debt.

If rearranging the maturities still leaves a deficit then the rate of fare must be raised, and that is only common sense. If it is not done nothing is gained and only trouble follows. The trouble would be the deterioration of the physical property of the railways and that in turn means poorer service and ultimate breakdown of the system.

Revenue and net income of the system as arrived at by the two audits, and the auditors' distribution of expenditure to capital and expense accounts, is also discussed in Mr. Stone's report. In this connection it is pointed out that Mr. Hauser differed throughout from Price, Waterhouse & Company on his report of the revenues and income of the D.S.R. Mr. Stone says that they practically agree, the average of the income given in the two reports being \$3,488,582.

It is further pointed out that the accountants contended that some items charged as capital expenditures by Mr. Hauser should in part have been charged to operating expenses and that if the items were not correctly apportioned at the time of original entry, it would be difficult to make a correct apportionment now.

Mr. Stone is further quoted in his report:

I am advised that the executive engineer of the D. S. R. is now compiling the cost or value of the properties as a basis for this distribution and when that is done the difficulty of allocating to capital and expense will be remedied. This applies likewise to the cost of rehabilitating the properties acquired from the Detroit United Railway.

Therefore, I believe this difference between the two reports may as well be dismissed even though it leaves as an open question the amount of 1927 net income from operation. If the same form of accounting is maintained hereafter it will be important to have the different kinds of expenditures allocated under direction of the executive engineer.

Survey Commission Bill in St. Louis Passed

The St. Louis, Mo., Board of Aldermen with only one dissenting vote on June 8 passed Mayor Victor J. Miller's bill providing for the creation of a transportation survey commission to make a comprehensive survey of the mass transportation needs of the community. A fund of \$50,000 is provided for the expenses of the commission, which will consist of sixteen members. It will study both electric railway and motor traffic conditions as well as the city's rapid transit needs, such as proposed subways and elevated systems.

The commission will include the Mayor, comptroller, presidents of the Board of Aldermen and Board of Public Service, the director of streets and sewers, a representative each of the Missouri Public Service Commission, the St. Louis Public Service Company and the City Plan Commission and seven private citizens.

Utility Hearings Concluded

Commissioner McCulloch of the Federal Trade Commission, who has been conducting the hearing in the public utility investigation, announced that after July 7 no further hearing will be held in the investigation until Sept. 1.

Delegates at Kansas City Handled With Ease

Additional crowds at the recent Republican National Convention in Kansas City, Mo., were handled with ease and expedition by the Kansas City Public Service Company by bus and car. The greatest strain on the local transportation system occurred during the parade on the opening night of the convention. Estimates place the number of people who on that occasion crowded into the downtown district at between 200,000 and 300,000. The service on both cars and buses was doubled to take care of the incoming crowds from 6 o'clock until 8, and again after the parade to return them to their homes.

A special bus service was established from the Union Station to the hotel district, beginning Sunday, June 10, to handle the incoming delegates to the convention. The service was reinstated again the last of the week for the benefit of the departing visitors. This was a regular 15-cent line, giving 10-minute service.

The greatest increase in patronage was on the Gray Line sightseeing buses, with from one to seven buses leaving each hour. The regular schedule is three trips a day.

Preparations for Arbitration in Toronto

D. W. Harvey, general manager of the Toronto Transportation Commission, Toronto, Canada, sent a letter to W. D. Robbins, secretary of the employees' union on June 13 stating that the commission had withdrawn the alternative of June 8, namely, a renewal of the existing agreement, since this alternative was not accepted by the men at the mass meeting held on June 9. The other alternative had been the offer of a board of arbitration to consider all wages and working conditions. Since the men, however, had agreed to submit all proposals which either the men or the commission might make as to future wages or working conditions to arbitration there was no reason why two impartial and disinterested appointees should fail to agree upon a chairman. If they should fail to agree upon a chairman the commission would be willing to leave such choice to the Mayor of Toronto. Following this communication the men named James Simpson as their representative.

At the mass meeting of June 9 the men had voted to submit the whole matter to conciliation under the Lemieux Act, but Mr. Harvey pointed out that the provisions of that act did not apply to that commission.

Bankers Prepare to Finance Cleveland Subway

Announcement was made in New York on June 22 that a syndicate headed by the Equitable Trust Company, New York, has been formed to underwrite an issue of \$30,000,000 bonds and preferred stock to finance the construction of the proposed subway system in Cleveland, Ohio, to which reference has been made before in *ELECTRIC RAILWAY JOURNAL*. It is intended to incorporate the Cleveland Subway Company, which would be under the control of the city, to build the subways. An ordinance authorizing the construction of the system will be introduced in the City Council, probably on June 25.

According to the plan now being considered, the subways will be operated by the Cleveland Railway. It is planned to sell the bonds and preferred stock in the Cleveland Subway Company to pay for the cost of construction and to place the common stock in escrow, to be turned over to the city when the system is paid for out of earnings. The idea is to make the new securities quasi-municipal obligations, payable out of revenues of the utility and not from the general city taxes. In this way the improvement can be made without increasing the debt limit of the city.

Hearings in Baltimore Fare Case Concluded

The Court of Appeals of Maryland, sitting at Annapolis, has completed the hearing of arguments in the court case growing out of the action of the Maryland Public Service Commission in granting the United Railways & Electric Company, Baltimore, a 9-cent fare or three tokens for 25 cents. A straight 10-cent fare had been sought.

Following the decision by the commission the United took the case into the Baltimore courts and Judge Joseph N. Ulman held that the commission's decision allowing 6.26 per cent earnings annually on a \$75,000,000 valuation was confiscatory. The court also held that it was illegal to limit the company to a 9-cent fare. It was on this decision that the Public Service Commission appealed the case. Pending the final action of the Court of Appeals the United made no change in its rates.

Before the Court of Appeals the hearing consisted largely of discussing at length the same points brought out at the hearing before the commission and before the lower court. The court did not announce when it would hand down its decision.

Library in Portland Grows

An announcement has been made that an unusual number of new books, magazines and pamphlets has been added to the library shelves of the Portland Electric Power Company, Portland, Ore. The most important, says the *Pepco-Synchronizer*, the company publication,

are the 63 volumes published by the International Correspondence Schools covering a wide range of subjects.

Higher Fare Sought by Capital Traction

An application for relief was filed on June 15 with the Public Utilities Commission by the Capital Traction Company, Washington, D. C., requesting a straight 8-cent cash fare or a 10-cent fare with four tokens for 30 cents. The present rates are 8 cents cash or six tokens for 40 cents on both systems of the District.

In an advertisement "A Statement to Washington Street Car Riders" John H. Hanna, president, said that because of the postponement of the proposed transit merger the company had been forced to appeal for relief as for more than three years it had failed to earn a dividend of 7 per cent. The value of the property used for public service was fixed by the courts at \$26,000,000. To enable the company to earn such a return a flat fare of 10 cents would be necessary, but it was "very much disinclined to ask for a greater increase over existing rates than is necessary to take care of the present urgent situation." He said that public esteem was an asset of the highest value but, confronted with the hard facts stated, the company could not continue to jeopardize the investment and income of thousands of stockholders through failure to seek relief to which it was legally and morally entitled. He quotes 26 cities of more than 100,000 population in the United States where a 10-cent fare is charged. In concluding his statement, Mr. Hanna says:

No individual or corporation owns as much as 5 per cent of the Capital Traction Company's stock. The bulk of it belongs to Washington men and women, who depend largely upon it for their living. The directors of the company are merely trustees for the stockholders. They believe the public generally, when they become familiar with conditions, will be willing to pay the moderate increase in fare requested.

Officials of the Washington Railway & Electric Company have announced that they are not a party to the petition of the Capital Traction Company for an increase in fare, but it is generally accepted that the Utility Commission of the District of Columbia will require both companies to maintain the same fare in case the increase is granted. The present position of the two railways is just the reverse of what it was at the last time their fares were adjusted.

The Washington Railway & Electric Company earnings are better due to the return on its investments and due to operating economies which it has been possible to bring about by securing the entire allocation of one-man car operation allowed by the Utility Commission. Moreover, the company has secured practically the entire benefit of the development in the suburban districts, which it serves almost exclusively.

Chicago Fare Case to Be Concluded

Final arguments for and against the proposed 20 per cent increase in fares of the Chicago Rapid Transit Lines will be heard by the Illinois Commerce Commission on June 26. With the presentation of testimony of its sale witness, a city accountant, other brief evidence against the application at a hearing in Chicago on June 14, attorneys for the city completed their arguments. The elevated lines are asking for the abandonment of the three-for-a-quarter ticket rate and \$1.25 weekly pass and the substitution of a straight 10-cent fare.

Since the filing of the company's petition on Feb. 21, the city, through its counsel, has contended that the company cannot obtain a fare increase without first having made a new valuation of its properties and that the company has failed to introduce such figures in its evidence. Company representatives, on the other hand, insist that a new valuation is unnecessary, maintaining that the valuation accepted by the commission in 1921 at \$86,250,000, plus \$7,750,000 of net additions to property since that time, is just and reasonable. This valuation was based upon a reproduction cost of \$95,000,000 less depreciation reckoned at \$14,750,000, and to which amount \$6,000,000 was added later for working capital.

The principal argument brought out by the city was that the 1921 valuation should have been only \$60,000,775 and that subsequent additions bring the present total to only \$68,360,724 instead of the \$94,000,000 claimed by the company's officials. Under this valuation, the municipal attorneys declare, the proposed fare would yield a return of 11.3 per cent as compared with the 6.02 per cent estimated by the elevated lines' representatives. Testimony introduced by company attorneys showed that in 1927 the Rapid Transit Lines earned only a 2.89 per cent return, and receipts for the first five months of 1928 show this has dropped to 2.28 per cent.

W. J. Smith, one of the commissioners who is hearing the case, announced after the conclusion of the city's arguments that engineers and accountants for the commission would continue their independent investigation of the evidence, and if further testimony is believed to be necessary to an equitable decision the commission may offer some testimony on its own behalf.

Blue Ribbon Specials for Sale in Jacksonville

In conjunction with the annual merchandising event at Cohen Brothers, Jacksonville, Fla., from May 7 to May 14, the Jacksonville Traction Company operated Blue Ribbon Specials on May 7 to carry patrons to and from the store free of charge between the hours of 9 a.m. to 10 a.m. and between the hours of 2 p.m. and 3 p.m. "The Big Store" engaged the services of every car in Jacksonville and south Jacksonville.

Celebrates Safety Broadcasting

Nashville Railway & Light Company entertains in a two hour program. General manager states purpose of educational method. Others speak on safety

COMMEMORATING the first anniversary of its safety department broadcasting its meetings and messages to the public, the Nashville Railway & Light Company, Nashville, Tenn., recently held a two-hour program over station WLAC. Present were Joel B. Fort, representing the state; Gen. J. Washington Moore, the city; William Gupton, the school children of Nashville; Charles Peay of the Nashville Automobile Club; A. M. Burton of the Life & Casualty Insurance Company's radio station, and more than 100 others in addition to the 400 Nashville street car operators. The exercises opened with the program of the Rail-Light

Mr. Brown introduced Col. Joel B. Fort, representing the Governor of Tennessee. Mr. Fort traced the industrial safety movement in America and discussed the annual saving in money. William Gupton, president of the City Board of Education, said that safety was chiefly an educational matter and that everyone should recognize his obligation to further the great and worthy movement in order to make the country safer and conserve the lives of the young boys and girls.

INSURANCE MAN PRAISES COMPANY

City Attorney Moore said that there was yet much to be done in the field of



Telling Tennessee the safety story

band. A choir of the Edgefield Baptist Church sang and there were also other features by the Rail-Light employees.

REASON FOR FEWER ACCIDENTS

J. P. W. Brown, vice-president and general manager of the company, made the salutatory address. He said the chief aim had been the spread of the gospel of safety and to stress the need of safety education in order to cope with the rapidly growing dangers of the street and highway. In addition to that branch of safety the company was also interested in industrial, home or any other branch of safety that would make the city and country a better and safer place in which to live. He said that the operators of the Nashville cars had for the past several years made records comparable with any others that he could find and that in the last year, 1927, less than 30 per cent of accidents was chargeable in whole or in part to the negligence of the street car operators. During the year 400 automobiles struck street cars at the rear, sides or in front while the cars were standing. These were carried on the records as accidents and it was this type of accident his company had hoped to decrease by broadcasting the need for safety. During the past eight years the operators had reduced their total accidents from 2,800 to 900.

accident prevention. He praised the results that had been accomplished through traffic regulation, truck-driver schools, conducted by the Safety Department of the Chamber of Commerce, and by penalties imposed by the courts on reckless and careless drivers.

In the opinion of A. M. Burton, president of the Life & Casualty Insurance Company, the citizens of Nashville and surrounding country owed much to the Nashville Railway & Light Company for the great movement of "Safety First," the need for which it had been trying so earnestly to impress upon the public. He said that congratulations were in order for the far-reaching method adopted by that company for promulgating this safety propaganda. He said that in addition to the stimulating influence for public safety, the musical and entertainment features of the program had been very wholesome and had brought happiness and sunshine to the hearts of a wide circle of friends.

Reduced Rates for Pacific Electric Employees

Employees of the Pacific Electric Railway, Los Angeles, Cal., are reminded that special books of tickets—five for \$1—good for employee and

dependent members of his or her family, can be obtained at the Redondo Beach Bath House, by presentation of railway pass or club membership card. Tickets include use of suit, towels and locker. Also books of dance tickets—40 for \$1—can be obtained in the same way from the supervisors in the ballroom.

Connecticut Wage Issue at Standstill

Employees of the Connecticut Company, New Haven, Conn., have rejected a continuation of the wage agreement which terminated on June 1 and the company is against arbitrating, feeling that in view of a decrease in living expenses, present wages are adequate. An attempt was made to bring about an amicable settlement when officials of the railway were in conference with representatives of the employees. However, no progress was made and subsequent to that action a vote of the men disclosed two-thirds were in favor of authorizing the union officials to declare a strike if necessary.

New Group Insurance in New Jersey

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., in connection with the 25th anniversary of the corporation announced on June 15 that the employees of the corporation and its subsidiaries will have an opportunity to double the amount of life insurance carried under the group insurance plan at a substantial reduction in premium.

Judge Named for Piedmont & Northern Hearing

An order naming Judge Morris A. Soper to sit in the case of the Piedmont & Northern Railway in the United States Court for the Western district of South Carolina, has been issued. The Piedmont & Northern is seeking in federal court to have a ruling of the Interstate Commerce Commission set aside refusing the electric railway authority to extend its lines in South Carolina and North Carolina. An order of Judge Edmund Waddill, Jr., senior circuit judge of the Fourth Federal circuit, appointed Judge Soper to sit in the place of Judge H. H. Watkins, Anderson, S. C., who disqualified himself on the grounds of previous legal connections with a railway concerned in the suit. Coincidentally with announcement of Judge Soper's appointment, it was made known that counsel for the Piedmont & Northern had asked the court that three judges sit in the case.

Recently, seven steam railroads operating in the Carolinas filed a petition in federal court, asking to be made "parties defendant" with the government in the suit, declaring that they were "directly and indirectly" affected by the proposed extensions of the electric railway.

Franchise Draft Accepted in Omaha

The Omaha, Neb., City Council has accepted the draft of a new franchise for the Omaha & Council Bluffs Street Railway drawn by Corporation Counsel Van Dusen. J. N. Shannahan, president of the company, says that while it contains features that were objectionable, the city has shown a desire to cooperate with the company in maintaining railway service, and that if voted by the people next November the grant will be accepted by the company. He thinks that its provisions are such that the company will be able to refinance itself and continue service. Mr. Shannahan expressed pleasure over the amicable settlement, commending the city for fairness and evidence of its intention to retain service within the municipality.

The franchise has a life of 30 years, and while amendable by the city a change can be made only when it is vitally important for the interests of both parties to the contract. The franchise is not exclusive, and levies upon the company the old obligations with respect to grading and paving where streets are improved or resurfaced. Extension of lines may be ordered by the city, while the company cannot change from car service to bus service without Council permission. The company may utilize bus service where this type is agreed as and is jointly desirable. The city abandons its old contention for free rides for certain classes of employees.

Zone System in Cleveland Sought

Joseph H. Alexander, president of the Cleveland Railway, addressed a letter to the City Council of Cleveland, Ohio, under date of June 18, inviting the Council to try a zone system of collecting fares for a period of not less than 90 days. He took this action in accordance with recommendations of the board of arbitration which recently raised the fare in East Cleveland, so that for the next five years it will always be higher than the Cleveland rate of fare, rising or falling with the Cleveland rate. The board of arbitration predicted the eventual scrapping of the Taylor plan if a zone system were not adopted.

Mr. Alexander proposed that the Council set up an inner and outer zone. The fare within both zones would be governed by the condition of the interest fund, as at present, rising when the interest fund goes below \$500,000, and going down when the interest fund passes the \$1,100,000 mark. For a through ride between the zones he suggested that the same schedule of fares prevail as that fixed by the arbitrators for East Cleveland in the case recently decided by them.

This would in effect establish a 9-cent fare for certain outlying sections of Cleveland, such as West Park and Collinwood. All crosstown lines and a number of the main lines would be wholly within the inner zone.

It is not expected that the Council will consider the proposal seriously unless some arrangement is made to put the high rate of fare in effect in Cleveland Heights and Lakewood, two of the major suburbs.

Increased Fares in Galveston

City Commissioners of Galveston, Tex., have adopted ordinances increasing car fare rates of the Galveston Electric Company. The ordinance provides for a sliding scale of fares from 10 cents to 5 cents. On June 30, 1927, the company submitted to the Mayor, City Commission and to the public a statement of its financial status indicating the unprofitableness of the railway lines. Later an adjustment in fare schedules was suggested by the company.

Situation in Rome, Ga., Will Be Studied

Decision in the case of the Georgia Power Company asking permission to increase fares in Rome, Ga., has been deferred by the Public Service Commission until a more thorough investigation can be made. The company proposes to increase its cash fare to 8 cents and to sell two tickets for 15 cents, with changes in the rates to school students as well. The petition stated that, with the present rates, the railway was losing money and was supported by the Rome Chamber of Commerce and representatives of the City Commission. On the other hand, a vigorous protest was made by two citizens of Rome in behalf of "the poor people of the city." They filed a detailed statement charging that the railway department might be losing money, but that the sale of power was more than profitable for the company.

St. Louis-Kansas City Line Permit Again Denied

The Missouri Public Service Commission at Jefferson City has again denied the application of the St. Louis-Kansas City Short Line Railroad for a certificate of convenience and necessity for the construction and operation of an electric interurban railroad connecting St. Louis and Kansas City. After the first application of the railroad was denied in May, 1925, a second application was filed with the commission on Oct. 7, 1927, and many hearings were held.

The ruling of the commission was that the showing of the proposed railroad as to revenues that could be earned to support it was not sufficient to warrant granting the certificate. Commissioner John H. Porter, who wrote the decision, further held that the commission was not satisfied with the financial structure of the proposed 237 mile railroad.

Steam railroads operating between the two chief Missouri cities opposed the proposed electric line.

Seattle Official Takes Rest

D. W. Henderson, superintendent of the Seattle Municipal Street Railway, Seattle, Wash., has applied for and received permission from the City Council for an extended leave of absence, on account of illness and to provide a needed rest. Mr. Henderson has been in active charge of the operations of the municipal lines in Seattle since the road there was taken over by the city from the Puget Sound Power & Light Company, by which he was formerly employed.

Mr. Witt Thrives on Politics

Peter Witt, former street railway commissioner of Cleveland, Ohio, and inventor of the Peter Witt car, is a candidate for the Democratic nomination for Governor of Ohio at the primaries on Aug. 14. He is running on an "elect Al Smith" platform.

Last December Mr. Witt completed four years of service in the Cleveland City Council. He was not a candidate for re-election and announced he had made up his mind to keep out of politics. But recently a group of his friends at the City Club at noon got up a petition nominating him for Governor and by nightfall Mr. Witt had decided to run.

Nation's Traffic Award Made to Two Railway Men

Two railway men were among the victors in *Nation's Traffic* national traffic contest and received prizes from the Committee of Awards which met in St. Louis May 21 and 22 to judge the several hundred manuscripts entered. The first award of \$2,500 for "Text for Uniform Traffic Ordinance" was divided in equal amounts between Walter W. Kennedy, assistant to the vice-president of the Birmingham Electric Company, Birmingham, Ala., and Robert H. Nau, secretary of the street traffic committee, Chicago Association of Commerce, Chicago, Ill. The award of \$1,000 for "Plan for the Solution of Municipal Parking Problems" was won by Leon R. Brown, safety engineer of the New York State Railways, Rochester, N. Y., and chairman of the traffic committee of the Rochester Engineering Society. Other awards dealt with traffic violators and adult and juvenile education.

The eight participants were awarded a total of \$6,850. The significance of the contest, according to *Nation's Traffic* was evidenced by the number of prominent men who deemed it of sufficient importance to devote time to it.

In the report of the Committee of Awards it was stated that outstanding plans or suggestions of a practicable and generally useful nature other than those which have been the subject of past experiments were not presented in this contest; also that several of the suggestions to which awards had been made were not so complete or so competent as might be produced by combinations of plans now in effect in different parts of the country.

Recent Bus Developments

Modified Proposals in Knoxville

The motor bus committee of the City Council of Knoxville, Tenn., has received a new proposition from the Knoxville Power & Light Company for the operation of buses in co-ordination with street cars. That company now has two proposals before the city.

The first one was to establish four bus routes, to be known as the Sevier-ville Pike, Beaumont, Whittle Springs and Lonsdale routes. The company proposed that riders getting on street cars and transferring to buses pay 4 cents extra for transfers, in addition to the 6-cent token. Riders who boarded buses first would pay 10 cents whether or not they transferred to street cars.

The Council committee then demanded that Power-Light eliminate the 4-cent transfer, give school children 5-cent fare, and relocate the Kingston Pike street car line to the middle of the pike. The company in its reply refused to eliminate the 4-cent transfer, but agreed to relocate the track if the city would pay half the cost. The city refused, and City Manager Roehl intervened and asked for further time. Mr. Roehl presented this proposition from Power-Light:

First, Power-Light agrees to put on the four bus lines recommended by the City Planning Commission, provided the city would grant franchises over the routes subject to approval of the company's legal department.

Second, the company will abandon its Kingston Pike right-of-way so the pike can be widened and paved by the city, and agrees to put on a trackless trolley on present Lyon's View route, if the city will give the necessary franchise which would be subject to approval of the company's attorney. The city was asked to let the present tracks remain until the pike is paved. All obligations against the company for paving cost on the pike would be eliminated.

Third, sanction by the city of a 7-cent token fare, with a universal free transfer from street cars to buses, and vice versa.

C. H. Harvey, president, said the Knoxville Power & Light Company would put on the trackless trolley under either the original or alternative proposition.

Applications and Opposition in St. Louis

The St. Louis, Mo., Board of Public Service held a public hearing on the application of the People's Motorbus Company on June 13 for a permit to operate buses on Oakland Avenue westward from Kingshighway to the Zoo in Forest Park. Opposition was voiced by the St. Louis Public Service Company because the proposed bus line would compete with its Market car line in the territory south of Forest Park. At the hearing the railway asked to operate a

bus line of its own from Arsenal Street into the Lindenwood district, now served by the Russell Boulevard-Southwest Avenue line of the People's Motorbus Company.

The People's Motorbus Company has also applied for a permit to operate a 5-cent loop bus line to the levee for the convenience of river excursionists.

New Service in Prospect on Indiana Line

Five new 21-passenger buses will be put into operation shortly by the Evansville & Ohio Valley Railway. Three of these will replace electric railway service between Evansville and Mt. Vernon, Ind.

Acquisition of Bus Line by Roanoke Railway

Control and management of the Safety Motor Transit Corporation, Roanoke, Va., has passed from the hands of the former officers of the corporation to these of the Roanoke Railway & Electric Company. Officers of the Safety Motor Transit Corporation have resigned, but it is understood that the employed force will be retained practically intact by the owners.

Plan in Seattle Suburb Under Consideration by New Regime

The proposition of starting a combination bus and railway service to provide more adequate transportation to the suburban district of Green Lake, Seattle, Wash., which has been under consideration for months, has been temporarily abandoned. A plan evolved by D. W. Henderson, superintendent of railways, and approved by the City Council utilities committee, has been turned over for consideration to the new administration, headed by Mayor Frank E. Edwards, who succeeded Bertha K. Landes, on June 4.

Washington Company Buys Suburban Line

The Washington Railway & Electric Company, Washington, D. C., has announced that it has brought to a successful termination the negotiations involving the purchase of the Montgomery County bus line. Since this bus line parallels one of the railway company's suburban lines, the services may be co-ordinated. Under the terms of the purchase agreement, the bus line retains its corporate identity. The bus line is owned and controlled entirely by citizens of Rockville. Four buses have been making thirteen round trips a day between Washington and Rockville, Md.

Would Seek Certificate in San Bernardino

The Pacific Electric Railway has applied to the California Railroad Commission for a certificate to operate motor coach passenger service between its Third Street station and Pickering Park in the city of San Bernardino.

Jitneys Barred in Louisville

Announcement was made in Louisville, Ky., on June 18 that jitney buses would be eliminated from the streets of Louisville on July 1. Such transportation was first established in Louisville about fifteen years ago, and while it has never amounted to a great deal in the better-class sections of the city, there have been a good many buses on Market Street, which carries two of the best revenue-producing lines of the Louisville Railway. Mayor Harrison after a conference with James P. Barnes, of the Louisville Railway, and City Attorney James P. Baskett, in a formal statement to the press, stated that he would confer with the City Attorney and Board of Safety looking to the enforcement of that part of the traffic code on jitney elimination.

Under decision of the Court of Appeals last year no bus may operate in Louisville without a franchise, and the Louisville Railway holds the bus franchise and is operating several lines. City officials expressed the opinion that the jitneys were being illegally operated. Under a new traffic ordinance that is now in effect, they are barred from the streets, unless under franchise.

Mayor Harrison, just back from the Republican Convention in Kansas City, commented on the fare there being 6½ cents for tickets, and 8 cents cash; 10 cents bus, with free transfer privilege; and 15-cent bus fare where the bus follows the car line.

Service Improves in Oklahoma City

The entire system of the Oklahoma Railway, Oklahoma City, Okla., was brought closer together by the establishment of the new Seventeenth Street Loop cars and the increase in service in the northwest section. In line with the scheme of bus operation in other large cities, two bus routes have been made feeder lines. Bus service on the lines affected is at closer intervals during the day than formerly, while street car schedules are also much increased. The routing and scheduling of cars made the entire system more accessible by eliminating the necessity for cross-town passengers to come all the way downtown through traffic and back and speeded up service over the entire line. Northwest Oklahoma City, where the first improvements in car and bus service were offered to the public as the result of recent surveys made by the railway, has been highly pleased, according to a canvass of the routes made recently.

Financial and Corporate

Underlier Hearing Started

Commission begins inquiry into possibility of city purchasing Philadelphia Rapid Transits' leased lines

HEARINGS were started on June 18 before the Pennsylvania Public Service Commission on the application of the City of Philadelphia for placing of valuation on properties of the underlying companies making up the Philadelphia Rapid Transit Company system, as a step looking to their condemnation by the city.

At the outset Commissioner Benn read a statement which follows in part:

The proceeding before the commission is unusual and, so far as we are able to determine, without precedent. We are not called upon, as the Public Service Commission, or in any other capacity, to express approval or disapproval of the condemnation of the properties of the underlying companies. The commission's certificate of public convenience is not asked for, nor is it necessary, and the commission's regulatory or administrative judgment is not invoked or involved in this proceeding.

It is possible, even probable, that later proceedings must be taken under the provisions of the Public Service Company law in the event that the city consummates the condemnations authorized by the Legislature. Not until then, in this matter, will the commission function under the provisions of the act of July 26, 1913, and its supplements.

As we view the Act of 1927, the only parties who have the right to appear at this hearing and be made parties to the record are the city of Philadelphia and the underlying companies named in the petition. The sole duty or function of the commission under this act is to determine the compensation or damages to be paid by the city to the owner or owners of the property.

In a friendly action, in which counsel and officials of the underlying companies have joined with the city solicitor and his staff, the commission has been petitioned to appraise the holdings of the underliers and fix a fair price for their acquisition by the city.

Under the McChord plan, which was submitted last year to the commission and the city, the city, it was said, could effect a saving of \$4,500,000 a year by substituting itself as lessor in place of the underliers and collecting the approximately \$9,000,000 which the P. R. T. pays each year to those systems in rentals. The price recommended to be paid for the underliers by Mr. McChord was \$136,000,000 and not \$36,000,000 as was made to appear in the JOURNAL for June 16.

The underliers have formed four committees to represent the stockholders of the lessor companies.

At the opening hearing city Solicitor Ashton moved that the commission issue an order on the underlying companies party to the valuation calling on their representatives to answer within 30 days the city's petition, filed with

the commission, announcing its "declaration of intention" to take over the franchises by condemnation.

The order was issued accordingly, and counsel for the underliers announced that they would file answer within that time. The city, Mr. Ashton said, is prepared to proceed with the hearings meanwhile, and Mr. Benn announced in conclusion that if the underliers assented, a date convenient to all would be fixed for the next session.

Mr. Maltbie Retained in Washington Case

Milo Roy Maltbie, former Public Service Commissioner of New York, has been retained in connection with the valuation survey of the railway lines and the bus company in Washington, D. C., which it is intended shall be consolidated. The matter was before the District of Columbia committee of the Senate at the recent session of Congress, and was referred to a sub-committee for a report in the fall. The railways fixed a valuation figure of \$50,000,000 on their properties, but contended that under allowances made in other valuation cases their holdings would scale \$62,000,000.

Pennsylvania Line Suspend Service

The Fairchance & Smithfield Traction Company, Uniontown, Pa., ceased operation on May 14, 1928. Receipts had been less than expenses since January of this year. Proceedings are pending for dissolution of the company. Track-age covers 2.75 miles.

Preferred Stock Offered in St. Louis

The Missouri Public Service Commission has authorized the St. Louis Public Service Company, St. Louis, Mo., to issue 27,000 shares of Series A preferred 7 per cent stock to be used in conversion of approximately \$2,250,000 of five-year gold notes issued when the company took over the properties of the defunct United Railways. The conversion must be made before Dec. 31, 1928.

Short Abandonment in Washington Authorized

Permission to abandon about 3 miles of track of the Spokane, Cœur d'Alene & Palouse Railway, formerly in the Inland system, has been granted the Spokane, Wash., company by the Interstate Commerce Commission. About a third of a mile is within the Spokane city limits and about 2½ miles is east of the city limits.

Upward Trend in Recent Income Statements

For the eleven months ended May 31, 1928, gross revenue of the Interborough Rapid Transit Company, New York, N. Y., was \$61,886,726, an increase of \$3,747,409 over the eleven months ended May 31, 1927. The balance after consideration of dividend rentals was \$2,949,612, representing an increase of \$1,583,939 over a similar period of 1927.

On the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., total operating revenues were \$43,411,306 for the eleven months ended May 31, 1928, compared with \$42,735,617. The net income after total income deductions was \$5,938,320 for this year's period compared with \$5,805,322 for a similar period of last year.

International Railway, Buffalo, N. Y., reports to the New York State Public Service Commission for the quarter ended March 31, 1928, net income of \$123,048 after fixed charges compared with net loss of \$124,888 in the corresponding quarter of 1927.

Operation of the Cincinnati Street Railway, Cincinnati, Ohio, run under a service-at-cost arrangement, for May resulted in a surplus of \$1,658. The figures follow: Net operating revenue \$213,690; operating income \$145,433; non-operating income \$1,938; gross income \$147,371; rental, interest sinking fund, and return on capital \$145,713; surplus \$1,658.

The United Electric Railways, Providence, R. I., reports for May net income of \$42,606 against \$28,863 in May 1927. Net income for five months ended May 31, 1928, was \$252,275 against \$243,305 in the similar period of 1927.

The Chicago Surface Lines carried 138,464,269 passengers in May, compared with 133,359,809 in April and 133,938,656 in May, 1927. Revenue passengers carried showed an increase of 1,482,650 over the same period last year. The largest number of passengers carried in any one month was in March, 1928, when 139,179,092 riders were transported.

Gross for May of this year was \$5,304,553 against \$5,205,735 in the similar month in 1927. Divisible receipts for the month totaled \$465,245 against \$452,579 in May of last year. These divisible receipts are the largest reported since December of last year.

Maine Branch Line to Be Abandoned

The Biddeford & Saco Street Railway, Biddeford, Me., has announced that the branch line between City Square and West Street will be discontinued on June 30. Last winter there was much public opposition to abandoning this line. Many persons who own automobiles have since taken occasion to ride the trolleys whenever possible so that the line might be continued. Despite the aid of a loyal public management has found the line does not derive sufficient revenue to pay operating expenses.

City Supervisor Commends Dallas Railway

During the year ended April 30, 1928, the Dallas Railway & Terminal Company, Dallas, Tex., completed and put into operation 2.9 miles of extensions and 8.8 miles of bus lines. Everman Plan No. 4 was completed with the exception of the Junius Height extension held up by legal proceedings. These facts were contained in the report of John W. Everman, the Supervisor of public utilities of the city of Dallas. He stated that the four utility companies worked closely with the department and in co-operation with each other in all matters looking to the interests of the city.

The report says that the railway service is generally satisfactory, the company exerting every effort to keep it up to a high standard. Both the number of cars in operation and the total mileage in the past year have been increased. The speed of cars has been increased from 9.10 m.p.h., last year to 9.28 this year.

In reviewing the statistics of the road, Mr. Everman said that the company was operating 121.83 street car track-miles and 13.2 bus-miles, that 102 double-truck one-man cars were in operation, of which 50 were rebuilt and placed in service during 1927.

During the past year the company rebuilt and repainted the 62 one-man Birney cars and also overhauled and repainted 50 of the practically new 60 Peter Witt cars. The other ten will go through the shops for similar improvement in the near future. Outstanding improvements and betterments to track and right-of-way in the way of extensions, rebuilding of tracks, paving and repaving completed in the past year totaled \$413,672 in cost, and improvements made over and above the ordinary maintenance cost \$75,000.

The report refers to the company's application to the Mayor and Board of Commissioners for increase in existing fares and the withdrawal of the petition following a recommendation made by a citizens' committee that it take this action. No change was made and the rates at the time the application was made, are still in effect as follows:

Adults, 7 cents cash.

Adult ticket fare, five for 30 cents.

Students' tickets, 3 cents.

Children five to twelve years of age, 3 cents.

Free universal transfer.

Later certain matters which had been under consideration for a long period were satisfactorily adjusted by the company and the supervisor. These included the return to surplus reserve by the company of \$41,922, representing an amount heretofore withdrawn from surplus reserve over and above the current 7 per cent fixed return credited to the deficit in fixed return; and also full settlement was made as between the Dallas Power & Light Company and the Dallas Railway & Terminal Company covering bills for power rendered dating back to June, 1921, and govern-

ing in the future in rendition of bills until further notice. In rendering these bills originally there was a misinterpretation of the order setting forth the rate to be charged and in the final adjustment the companies accepted the supervisor's interpretation and the Dallas Power & Light Company returned \$245,577 to the Dallas Railway & Terminal Company. This sum was credited to surplus reserve of the Dallas Railway & Terminal Company.

Changes in Conspectus of Indexes

Three changes will be noted this month in the Conspectus of Indexes which is compiled for the ELECTRIC RAILWAY JOURNAL by Albert S. Richey, Worcester, Mass. One of these changes consists of the inclusion of an index which is entirely new to the Conspectus, the second is in the form of one of the indexes, and the third is a change in the period covered by the peak figures. These changes are shown in the accompanying table.

The Industrial Activity Index of the *Electrical World* is now included in the Conspectus. This index is based on the amount of electrical power used for power purposes by industrial concerns in the United States, and is referred to the average monthly index for the years 1923-1925, inclusive, as a base. It is corrected for the number of days in the individual months and by the elimination of Sundays and general holidays. This index represents the relative daily use of electri-

cal power by manufacturing industries, and is generally considered a very good index of industrial activity in the country as a whole. It should be of considerably greater value than the monthly figure of Unfilled Steel Order tonnage, which it replaces.

Beginning with this number, Bank Clearings outside of New York City are shown as an index number (with the average of 1926 as a base) instead of the dollar figure in billions as heretofore. Bank clearings in 126 cities outside of New York City are included, and in the calculation of the index the average daily figure is used, eliminating Sundays and nine general holidays. The index is also corrected for the seasonal variations which occurred in the years 1923-1927, inclusive. The new index form should be of considerably greater value than the uncorrected dollar figure which has been shown heretofore.

The last two columns of the Conspectus now show the high and low figures for the last preceding five years instead of since the World War, as formerly. The years 1919-1922 included abnormal fluctuations of several of the indexes, principally due to the violent changes in the readjustment of affairs immediately following the close of the war. Since 1923 there have been no such abrupt changes and most of the indexes have been following trends which now may be considered as more or less normal. For this reason it is believed that at present there will be more interest in a presentation of the high and low peaks for the last five years.

Conspectus of Indexes for June, 1928

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago		Year Ago	Last 5 Years	
		June 1928	May 1928		High	Low
Street Railway Fares* 1913 = 4.84	7.62	7.62	7.44	7.62	6.88	
Electric Railway Materials* 1913 = 100	141.4	140.4	143.0	175.3	139.5	
Electric Railway Wages* 1913 = 100	229.2	229.2	227.5	229.2	206.8	
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	202.7	201.9	200.6	206.8	187.3	
Eng. News-Record Construction Cost (General) 1913 = 100	206.2	207.0	205.6	224.7	202.0	
U. S. Bur. Lab. Stat. Wholesale Commodities 1926 = 100	98.6	97.4	93.7	104.8	93.7	
Bradstreet Wholesale Commodities 1913 = 9.21	13.19	13.44	12.43	14.41	12.23	
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	153.8	152.1	155.4	167.1	141.0	
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	161.5	160.8	163.7	171.8	157.5	
Industrial Activity Elec. World—Kw.-hr. used 1923-25 = 100	110.0	119.3	122.5	127.7	73.4	
Bank Clearings Outside N. Y. City 1926 = 100	108.4	105.6	102.4	108.4	81.6	
Business Failures Number Liabilities (Millions)	36.64	41.13	39.92	122.95	27.22	

*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.

**London Reports Good Year—
1,668,827,029 Passengers**

In reporting upon the operations of the London Underground group, Lord Ashfield, chairman, said 1927 constituted a record for that group of companies. The group covers the Metropolitan District Railway, London Electric Railway, City & South London Railway, Central London Railway and London General Omnibus. The number of passengers carried was almost 1,669,000,000 and in addition 604,000,000 passengers were carried by other companies with which the Underground is associated. He said the local traffic in London was exceeded only in New York. The number of passengers carried by the London Underground group increased 110,000,000 over 1926.

These facts were disclosed at an ordinary general meeting held on Feb. 23.

Gross traffic receipts for the year were £13,951,391 representing an increase over 1926 of £753,764. Miscellaneous receipts amounted to £978,325, an increase of £51,215 over 1926. This was attributed to the successful way in which the commercial advertising was handled. Gross receipts of the group for the year were £14,929,716. Managing Director Ashfield explained the distribution of this sum of money. The average rate of return for the year was 4.66 per cent against 4.09 per cent a year ago, which he claimed was "short of that reasonable return to which we are fully entitled."

He summarized the gains of the year stating that the car-miles run by trains and omnibuses had increased by 21,-

000,000 but the cost per mile had decreased by 7 per cent. The company had £50,000 more carried to reserve, £236,000 more paid away on the prior charge securities, £112,000 more distributed in dividends and £108,000 more carried forward, representing in all £506,000. This confirmed Lord Ashfield's statement that the year 1927 was a better one than at first might appear from the annual accounts and returns.

**Preferred Issue of Philadelphia
Rapid Transit Increased**

Stockholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., on June 18 approved an increase of \$5,000,000 in the preferred stock, bringing the authorized total to \$35,000,000. Proceeds from the sale of the increased preferred will be used to relocate the Market Street subway tracks under City Hall, for the erection of a bus terminal building and establishment of a garage terminal.

Common stockholders were asked to waive their rights to subscribe to the new preferred. Unless waived, rights go to stockholders of record June 22 in the ratio of one new preferred share for each six of the common held.

Riding on Increase in Los Angeles

Traffic by both bus and street car on the lines of the Los Angeles Railway, Los Angeles, Cal., for the five months' period ended May 31, last, reached a total of 148,155,565 passengers. This is an increase of 2,823,800 passengers, or approximately 2 per cent, over the volume of traffic in the similar period of last year, which totaled 145,331,765 passengers.

Bus traffic figures for the period aggregated 7,098,486 passengers, as compared with 5,508,276 in the similar period of 1927, a gain of 1,590,210, or nearly 3 per cent. Passengers by street car numbered 141,057,079, against 139,823,489 in the corresponding period of last year, an increase of 1,233,590 fares, or nearly 1 per cent.

On May 4, the Los Angeles Motor Coach Company was organized jointly by the Los Angeles Railway and the Pacific Electric Railway and a part of the bus transportation system of the Los Angeles Railway, approximating 25 per cent of the traffic, was transferred to this company. The consequent decrease in bus traffic figures for the month of May was not in direct proportion to the cut. This indicates an increase in other lines still under the operation of the Los Angeles Railway.

The number of passengers traveling bus lines in May was 1,148,855. This compares with 1,173,714 in May, 1927, which is a decrease of 24,859 passengers, or slightly more than 2 per cent. Street car traffic for the month showed little change from that in May, 1927, and numbered 28,218,201 passengers, against 28,115,348 last year.

As an indication of the increasing

COMPARATIVE STATEMENT OF THE OPERATING RESULTS OF THE LONDON UNDERGROUND GROUP, YEAR 1927, COMPARED WITH 1926

	Railways		London General Omnibus Company, Ltd.		Total	
	1927	Total Increase	1927	Total Increase	1927	Total Increase
	£	£	£	£	£	£
Traffic receipts after the operation of the common fund under the terms of the London Electric Railway Companies' facilities act agreement, dated Dec. 21, 1915, and supplemental agreement, dated Dec. 8, 1921.....	5,404,659	578,745	8,546,732	175,019	13,951,391	753,764
Expenditure.....	3,225,350	217,454	8,061,259	62,344	11,286,609	279,798
Net receipts.....	2,179,309	361,291	485,473	112,675	2,664,782	473,966
Miscellaneous receipts, net.....	596,329	58,630	381,996	7,415	978,325	51,215
Net income.....	2,775,638	419,921	867,469	105,260	3,643,107	525,181
Interest, rentals and other fixed charges	1,433,289	210,669	259,845	25,510	1,693,134	236,179
Balance.....	1,342,349	209,252	607,624	79,750	1,949,973	289,002
Appropriation to reserve for contingencies and renewals.....	185,000	30,000	345,000	20,000	530,000	50,000
Balance.....	1,157,349	179,252	262,624	59,750	1,419,973	239,002
Dividends on guaranteed and preference stocks.....	389,477	.....	.....	.....	389,477	.....
Balance.....	767,872	179,252	262,624	59,750	1,030,496	239,002
Add balance from last year's accounts..	242,191	15,482	64,125	3,376	306,316	18,858
Total amount available for dividends on ordinary stocks and shares and for other purposes.....	1,010,063	163,770	326,749	56,374	1,336,812	220,144
Dividends on ordinary stocks and shares	681,718	77,615	240,625	34,375	922,343	111,990
Rate per cent, per annum.....	4	.46	7	1	4.66	.57
			(Free of Tax)			
Balance carried forward to next year's accounts.....	328,345	86,155	86,124	21,999	414,469	108,154

Italics denote decrease.

MISCELLANEOUS STATISTICS OF LONDON UNDERGROUND GROUP FOR YEAR 1927 COMPARED WITH 1926

	Railways		London General Omnibus Company, Ltd.		Total	
	1927	Total Increase	1927	Total Increase	1927	Total Increase
Passengers carried—						
Ordinary.....	234,594,270	24,124,062	1,323,423,819	74,070,591	1,558,018,089	98,194,653
Workmen.....	57,872,186	7,291,622	.....	.....	57,872,186	7,291,622
Seasons.....	52,936,754	4,209,252	.....	.....	52,936,754	4,209,252
Total.....	345,403,210	35,624,936	1,323,423,819	74,070,591	1,668,827,029	109,695,527
Average daily number of passengers carried.....	1,020,393	98,820	3,909,672	196,884	4,930,065	295,704
			Miles			
Route-miles owned or leased..	78	.775	.....	.....	78	.775
Route-miles run over by companies' trains.....	128	.281	.....	.....	128	.281
Road-miles run over by companies' omnibuses.....	.....	.....	880	20	880	20
Number of stations.....	125	.....	.....	.....	125	.....
Number of garages.....	.....	.....	46	2	46	2
Number of elevators.....	171	.....	.....	.....	171	.....
Number of escalators.....	67	4	.....	.....	67	4
Number of car-miles run in relation to passenger receipts	79,005,322	13,607,193	146,283,963	7,499,788	225,289,285	21,106,981
Number of car-miles run by companies' trains or omnibuses.....	86,038,811	13,731,157	146,283,963	7,499,788	232,322,774	21,230,945
Number of cars or omnibuses owned.....	1,793	23	3,990	55	5,783	78

*The number of omnibuses owned and/or worked by or in conjunction with the London General Omnibus Company, Ltd., is 4,887, compared with 4,703 in 1926.

popularity of the bus lines, figures for April, before transfer of part of the system to the Los Angeles Motor Coach Company, showed a gain of 3.7 per cent over traffic figures reported for April, 1927. The company is now operating seventeen bus lines, as against sixteen at this time last year. It has just received a permit from the Railroad Commission to extend the Beverly Boulevard line from Vermont Avenue to First Street and Bonnie Brea Avenue.

Deficit in Terre Haute

For the year ended Dec. 31, 1927, the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., realized a surplus of \$145,920. From this sum \$226,730 sinking fund requirements were subtracted, leaving a deficit of \$80,810 for the year. This was disclosed in the annual report submitted at the annual meeting on June 13.

There was expended and charged to capital account on owned lines \$41,315 and on leased lines \$103,833, making a grand total of \$145,148 on owned and leased lines. Considerable reconstruction and improvement work was accomplished on the different divisions of the company.

Freight earnings for 1927 were \$603,486 compared with \$593,329 in 1926. Total mileage was 430.87 and total main line route mileage 433.07.

MISCELLANEOUS STATISTICS OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY Year Ending Dec. 31, 1927

Passengers carried—Interurban lines.....	3,950,127
Passengers carried—City lines.....	18,798,477
Total passengers carried.....	22,748,604
Freight handled, tons.....	211,741
Express handled, tons.....	9,541
Car-miles operated—Interurban lines...	6,470,379
Car-miles operated—City lines.....	3,764,611

The report also contains some facts of the leased properties, the Indianapolis & Northwestern Traction, the Indianapolis & Martinsville Rapid Transit Company, the Terre Haute Traction & Light Company, the Terre Haute & Western Railway and the Indianapolis, Crawfordsville & Danville Electric Railway.

EARNINGS AND OPERATING EXPENSES OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

	1927	1926
Gross earnings.....	\$5,616,529	\$5,611,653
Operating expenses.....	4,463,122	4,436,221
Net from operation.....	\$1,153,406	\$1,175,432
Taxes.....	\$166,108	\$181,819

MAINTENANCE EXPENSES OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

	1927	1926
Maintenance of way and structures.....	\$778,266	\$683,616
Maintenance of equipment..	437,050	419,683
Maintenance of power plant Buildings and equipment.	108,601	128,313
Total railway maintenance	\$1,323,868	\$1,231,612
Maintenance of light and power.....	183,065	185,520
Total maintenance.....	\$1,506,934	\$1,417,132

Personal Items

Toronto Man Association President

D. W. Harvey, responsible operating official of Toronto Transportation Commission, elected to head Canadian Association

D. W. HARVEY has had conferred upon him the highest tribute within the power of Canadian electric railway men to bestow. At the meeting of the Canadian operators held recently in Toronto, he was made president of the Canadian Electric Railway Association. It is a big job that Dave Harvey holds at Toronto. He is responsible for the conduct of 200 miles of electric railway formerly included in the system of the



D. W. Harvey

Toronto Railway, privately owned, and the Toronto Civic Railway, brought together some time ago under the auspices of the Toronto Transportation Commission. He is a very young man to occupy so important a post, particularly as he was only 37 years of age 4 years ago when he was chosen to succeed H. H. Couzens as manager at Toronto.

As if it were not enough for Mr. Harvey to have managed the railway successfully and militantly, the main responsibility has been his of developing the radial lines out of Toronto, the local motor coach services and the special de luxe services. Still more recently the conduct of the municipal ferries has been entrusted to him.

Mr. Harvey and Mr. Couzens were chiefly responsible for rehabilitating the railway lines at Toronto following the taking over of the property of the Toronto Railway, and the measure of success that has followed is undoubtedly due in large part to the fact that both Mr. Harvey and his predecessor were left untrammelled and unusually free from political interference. No left-handed thrust is intended at the Toronto Railway when it is said that the property to which the city succeeded was in a deplorable condition at the time

the city succeeded the private company. The former owners, uncertain of the final disposition of the property, were loath to do more than keep the property going in the face of the political uncertainty.

The first task was to rehabilitate the property physically. This was accomplished with an unusual degree of celerity. That work has been followed on the part of Mr. Harvey and his associates with an intensive campaign to sell the services of the system to the public in which a great deal of resourcefulness has been shown. This is a record that has gone down in black and white in the ELECTRIC RAILWAY JOURNAL from time to time so that he who runs may read.

For seventeen years Mr. Harvey has been serving the city of Toronto. He really began to visualize the city's transportation needs as long ago as 1911, when the first of the so-called civic lines was placed in operation. On that line he was construction engineer. In 1912, when he was only 26 years old, the operation and maintenance of the civic lines were placed under Mr. Harvey's supervision. He continued in these capacities until appointed to be assistant manager of the Toronto System in 1921 after the lines of the Toronto Railway had been acquired by the city.

Mr. Harvey was born in London, Ont., on Feb. 24, 1887. He was educated in the public schools and the Collegiate Institute there. In 1906 he became a student in the Applied Science Faculty at Toronto University, taking the course in civil engineering and graduating in 1910 with the degree of B. A. Sc. In the same year he entered the Ontario Power Company service in Niagara Falls on construction work. In 1911 he was appointed to the City of Toronto Works Department, and had charge of constructing and operating the Toronto Civic Railway until Sept. 1, 1921, when the city took over the Toronto Railway. He was then appointed assistant manager of the Toronto Transportation Commission. On May 1, 1924, on the resignation of H. H. Couzens he was appointed general manager of the commission as the logical successor to that office because of his previous record and his intimate knowledge of the system and the needs of the city.

Resignations on Ohio Property

Earl Lemaster, superintendent of the Newark division of the Southern Ohio Public Service Company, Newark, Ohio, J. A. Hewitt, superintendent of the Zanesville division, and F. J. Clunis, general manager of the midwest section of the company, have resigned effective July 1. Following the announcement of the resignations the statement was made that the Southern Ohio Public

Service Company had sold to a Chicago corporation, but this has not been confirmed.

It was further announced that Mr. Lemaster will join an eastern interurban company; that Mr. Clunis will go with the Tulsa Interurban, Tulsa, Okla., and that Mr. Hewitt will be similarly employed with a Seattle interurban company in Seattle, Wash. The Southern Ohio Public Service Company was formerly included in the system of the Ohio Electric. It extends from Zanesville to Lima, Cincinnati, Fort Wayne, Columbus and way points.

British Columbia Personnel Unchanged

George Kidd, president of the British Columbia Electric Railway, Vancouver, B. C., has just returned from Eastern Canada where he attended a conference of the purchasers of the company. When he was offered the presidency of the British Columbia Power Corporation, which now controls the British Columbia Electric Railway and all its subsidiaries, Mr. Kidd was assured that the past policy and management of the railway would be continued and that there was not the slightest intention on the part of the new owners of interfering in any way with the rates or affairs of the company as they have been conducted for many years.

His request for a local representation on the board has now been met, with the result that W. G. Murrin, long vice-president of the railway, has been made vice-president of the British Columbia Power Corporation and Mr. Goward will occupy a similar position in Victoria, and Sir Frank Barnard, described as the father of the old British Columbia Electric Railway, also accepted a position on the directorate, together with Blake Wilson.

Mr. Kidd says the price paid by the new owners to the English shareholders for the property is not high, compared with the quotations for other similar utility securities. For purposes of comparison it must be remembered that the shareholders of the old British Columbia Electric Railway were receiving a dividend of 8 per cent free of English income tax, which meant that on the present yield of the other leading public utilities, the stock was worth between \$300 and \$400, an amount probably in excess of the sum paid for it by the new owners.

The new owners are men who have for many years taken the leading part in the development of public utilities throughout Eastern Canada and have been most successful in developing those utilities and in bringing new industries to absorb the power available. The opinion of the new owners is reflected best, perhaps, in the optimism of Sir Herbert Holt, who has stated that in his opinion Vancouver is destined to become the second city in the Dominion.

F. G. Buffe Honored by Association

During coming year Midwest group will have public relations expert to handle affairs

F. G. BUFFE, vice-president of the Kansas City Public Service Company, Kansas City, Mo., was elected president of the Midwest Electric Railway Association at its meeting in that city, June 4-6. As head of an association, with its countless opportunities for accomplishing much in the human relations field, Mr. Buffe might be called the right man in the right job, for his education, experience, and even inclination, especially equip him to solve association problems and to promote educational and social activities within the fold.

Mr. Buffe is known not only in Kansas City, where he has put into force



F. G. Buffe

some of his advanced notions on co-operative activities and employee representation, but throughout the Middle West his reputation as a public relations man, and as a speaker who has something significant to say remains undisputed. His numerous addresses and papers bespeak the endowments and outlook of the man more than a column of type could do. Significant among these talks was the one delivered before the annual meeting of the Midwest Electric Railway Association held in Denver, Col., July 8-10, 1926. On that occasion he had both the conviction and temerity to talk of rights of employees—that they were entitled to full knowledge of the aims and purposes of their companies if loyal service were expected of them. Mr. Buffe understands the potent influence of the human element in any industry. His study of law and his newspaper experience in Denver and Peoria and subsequent publicity work for the Illinois Traction properties give him the advantageous position of remaining on the outside looking into the industry.

This same detachment enabled him to see the bus as a vehicle with a future. In speaking before the American Society of Civil Engineers in Kansas City, Mo., on April 14, 1926, Mr. Buffe

said that the bus offered new opportunities to serve, as well as new problems to solve, and that its proper development would mean a distinct public gain. And the use of the bus by the Kansas City Public Service shows Mr. Buffe meant what he said. His faith in railways never falters, however, evidenced by his letter to the editor of *ELECTRIC RAILWAY JOURNAL*, published in the issue of May 8, 1926, in the course of which, Mr. Buffe remarked "the very vital necessity of the street railway is the only thing that kept it alive during the period from 1915 to 1920. The industry simply had to carry on because its collapse would have meant disintegration of business values and paralysis of urban life."

It was because of his record of achievements in Kansas City since 1917, the year he became affiliated with the Kansas City Railways, that in the fall of 1926, when the receivership of these properties was terminated, Mr. Buffe, who served as general manager throughout the receivership, was elected vice-president in charge of operation of the newly-formed Kansas City Public Service Company.

Mr. Buffe was born in Illinois, went to college there, and received his early training under H. E. Chubbuck, then vice-president of the Illinois Traction System. His intensive training on that system in his early years gave him a large capacity for work, but this has never negated his desire for fun nor militated against his natural ability to fraternize broadly. Unless memory is at fault motor-boating was one outlet for his exuberance and those delectable days on board were lived also by the readers of the George Fitch tales of motor boating on the Mississippi.

Obituary

FRANK HENRY BROWN, of Pawtucket, R. I., superintendent of the northern division of the United Electric Railways, died on June 19. Mr. Brown had been employed in street railway work since he was nineteen years old, and had been 21 years with the United Electric Railways. He had worked for several years in Worcester, Mass., and in New Jersey. His superintendency at Pawtucket was later extended to Woonsocket and to Providence. Mr. Brown was born in Providence 57 years ago.

CHARLES A. WARNER, superintendent of track and overhead department of the Muskegon Traction & Lighting Company, Muskegon, Mich., died on May 18. He began working for the transportation company as a section hand in 1889, during the days of horse-car operation. In three years he won promotion to the position he held at the time of his death. He helped install the overhead system for electric operation of cars started in May, 1890. Mr. Warner was born on Dec. 18, 1861, in Sweden.

Manufactures and the Markets

Crouse Heads Electrical Manufacturers

Huntington B. Crouse, president of the Crouse-Hinds Company, Syracuse, N. Y., was elected president of the National Electrical Manufacturers' Association at its second Annual Meeting at Hot Springs, Va., on June 13, succeeding Gerard Swope, president of the General Electric Company, who retains membership on the board of governors and on the executive committee of the association. The following vice-presidents to head the various divisions were also elected: Apparatus division, N. A. Wolcott, Packard Electric Company; appliance division, M. C. Morrow, Westinghouse Electric & Manufacturing Company; policies division, Clarence L. Collens, Reliance Electric & Engineering Company; radio division, Louis B. F. Raycroft, Electric Storage Battery Company; supply division, W. E. Sprackling, president Tubular Woven Fabric Company, Pawtucket, R. I.

For a term of three years the following were selected to become members of the board of governors: H. B. Crouse, Crouse-Hinds Company, Syracuse, N. Y.; R. Edwards, Edwards & Company, New York City; A. L. Eustice, Economy Fuse & Manufacturing Company, Chicago, Ill.; Otto H. Falk, Allis-Chalmers Manufacturing Company, Milwaukee, Wis.; W. L. Jacoby, Kellogg Switchboard & Supply Company, Chicago, Ill.; J. F. Kerlin, National Carbon Company, Cleveland, Ohio; D. H. Murphy, Wiremold Company, Hartford, Conn.; R. J. Russell, Century Electric Company, St. Louis, Mo.; Frank E. Wolcott, Frank E. Wolcott Manufacturing Company, Hartford, Conn. For a term of one year to fill an unexpired term, I. A. Bennett of the National Metal Molding Company, Pittsburgh, was elected.

Economy Fuse Buys Federal National

Economy Fuse & Manufacturing Company has recently purchased the Federal National renewable fuse department, including all material, physical property, patents and good will of the Federal National renewable fuse from the Federal Electric Company of Chicago.

Slight modifications in the original design of the fusible element have been made with the result that the National renewable cartridge fuse is now listed as standard, in all capacities up to 600 amp., in both 250 and 600 volts, in the April, 1928, List of Inspected Electrical Appliances, under the label service form of supervision by the Underwriters' Laboratories.

T. D. Halliwell, formerly with the Brooklyn Rapid Transit Company and

later with the Westinghouse Electric & Manufacturing Company, is now with the Economy Fuse & Manufacturing Company, with the title of assistant to the president.

Conference Held on Handling Methods

A meeting of shippers, carriers, and warehousemen, held June 6, at the Department of Commerce, Washington, D. C., under the joint auspices of the Bureau of Foreign and Domestic Commerce and the Division of Simplified Practice, approved the proposed program covering simplified methods which

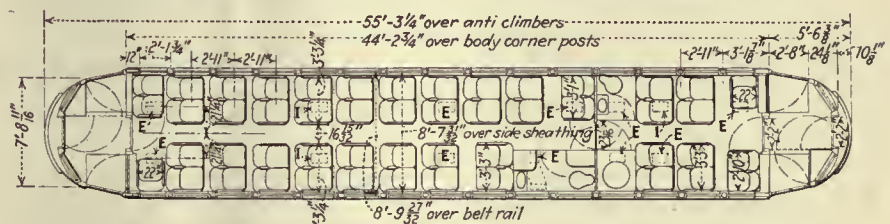
North Shore Cars Delivered

Fifteen interurban, two-man, motor, passenger cars have recently been delivered to the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., by the Pullman Car & Manufacturing Corporation, Chicago, Ill. The cars seat 50 passengers and are of the double-end double-truck type.

Each car weighs 105,000 lb., being 55 ft. 3 1/2 in. long and 9 ft. wide. They are of all-steel construction with arch roofs. One car is fitted with roller journal bearings. Each car is equipped with auxiliary battery lights for use when the power is off. Further details are given in the accompanying specifications.



One of fifteen interurban passenger cars built for the Chicago, North Shore & Milwaukee Railroad by the Pullman Car & Manufacturing Corporation



Floor plan of the New North Shore cars

Total weight.....	105,000 lb.	Hand brakes.....	Peacock, Blackall handle
Bolster centers.....	32 ft. 8 in.	Heat insulating material.....	Salamander
Length over all.....	55 ft. 3 1/2 in.	Heaters.....	Peter Smith hot water, Railway Utility Company electric
Length over body posts.....	44 ft. 2 1/2 in.	Headlights.....	Portable arc
Truck wheelbase.....	7 ft.	Headlining.....	7-in. steel
Width over all.....	9 ft.	Interior trim.....	Mahogany
Height, rail to trolley base.....	12 ft. 6 in.	Journal bearings.....	Fourteen plain, one Hyatt roller
Window post spacing.....	35 in.	Journal boxes.....	Symington
Body.....	All steel	Lamp fixtures.....	Adams & Westlake center lamps
Roof.....	Arch	Motors.....	Four Westinghouse 557-R 5, inside hung
Doors.....	End, swinging	Painting scheme.....	Orange and maroon
Air brakes.....	Westinghouse AMU	Roof material.....	Wood, canvas covered
Armature bearings.....	Plain	Sash fixtures.....	Adams & Westlake
Axles.....	Heat-treated, 5x9-in.	Seats.....	Hale & Kilburn No. 900
Car signal system.....	Adams & Westlake No. 25 bell	Seat spacing.....	35 in.
Compressors.....	Westinghouse DH-25	Seating material.....	L. E. Chase Byzantine plush
Conduit.....	Metal	Slack adjusters.....	Smith-Ward
Control.....	Westinghouse HLF	Steps.....	Stationary
Couplers.....	Ohio Brass, form 13	Step treads.....	Safkar
Curtain fixtures.....	Railway Curtain Co.	Trolley catchers.....	Knutson No. 5
Curtain material.....	Pantaosote	Trolley base.....	US 20-C
Destination signs.....	Hunter	Trolley shoes.....	Miller
Energy saving device.....	Economy meters	Trucks.....	Baldwin
Finish.....	Duoco	Ventilators.....	Railway Utility and Garland
Floor covering.....	Linoleum and rubber tile	Wheels.....	Rolled steel, 36 in. diameter
Gears and pinions.....	Nuttall B-P	Wheelguards.....	Wood
Glass, Plate, 1/4-in. in car body, 1/2-in. in front of motorman			

have been suggested for handling materials. The conference was called for the purpose of considering the use and extension through co-operative effort of simplified methods of handling, moving, loading and unloading goods; to promote the development of interchangeability in the equipment required for handling goods; and to promote the establishment of such dimensional standards as may be necessary to secure interchangeability of equipment.

Investigation of Unemployment Ordered

The Senate, just before adjournment, passed a bill requiring the committee on education and labor of the Senate, or a duly authorized sub-committee thereof, to make an investigation concerning the causes of unemployment and the relation to its relief through (1) the continuous collection and interpretation of adequate statistics of employment and unemployment; (2) the organization and extension of systems of public employment agencies, federal and state; (3) the establishment of systems of unemployment insurance or other unemployment reserve funds, federal, state or private; (4) the curtailing of production, consolidation, and economic reconstruction; (5) the planning of public works with regard to stabilization of employment; and (6) the feasibility of co-operation with the federal, state and private agencies with reference to the first three and last. The report of the committee is to be made to the Senate together with recommendations for legislation if such is deemed advisable, on or before Feb. 15, 1929.

Manganese Crossing Specifications Issued

Standard specifications for manganese crossings have been issued in booklet form by the Balkwill Manganese Crossing Company, Cleveland, Ohio. Aside from descriptive specifications of the crossings, recommendations are made for the particular type of crossings suitable for various uses, with full directions on how to specify.

Detailed drawings are given for angles from 90 deg to 60 deg. of a medium-duty type 40-bolt assembly; heavy-duty type 56, 64 and 72-bolt assemblies; extra-heavy-duty type 64 and 72-bolt assemblies; angles from 60 deg. to 50 deg. of heavy-duty type 56 and 64-bolt assemblies; angles from 50 deg. to 43 deg. of heavy-duty type 60 and 68-bolt assemblies and angles from 43 deg. to 35 deg. of heavy-duty type 62 and 70-bolt assemblies. Sectional drawings also show how modifications may be made to accommodate any kind of rail. Other plans show the 90 deg. and 65 deg. to 70 deg. heavy-duty type reclaimable crossings both assembled and disassembled, designs showing closure rails between crossings and suggestion for precast reinforced concrete foundation slabs.

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

	June 19, 1928
Metals—New York	
Copper, electrolytic, cents per lb.....	14.5375
Copper wire, cents per lb.....	16.625
Lead, cents per lb.....	6.30
Zinc, cents per lb.....	6.5
Tin, Straits, cents per lb.....	46.75
Bluminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	4.175
Somerset mine run, f.o.b. mines, net tons...	1.875
Pittsburgh mine run, Pittsburgh, net tons..	1.8
Franklin, Ill., screenings, Chicago, net tons	2.15
Central, Ill., screenings, Chicago, net tons..	1.55
Kansas screenings, Kansas City, net tons...	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	5.3
Weatherproof wire base, N. Y., cents per lb.	17.125
Cement, Chicago net price, without bags..	2.05
Linseed oil (5-bbl. lots) N. Y., cents per lb.	10.8
White lead in oil (100-lb. keg), N. Y., cents per lb.....	13.75
Turpentine (bbl. lots), N. Y., per gal.....	\$0.64

ROLLING STOCK

CHICAGO, SOUTH SHORE & SOUTH BEND RAILROAD, Michigan City, Ind., has been inquiring for ten motor cars with an option on five additional cars and five trailers.

CLEVELAND RAILWAY, Cleveland, Ohio, has purchased one urban type Twin Coach.

NORTHERN OHIO POWER & LIGHT COMPANY, Akron, Ohio, has purchased ten urban type and five parlor type Twin Coaches.

CINCINNATI STREET RAILWAY, Cincinnati Ohio has purchased eight urban type Twin Coaches.

COUNTY TRANSPORTATION COMPANY, a subsidiary of the New York, Westchester & Boston Railway Company, New York City, has accepted delivery of twelve Mack six-cylinder 29-passenger city type buses.

LORDSHIP RAILWAY, Bridgeport, Conn., has received a Mack four-cylinder chassis, 225-in. wheelbase coach.

BOSTON & MAINE RAILROAD, Boston, Mass., has accepted delivery of a Mack four-cylinder chassis, 230-in. wheelbase bus.

BOISE STREET CAR COMPANY, Boise, Idaho, has ordered two Mack four-cylinder 29-passenger city type buses.

WISCONSIN POWER & LIGHT COMPANY, Madison, Wis., placed an order for five 30-passenger A.C.F. street car coaches and later raised the order to a fleet of ten.

TRACK AND LINE

NOVA SCOTIA LIGHT & POWER COMPANY, Halifax, N. S., has been asked by the City Council to build a track extension on Quinpool Street.

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, Columbus, Ohio, will start track reconstruction work about July 1, on the High Street Union Station Viaduct and East and West Goodale Streets.

MANHATTAN & QUEENS TRACTION CORPORATION, New York, N. Y., has received through the Borough of Queens, a bid from McElroy & Kerwin, 316 Flatbush Avenue, Brooklyn, N. Y., to relocate its tracks on Queens Boulevard, from 55th Road to Quinten Street, for \$293,153. New track and poles will be required.

SPRINGFIELD STREET RAILWAY, Springfield, Mass., is installing new 6-in. 100-lb. T-rails on Hancock Street. As soon as the city completes its work on State Street the railway will start laying track. For this work 350 tons of new rail will be required.

BRITISH COLUMBIA ELECTRIC RAILWAY, Vancouver, British Columbia, is relaying a portion of its street car tracks on Douglas Street, Victoria. The old 70-lb. high T-rail is being replaced with 87-lb. rail of a similar type. The work includes the renewal of the special layout at the intersection of Fort and Douglas Streets. Concrete header construction is again being used.

PACIFIC ELECTRIC RAILWAY, Los Angeles, Cal., has placed orders with the Union Switch & Signal Company covering the necessary materials for the installation of automatic block signaling on the Vineyard to Sherman Junction, Rivas to Glendora, and Los Nogales to Rio Vista sections of its lines. These materials include 42 color light signals, 76 relays, 82 impedance bonds, and 37 switch indicators.

SHOPS AND BUILDINGS

EVANSVILLE & OHIO VALLEY RAILWAY, Rockport, Ind., freight and office buildings were damaged to the extent of several thousand dollars by fire which started in adjoining buildings.

SASKATOON MUNICIPAL RAILWAY, Saskatoon, Saskatchewan, has applied to the local board for approval of expenditures of \$20,000 on a carhouse extension.

GREAT NORTHERN RAILWAY, St. Paul, Minn., has awarded a contract to W. T. Butler, Seattle, Wash., for the construction of a shop at Wenatchee, Wash., for the repairing of electric locomotives.

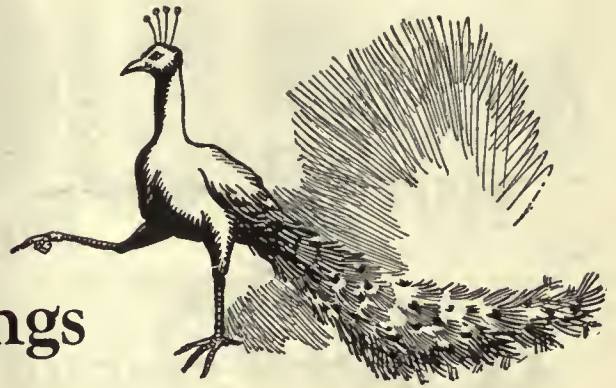
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY, Springfield, Ill., is planning an equipment storage and distributing plant to cost about \$55,000.

BRITISH COLUMBIA ELECTRIC RAILWAY, Vancouver, B. C., has let a contract for the first 20,000-kw. turbo-generator for its Vancouver plant.

ADVERTISING LITERATURE

CRESCENT REFRACTORIES COMPANY, Curwensville, Pa., has issued series No. 1 of its technical bulletin service, containing the first twenty bulletins, including charts, formulas and simple rules for use by persons interested in refractory linings.

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“Peacock”
Staffless

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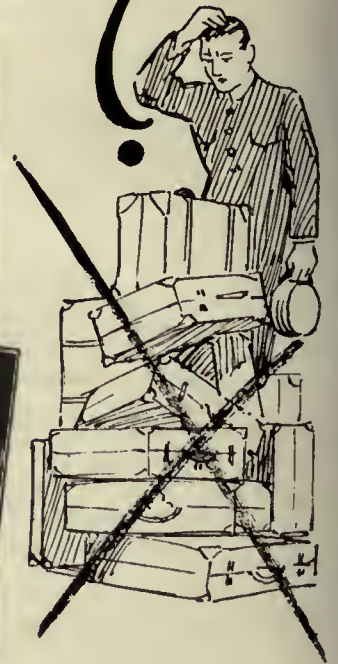
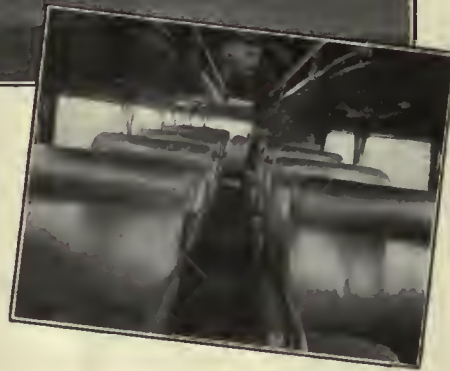
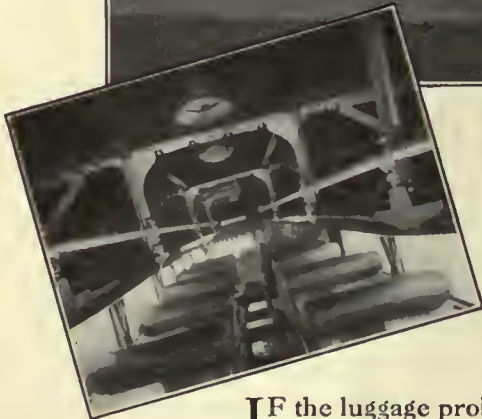
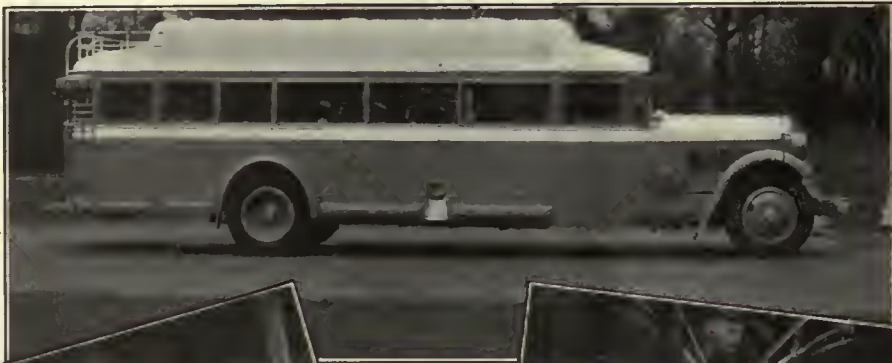
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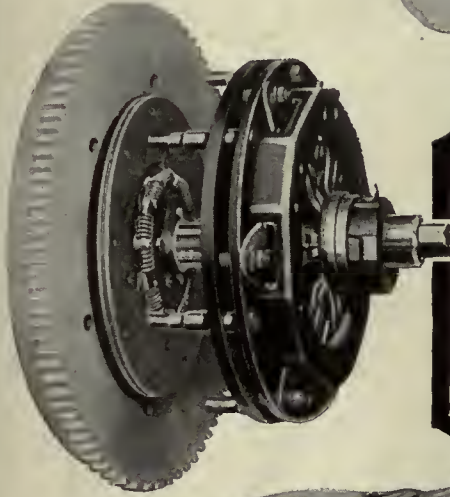
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Saginaw Street, Pontiac, Michigan. Note the heavy overhead corner loading which the Union Metal Poles ably support.

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Union Metal Fluted Steel Pole equipped with lighting units, traffic signal and trolley span wire support as used in Pontiac, Michigan.

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No. 8M5 Special



No. 8N5-B

Many electric railways have enthusiastically endorsed the three seats shown here. The 8M5 Special is a de luxe interurban type with spring-filled seats and backs.



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The 8N5-B has our new cut-in-back feature which provides more patron comfort, yet saves space. The 55-P Special is a deep, comfortable de luxe type, popular for bus use.

The Right Seat for Every Purpose!

THAT is what you can find in the Heywood-Wakefield line. It comprises every accepted type of car and bus seating — from the sturdy, serviceable, rattan type to the deep, luxurious interurban styles, similar to No. 55-P Special shown above. There are seats purposely designed to increase capacity by saving space, seats designed to assure individual comfort by means of divided backs, and seats that bring to the electric railway all the comfort of pullman service. Our new catalogue shows these seats and describes them in detail. We will be pleased to mail you a copy upon request.

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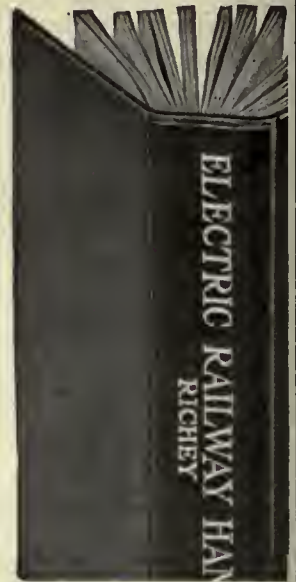
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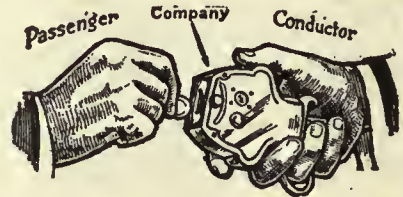
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- Sanders, Track**
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
Cincinnati Car Co.
- Sash, Metal Car Window**
Hale-Kilburn Co.
- Scrapers, Track (See Cleaners and Scrapers Track)**
- Screw Drivers, Rubber Insulated**
Elec. Service Supplies Co.
- Sealing Materials**
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.
- Seats, Bus**
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Hale-Kilburn Co.
Heywood-Wakefield Co.
- Seats, Car (See also Rattan)**
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- Second Hand Equipment**
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National Pneumatic Co.
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Standard Automatic Signal Corp.
- Signals, Indicating**
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- Signal Systems, Block**
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Nachod and United States Electric Signal Co.
- Signal Systems, Highway Crossing**
Nachod and United States Electric Signal Co.
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Differential Crane Car
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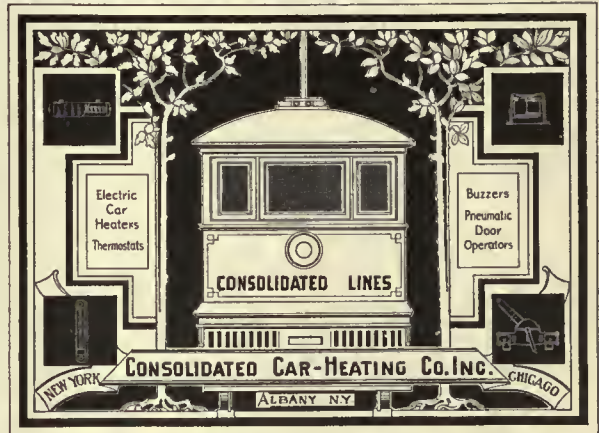
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ALPHABETICAL INDEX TO ADVERTISEMENTS

This index is published as a convenience to the reader. Every care is taken to make it accurate, but Electric Railway Journal assumes no responsibility for errors or omissions.

Table with columns for alphabetical sections (A through W) and corresponding company names and page numbers. Includes entries like American Brass Co., General Electric Co., and Westinghouse Electric Co.

WHAT AND WHERE TO BUY—Continued from page 36

Table listing various industrial products and their suppliers. Categories include Track Grinders, Trolley Wire, Welded Rail Joints, and Wire Rope, with suppliers like American Steel & Wire Co. and Westinghouse Electric Co.

Reversing Action a Factor In Brill Seat Success

Much of the success of Brill Car Seats is due to the positiveness of their reversing mechanism. In the first place, the two seat rockers supporting the cushion are of rolled steel T-section. This type of rocker gives added strength and has a tendency to reduce wear to a minimum. These T-section rockers are held firmly in place and move to the reverse position only with the action of the aisle and wall arms to one of which, on each side, they are directly connected by a cam and link arrangement.

To this direct connection, as well as the simplicity and durability of the mechanism, the positiveness and efficiency of the reversing action of Brill Car Seats is attributed.

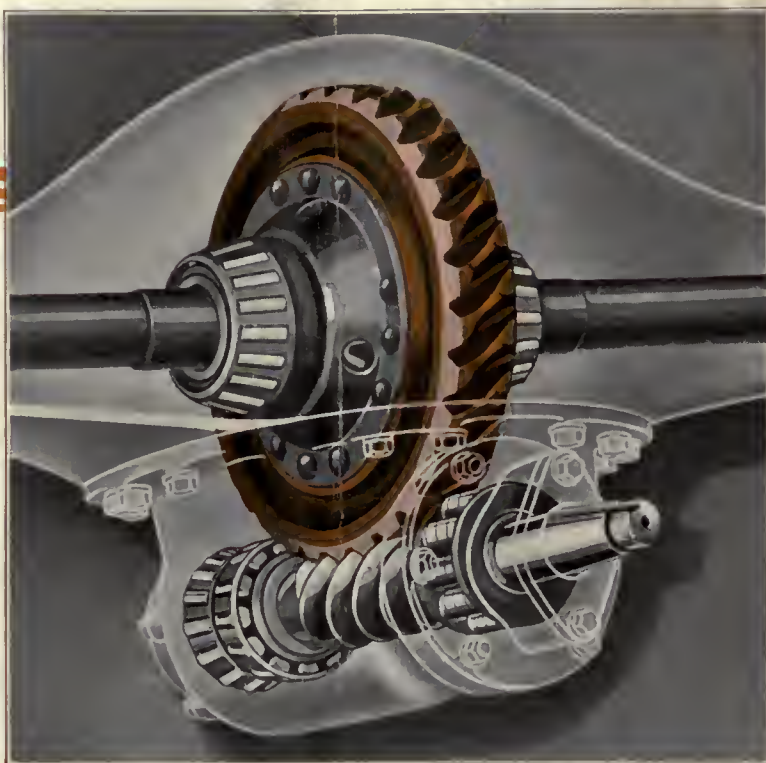
Specify Brill Seats—it pays.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WAGON MANFG CO.
ST. LOUIS, MO. — CLEVELAND, OHIO — SPRINGFIELD, MASS.



Brill Seats Build Transportation Sales



The ideal final drive—

To the patrons who ride in your motor coaches, Timken Worm Drive Axles mean strength, security, and the comfort of *silence*.

To you who operate motor coaches, Timken Worm Drive Axles mean long-life, dependability, easy accessibility, low operating costs.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN AXLES

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Publishing Company, Inc.

JUNE 30, 1928

Twenty Cents Per Copy



for Salt Lake City—

All the advantages of modern trolley cars, yet with greater flexibility—elimination of costly track expense—and low maintenance through patented structure.

VERSARE

ELECTRIC COACH

[TRACKLESS TROLLEY]

An electric car is no better than its gears!



The New W-N Drive

Just like the well-known chain and its weakest link, so are electric cars no stronger than their driving gears.

With this in mind, Nuttall engineers, in conjunction with Westinghouse, have designed the new W-N Drive, especially to withstand the wear and tear of electric traction use, and to make the gears as trouble-proof as possible.

To resist the constant wear of gear on pinion, heat treated hardened gears of helical design have been used. These are kept in alignment by an oil tight case of steel with Timken Roller bearings, and are immersed in a continuous bath of oil. This new improved gear drive permits the use of higher ratio of reduction and makes available the full efficiency of modern high-speed motors.

With this new drive cars can now be operated to maximum advantage and with least trouble, giving silent, swift and satisfactory service to the public, and giving the full benefits of that type of service through the profits that it brings.

All Nuttall Products are sold through the Westinghouse Electric & Mfg. Co., district offices: Refer your inquiries to the nearest Westinghouse Office.



Canadian Agents:

Lyman Tube & Supply Co., Montreal, Toronto and Vancouver

Westinghouse - Nuttall

Electric Railway Journal

CHARLES GORDON, Editor

Vol. 71, No. 26 Pages 1057-1096

June 30, 1928



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San Francisco Needs Street Traffic Control (First Article) 1060

Perhaps no city in this country has such an unusual street layout as San Francisco. To be sure, it has a serious traffic problem. To evolve suggestions to relieve the situation a traffic survey was made, with Dr. Miller McClintock as director. Every problem was studied and many helpful recommendations, based on data secured, were made.

Milwaukee Builds Practice Track and Road . . . 1065

No stone has been left unturned by the Milwaukee Electric Lines in providing for the proper instruction of its trainmen and bus drivers. With a private right-of-way and road to duplicate actual service conditions the operators are certain to become proficient before being assigned to regular runs.

Car Shop and Garage Is of Latest Design 1068

By C. J. PORTER

Just another car shop and garage? Decidedly, not! Its location, design, construction, equipment and utility all contribute to make this building another worthy product of this modernization era.

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Next Week—

Milan's Americanized Car



Prolong Service-Life with Varnish



Westinghouse Insulating Materials

- Treated Fabric Tapes
- Untreated Tapes
- Cord and Thread
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- Varnishes
- Paints
- Japans
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- Insulating Compounds
- Insulating Glue
- Transformer Oil
- Switch Oil

WHEN railway motors are dipped and baked in Westinghouse Varnish No. 335, their service-life is greatly prolonged. Varnish No. 335 is not only immune to oil and water, but it also protects the motor insulation against the effects of vibration and excessive heat. Furthermore, Westinghouse varnish does more than save the surface—it insulates. When specifying varnish for railway motors, consider first its ability to protect and to insulate. These factors are your assurances of long service-life.

Using Westinghouse Insulating Materials Is Like Owning a Million Dollar Laboratory

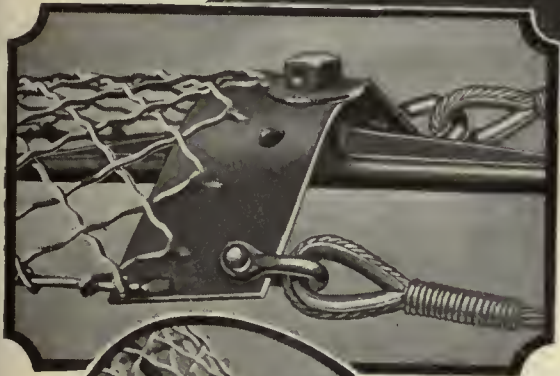
Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

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

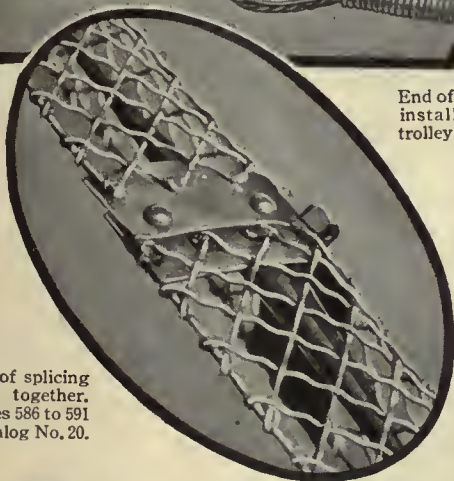


1928

Westinghouse



End of guard installed on trolley wire.



Method of splicing sections together. See pages 586 to 591 O-B Catalog No. 20.

Safe — and an Economic Necessity

THREE important factors have a decided influence on net profits. The first is savings from *Safety*. By protecting cars at railroad crossings, eliminating possible serious and costly accidents, O-B Trolley Guard plays a most important part in providing safety.

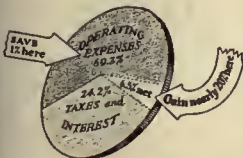
Service is the second factor. On it depends the good will of your patrons. O-B Trolley Guard prevents delays and saves time at crossings—making faster schedules possible and thus serving your riders better.

You *Save* money. One accident prevented by O-B Trolley Guard adds materially to the net. Faster schedules and elimination of delays reduce operating costs.

By its merit and service O-B Trolley Guard becomes an economic necessity. Low initial cost; handy ten-foot sections, factory formed ready to install, with yokes and plates attached; all go to make O-B Trolley Guard a sound "Dollars and Sense" investment.

Ohio Brass Company, Mansfield, Ohio
 Canadian Ohio Brass Co., Limited
 Niagara Falls, Canada
 890L

Good will, in which thousands of dollars are invested, is only maintained by better service, and by the adoption of modern devices for further bettering service. Increased patronage is very probable, when riders know of these improvements. O-B Trolley Guard, in addition to reducing operating expense and thus adding to the "net", is a safeguard of your investment in good will.



Ohio Brass Co.



NEW YORK CHICAGO
 PHILADELPHIA

PITTSBURGH ATLANTA
 ST. LOUIS SAN FRANCISCO

CLEVELAND
 LOS ANGELES

PORCELAIN
 INSULATORS
 LINE MATERIALS
 RAIL BONDS
 CAR EQUIPMENT
 MINING
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 VALVES



Increasing the Utility of Motor Transportation

Speedy highway transportation with the same degree of safety that the riding public has become accustomed to on railway vehicles attracts patronage.

Short, smooth stops, made without discomfort to patrons, permit higher schedule speeds and better running time.

Powerful retarding force, equalized to minimize skidding, easily controlled, and without driver fatigue, insures maximum safety under all road, traffic, and load conditions.

Automatic equalization of braking forces, combined with the absence of "brake riding" due to greater driver confidence, lengthens the life of linings and reduces frequency of adjustment, which results in a saving of material, labor and layover charges.

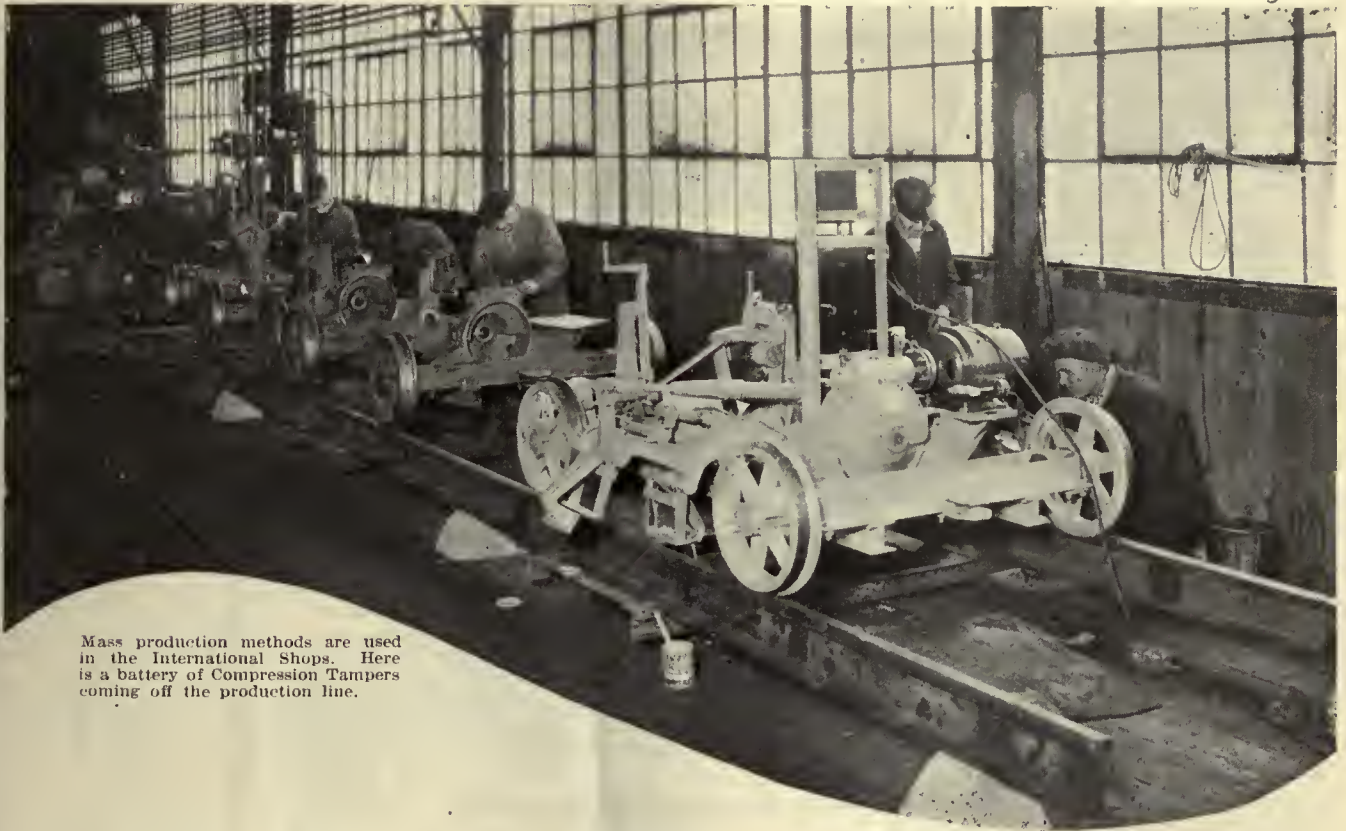
Westinghouse Air Brakes are increasing the utility of motorized transportation on many properties.

WESTINGHOUSE TRACTION BRAKE COMPANY

Automotive Brake Division - - - - - Wilmerding, Penna.



6225
WESTINGHOUSE
AUTOMOTIVE AIR BRAKES
WESTINGHOUSE



Mass production methods are used in the International Shops. Here is a battery of Compression Tampers coming off the production line.

This Is A Machine Age!

THAT'S not a startling head line—you knew it all the time. But are *you* taking full advantage of the *benefits* of machinery?

Take paved track construction. With a lot of shovels, picks, maul, crowbars, tongs and *strong backs* you can build paved track

OR

With a compression tamper and a tie layer and the power overhead, you can build paved track.

What's the difference?

Hand labor construction is less durable, takes more time to do and costs a great deal more.

But take the machine method, and Steel Twin Ties—better track at *less* cost every time.

Can you think of any reasons why you shouldn't use mass production methods and Steel Twin Ties?

Better let us quote you on delivered prices for third quarter delivery. (You can lease a tamping machine from us—we'll deliver it and call for it).

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

STEEL TWIN TIE TRACK

THE BASE OF MODERNIZATION

PROMPT SERVICE

PPROMPT shipment of quality Creosoted Pine Poles is an outstanding feature of *International* Service.

A large supply of poles ready for "Ship today" Service is carried in stock. Specially framed poles in any quantity, size or type of framing, can be obtained on short notice.

To facilitate the prompt shipment of such poles, *International* maintains a corps of expert framers to frame poles before treatment in exact accordance with any specification.

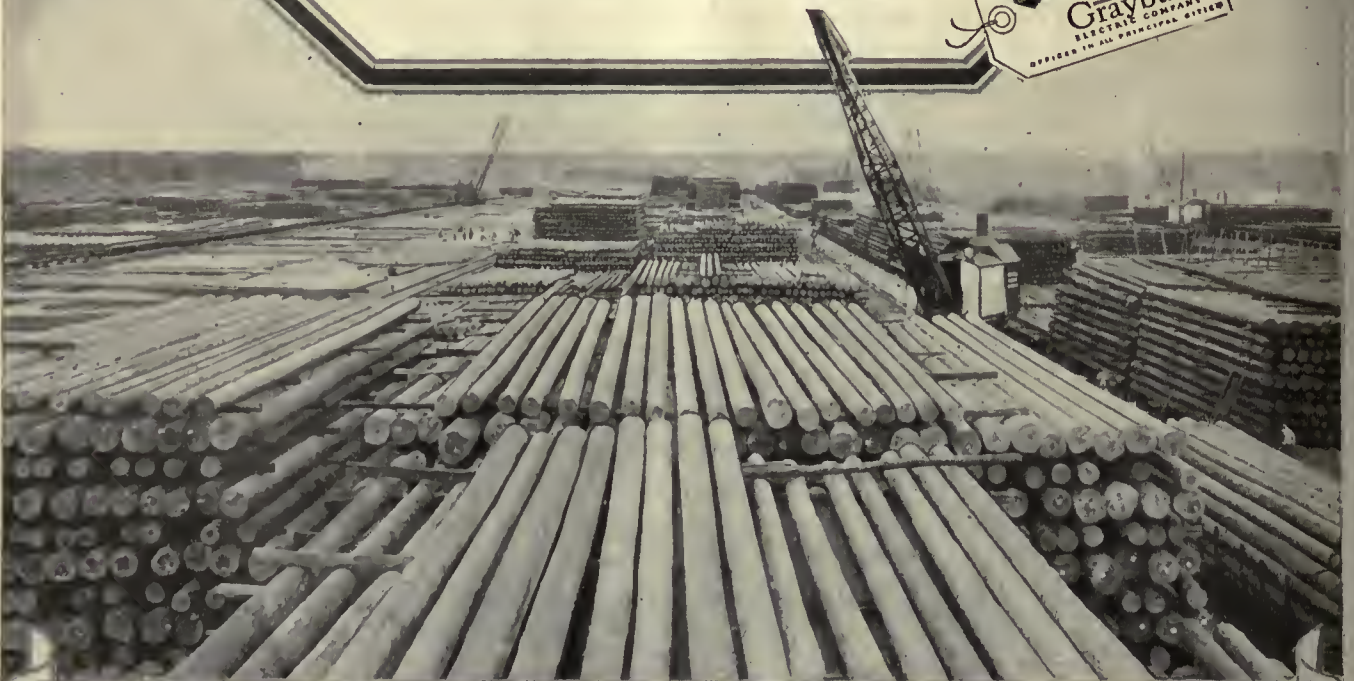
The Texarkana plant has two of the largest treating cylinders in the wood preserving industry. These cylinders together with extensive power equipment enable *International* to treat and handle efficiently and economically poles in large quantity and render a service that is unexcelled in the Creosoted Pine Pole Industry.

Illustration shows a section of the seasoning and framing yard at Texarkana which is tile drained and kept free from vegetation.

International Creosoting & Construction Co.

General Offices—Galveston, Texas

Plants: Texarkana Beaumont Galveston



International Creosoted Yellow Pine Poles

Golden Glow

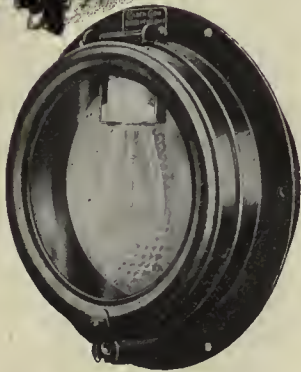


Safety !

Safety is the watchword of today's transportation needs. Accidents are dangerous, costly and a constant drain on resources. Safety pays dividends.

Good headlights provide this safety in night operation—while makeshift headlights or marker-lights are entirely inadequate in competition with the brilliant lighting of swiftly moving automobile traffic.

Let us tell you about Golden Glow Headlights fully described in our latest pamphlets. Send for copies today.



Type DG Golden Glow Headlight for city service. Being fitted with a Golden Glow prismatic reflector it illuminates a wide area adjacent to and for about 50 feet ahead of the car.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District Offices at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL





The Indication

an important feature of National Fare Registers

The public indication is one of the most important of the ten distinctive features of National Fare Registers. It shows the amount of each fare, the zone from and to and the kind of transaction. It is visible to other passengers in the car as well as to the passenger paying fare.

It makes inspection and checking easy and accurate because inspector gets complete information about each fare. Without this public indication there could not be complete protection for fares collected.

The National Fare Register has other distinctive features which have made it the choice of well-known electric railway operators. A ticket of convenient size printed and issued at the time the fare is recorded, shows zone from and to, amount of fare, date, operator's number and other information. A printed trip sheet locked inside the machine gives a consecutive record of each fare. A fast operating keyboard and electric motor insure quick loading.

Electric railway operators have found National Fare Registers a protection for receipts, a means of reducing operating costs and a method of speeding service that has never before been available.

There are 252 National Cash Register offices in the United States and Canada, each a service station for National Fare Registers. Our nearest representative will be glad to give complete information and demonstrate this new register.



The indication of the National Fare Register is visible to passengers in the car.




The National Fare Register is small and compact, easy to install and fast in operation. It is sturdy in construction and will stand up under hard usage.

National Fare Registers

Product of The National Cash Register Company

Dayton, Ohio

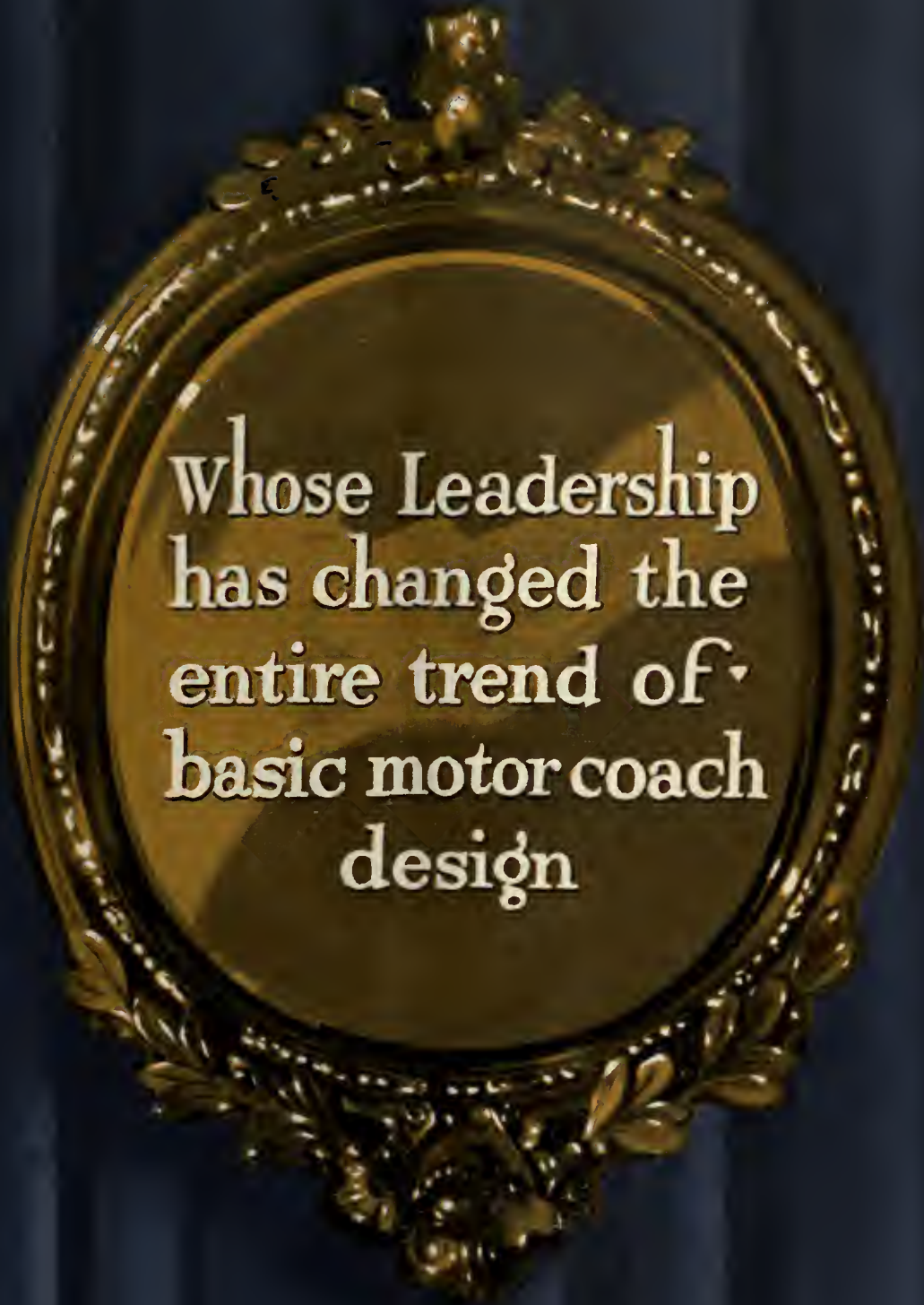


Commemorating
the First Year of
Twin Coach
HISTORY

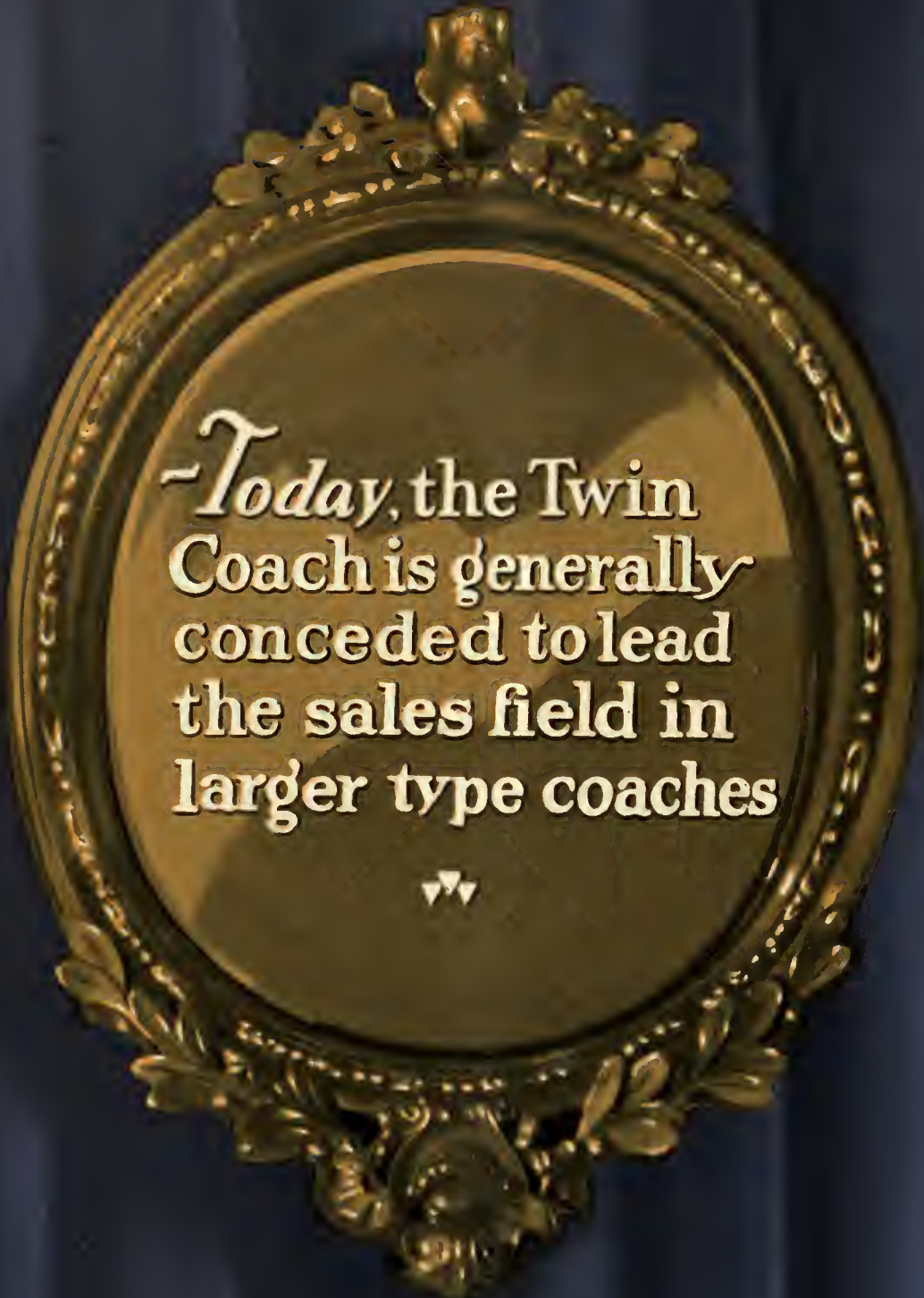




FRANK R. FAGEOLI

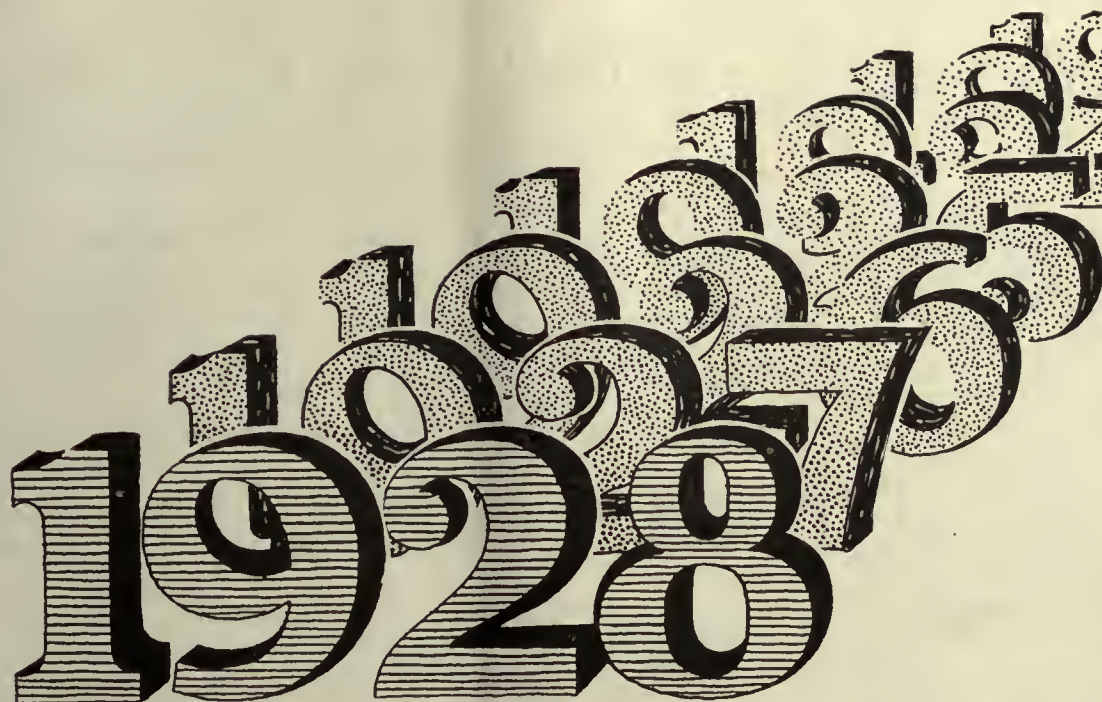


Whose Leadership
has changed the
entire trend of
basic motor coach
design



*-Today, the Twin
Coach is generally
conceded to lead
the sales field in
larger type coaches*





~ ~ ~ ~ Year by year the Electric Railway Industry is advancing. This advancement is due to the efforts of those in places of responsibility. It is their determination to keep abreast of the times and their desire to give the traveling public what it wants, that is bringing about this advancement. New and modern equipment, public relations, and a study of street transportation are important factors. Many of the leading operators have seen the advantages of treadle-ization and have adopted the NP Automatic Treadle.

TREADLE-IZE!

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works: Rahway, New Jersey

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MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

8

RAILWAY AGE

March 31, 1928

Brill Gas-Electric Creates Enthusiasm

Since December 1926, a Brill Model 250 Gas-Electric Car has been in the service of the East Broad Top Railroad & Coal Company. This car is operating 140 miles a day, six days a week, between Mt. Union and Robertsdale, Pa.

Every official of the company is enthusiastic over its performance and proud of the fact that operating costs have been reduced to such a degree

that very satisfactory profits are being obtained.

This particular car possesses the distinction of being the first Gas-Electric built for a narrow gauge railroad, so far as is known. It has demonstrated that it is economical and downright dependable.

Let us send you further information about this type of motive power.

AUTOMOTIVE CAR DIVISION
The J. G. Brill Company
Philadelphia, U. S. A.
Chicago Office: Railway Exchange Bldg.

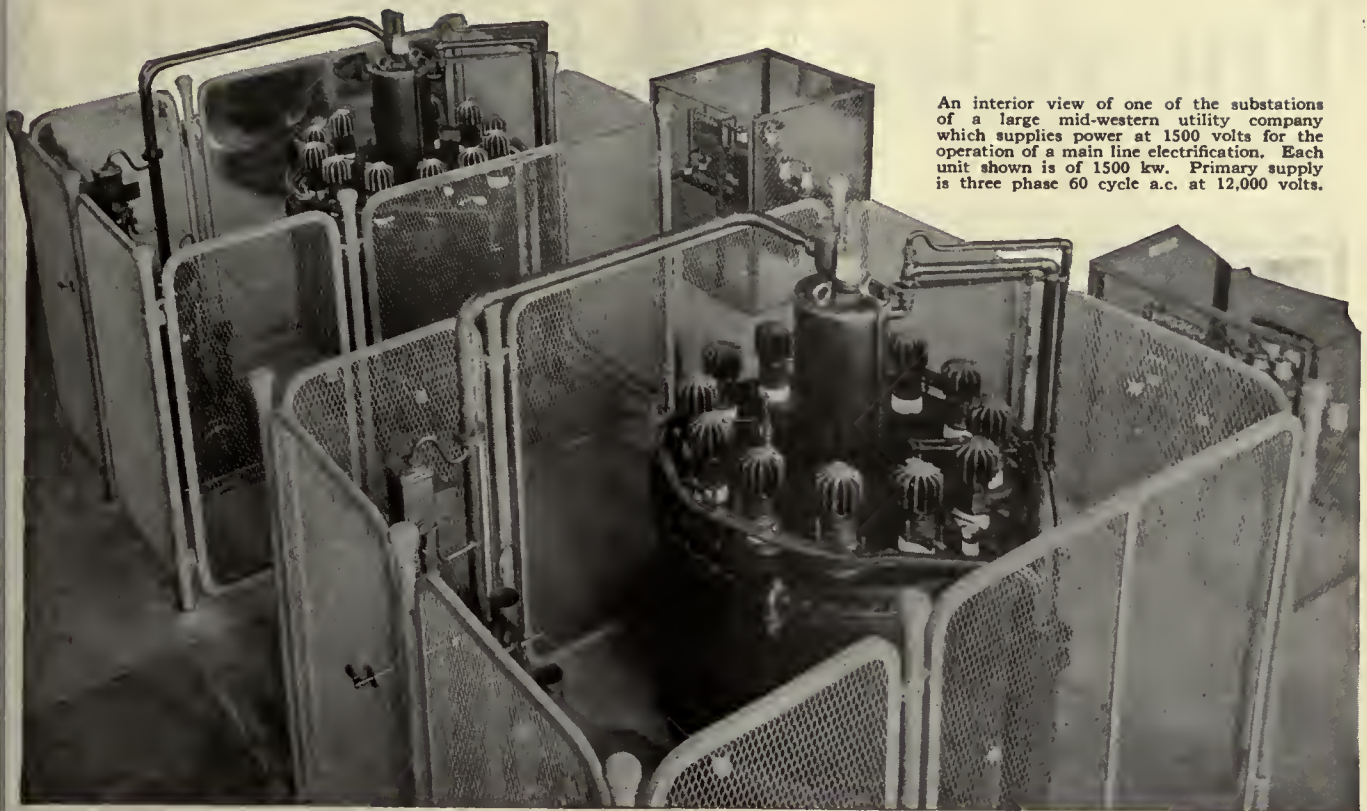


“Satisfactory
Profits
are
being
obtained”

It
has
Timken
Bearings

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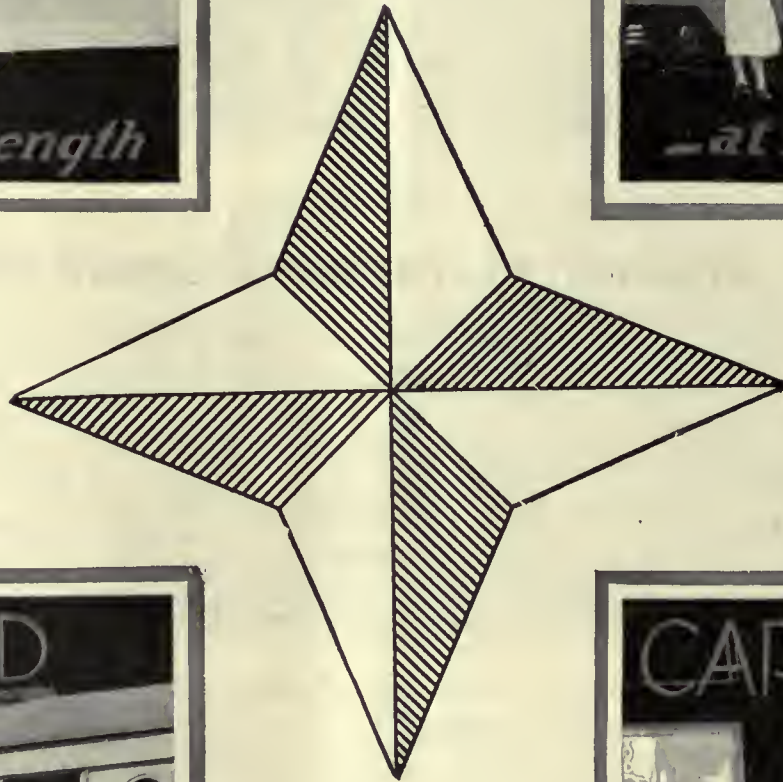
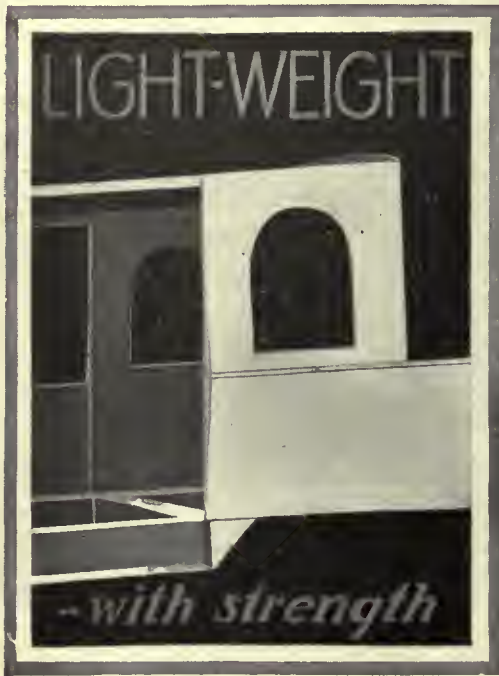
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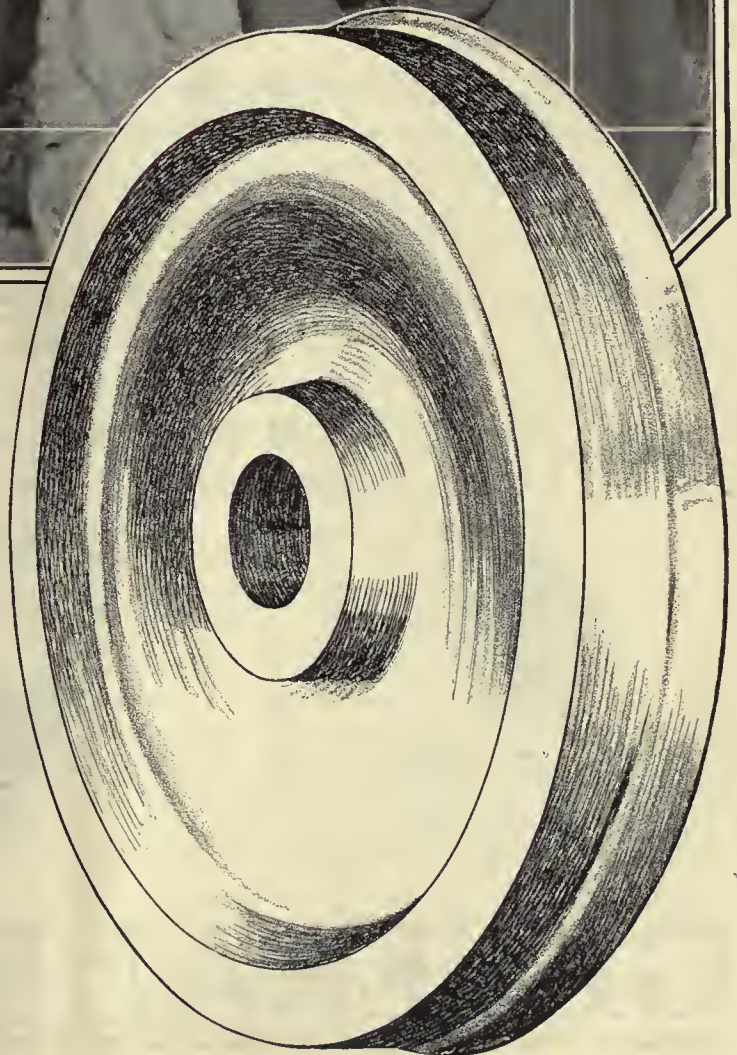


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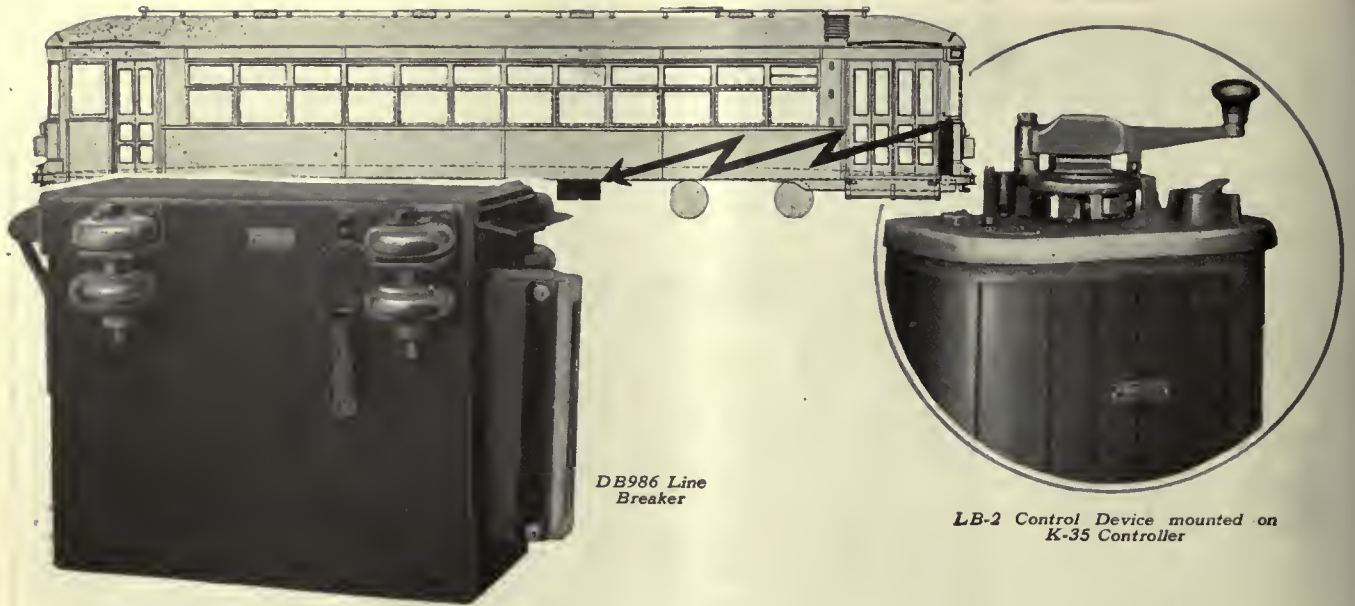
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The G-E Line Breaker and LB Control Device are typical examples of G-E developments produced primarily to protect and save equipment.



330-44

GENERAL ELECTRIC

Electric Railway Journal

McGraw-Hill Publishing Co., Inc.
JAMES H. MCGRAW, President

Consolidation of
Street Railway Journal and
Electric Railway Review

LOUIS F. STOLL, General Manager
CHARLES GORDON, Editor

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Number 26

Standing for True Business Statesmanship

EXTENSION of the McGraw-Hill publishing activities to every branch of American business is the most significant effect of the merger of the A. W. Shaw Company, of Chicago, and the McGraw-Hill Publishing Company, Inc., announced elsewhere in this issue.

Heretofore the magazine publishing activities of the McGraw-Hill organization have been confined to specialized service to major engineering industries and the trade channels for distributing their products. The book division of the organization, it is true, has long since broadened its scope; it publishes books not only on engineering, management and industrial subjects, but on general business and scientific agriculture.

Through the merger the McGraw-Hill institution now acquires a medium by which it can speak to the whole range of American business. *The Magazine of Business* has a circulation of more than 150,000 copies and deals with the problems fundamental to all business—such as those of finance, production, distribution and sales, management, transportation and export trade. It treats, as well, those major movements in legislation, such as taxation, tariff and government regulation, which bear upon business.

The importance of this new extension of the McGraw-Hill activities is apparent to all who have followed the standards which, under the leadership of James H. McGraw, have dominated its publications. To give, through effective organization, the best of which they are capable, is his constant admonition to the publishers and editors working under his direction. The new association of interests presages a virile development of an already effective service to the whole business structure of America.

Further, it is significant that in referring to *The Magazine of Business*, Mr. McGraw in his announcement of the merger closed with these words, "It will fight for the interests of business but it will place in an equally important position the responsibility of business to the public. It will, in a word, stand for true business statesmanship."

Past performance in McGraw-Hill papers is a warrant that this pledge will be fulfilled.

Attracting New Blood

"FOR long, long years he has labored to get his engineering degree," writes W. E. Wood, president Virginia Electric & Power Company, in the *Stone & Webster Journal*. Mr. Wood refers to the technical graduates of American universities, thousands of whom at this season step confidently from the class room and laboratory into the ranks of American industry. "Where shall he begin?" asks Mr. Wood. And then he gives the young man some timely and practical advice regarding those human factors in industry as important to success—if not more so—than is technical ability.

What of the part which industries themselves play in shaping the destiny of the young graduate? Choice of a position is the burning question in the young man's mind. Some electric railways have had notable success through placing young graduates in student training courses. As a rule, the plan of moving these men on into the operating departments when they have served their apprenticeship has not been worked out as completely as it should be. Other properties fail entirely to offer any inducement in the way of special training to the graduate.

Many large industrial corporations have recognized the need for organized effort to induct into their ranks the best of this annual crop of engineers who offer that youth and new blood without which any business quickly dries up. In attracting young technical graduates the industry is in competition with others that may seem to offer more to the young man. It has been in serious difficulty for many years, and still has many serious problems ahead. But in this situation lies the great opportunity for the graduate. He can be interested in the possibilities of the local transportation industry if the industry itself takes the initiative.

Enticing the Summer Traveler

JUST as banking houses have come to regard the small-salaried investor as desirable clientele, so of late years transportation experts and managers have been concentrating on tours, itineraries and rate schedules that will appeal to the modest wage-earner who each summer spends some portion of his savings on tours and trips. During this week the annual holiday trek gets under way, with millions of pleasure seekers bound for the beaches and mountains via boats, buses, trains and trolleys.

To induce as many of these prospective travelers to go by the railway's trolley, bus or tour, many companies have been offering special ticket and week-end rates. For instance, the Chicago, South Shore & South Bend has offered a three-day limit \$2 excursion ticket to the Dunes on the shore of Lake Michigan with a glimpse of Chicago 30 miles away. Other companies, including the Philadelphia Rapid Transit Company, Kentucky Carriers, and the Public Service Co-ordinated Transport of New Jersey, have advertised special bus trips for excursionists and week-enders. One continued attraction for summer outings will be the Sunday \$1 pass. The opportunities for education and recreation through this latter means of travel was told recently by a writer in the *Los Angeles Times* who, short of funds, was entertaining a friend from New York. They traveled on the Pacific Electric Railway on the \$1 Sunday pass, and the recital of the places they saw and the territory covered read like a real adventure story. He said that if it weren't for the tourists, one might never discover the possibilities of one's own surroundings.

Railway managements, if they have not already done so, should take stock at once of the particular opportunities on their own lines to sell rides in the good old sum-

merit. Nature lovers, hikers, campers, bathing beauties—all are part of the caravan moving from the cities and towns on picnics, sightseeing parties and just-out-in-the-open revels. Cheaper rates and good accommodations will attract them. But railways must do more than just run vehicles. They must oblige their patrons with countless extra services. For example, tickets could be on sale at local stores and perhaps a guide might accompany a sightseeing trip. All such extra services will please the rider who has mapped out his time, and will encourage the vacationist who is uncertain where and how to go.

If transportation companies were only to do what was expected of them—carrying passengers hither and yon—they would transport only those business bound. The desired patronage that will round out the service is from the rider who wants to travel for pleasure, for rest or on educational pursuits. By and large, the public has developed a habit of travel. As a transportation and travel agency, the electric railway must consider the small tourist who in at least one season of the year is mentally and physically in tune with the world, is fairly amenable to suggestions and quick to react to bigger and better opportunities for becoming travel-wise.

Galvanized Buckets and the Man

MOST any man will do to fill a job, but to select a galvanized bucket—well, that requires considerable thought and careful inspection. With such comparison one of the flaws in electric railway management is brought to light by Dr. C. P. Segard, of the Third Avenue Railway, speaking at the recent meeting of the New York State Electric Railway Association. His complaint is that man power has been subordinated to mechanical power—that more attention has been given to equipment and operation than to the human element, which is indispensable no matter what type and kind of equipment are in use. He is at a loss to understand why, if the street railways pay out of their incomes approximately 50 per cent in wages, that in itself is not indication enough of the importance of man power in their business.

Mr. Segard's point is well taken. Some time ago before useful discoveries were made in the field of medicine, psychology and sociology, the man at work presented no special problem. He just came, was assigned a task and if he didn't measure up to the standard, assuming there was one, he was automatically dropped to become driftwood—a burden to himself and a liability to the community. Latter-day wisdom discovered many men inefficient in one branch of activity, with possibilities for fair success in another. Gradually time and effort were concentrated on studying the individual employee so as to know his endowments and proclivities. Then he was placed where he could employ his own particular talents to best advantage, become a contented worker, and give to his particular industry something of himself that would make both him and the business grow.

Here and there railway managements have adopted this modern point of view. They have resorted to psychological tests, studied the research available, employed medical assistance and insisted on intensive training in their quest for employees physically and mentally qualified for specific jobs. There is a definite obligation on the part of business to cut down the number of misfits by a study of their employees' aptitudes and abilities. Progressive railway organizations are giving attention, as never before, to the importance of the human element in maintaining and selling a public service.

Many "Ifs" in the St. Louis Finding

JUSTICE in part finally has been done the St. Louis Public Service Company, successor to the United Railways, in the fare and valuation decision rendered by the Missouri Public Service Commission. In the matter of fares, the rates effective on July 1 have been fixed at 8 cents flat, with a 4-cent fare for children, contrasted with the present rate of 8 cents cash or two tokens for 15 cents for adults, and 3 cents for children. The new rate is substantially the request of the predecessor company made a year ago. In the matter of the valuation the figure fixed by the commission is \$66,000,000. This contrasts with a sum of \$75,000,000 set up by the company and the tentative figure of \$52,000,000 fixed some time ago by the commission and apparently the sum on which calculations by the state body have heretofore been made. The valuation question has been a matter of controversy since before the receivership in the year 1919. To that subject alone eight pages are devoted in the final report of the receiver to the court, rendered only a few months ago as the concluding word of his stewardship.

During the almost nine years of the receivership, \$1,500,000 a year was charged to depreciation reserves. This sum it was sought to continue as a yearly charge. The city contended that \$1,000,000 a year was sufficient. The commission decided that \$800,000 a year was enough. This is only 1.2 per cent on the valuation found by the commission. The justification for its ruling in this particular is found by the commission in the facts covering past expenditures, the present large reserves, and the good physical condition of the property at this time. This, of course, is a back-handed compliment, but it remains to be seen whether the sum now set up is sufficient to preserve that excellent condition. Under this plan the difference of \$700,000 between the two sums becomes available, other things being equal, as net return, but other things may not remain equal.

It is the old two-edged sword again. The commission's estimate of the probable number of riders may or may not prove to be correct, but it is much to the company's credit that despite the decreasing number of riders carried the railway was able to keep its expenses at a constant during 1925, 1926 and 1927. Among the other interesting comments by the commission is that in its opinion stress should not be put on either original or reproduction costs of the property. The state body said that its desire was to give the company a return as nearly just as possible and still keep its customers.

This is a nice point, and one with which the company may find itself able to conform, but only because of the recent drastic reorganization as a result of which there are now outstanding only \$46,457,458 of bonds and preferred stock. But there are a lot of "ifs" in the situation. If the commission's estimate of future earnings proves to be substantially correct; if its estimate of possible future passenger trends is correct; if its depreciation allowance proves to be all that is really needed to keep the property up to its present standard, and if the wage question now up for adjudication can be settled without imposing any additional or substantial burdens upon the company, matters may right themselves. These are only some of the uncertainties. So far as the new company is concerned it has been functioning only since Dec. 1, 1927, but in that time it has given ample evidence that it is keenly aware of its obligations to the public.

Meeting the Need for Employee Training

MORE and more, transportation executives are realizing the need for intensive training of all employees who must perform tasks that require the exercise of individual skill or judgment. While this may be considered to include practically every person working for the property, those who are engaged in the operation of vehicles naturally need the most attention prior to assuming their regular duties on car or bus.

Closely coupled with this training is the selection of the men. It has been demonstrated on many properties that tests can be developed which will enable the examiner to determine with small chance for error whether an applicant has the mental acuteness and physical skill that work of this sort demands. After ascertaining in this manner that the applicant is fairly certain to become fitted for the task, the work of training can be planned accordingly.

This is what has been done by the personnel department of the Milwaukee Electric Railway & Light Company. Methods that are in use for the selection of men, which have been described previously in this paper, have been planned to weed out the unfit before, rather than after, the period of training. This has made it possible to concentrate on those applicants who have been accepted, with the knowledge that few of them will fail to qualify. In developing this idea further, a track and road have been constructed where the men are actually given instruction in their work on car or bus away from the main lines of traffic. An article in this issue tells of the equipment and methods in use. After such instruction the period of probation on the road can be shortened.

The important difference between this and the older methods of employment and instruction is that the entire plan is worked out as a whole, and the steps are arranged to fit into their places in a well-organized scheme. In this respect it constitutes a definite recognition of the returns which have been obtained from the earlier training work of the same company, which necessarily was carried along in abbreviated form but which was planned along the same lines as those now in use.

Creating Modern Standards

COMPETITION and change go hand in hand. An industry pressed to maintain its supremacy must take radical steps to keep pace. An outstanding example of this is the discontinuance of the Model T Ford automobile. The Ford Motor Company realized that the public was demanding more in the way of speed and appearance and, therefore, rearranged its entire plant to bring out a new model.

In most industries it is becoming more and more a survival of the fittest. As E. J. McIlraith stated it before the recent convention of the Canadian Electric Railway Association, "only the active, aggressive and progressive will survive."

While public transportation companies are being pressed relentlessly to make changes they must realize that it is necessary to create new standards along modern lines, rather than allow the development to become haphazard and disorganized. Accordingly there must be a readjustment in the thinking. True, many competent minds have been determining the ultimate development of the industry, but no general conception of its future has been seen by the industry. New ideas are being developed on many properties. It is the joint work of

these contributors that eventually will raise the electric railway to the plane where it belongs.

Although much progress has been made in the several fields there still are numerous possibilities in every single one. In his paper Mr. McIlraith listed fourteen items "to serve as a foundation" in developing new ideas. Among these were traffic regulation and improvements of street use, reducing plain wastage in operations, building more comfortable and attractive cars, scheduling service suited to the various districts served, using properly the possible auxiliary equipment, active and effective supervision of the operations to insure performance of the standard sets, and planning for better and bigger city growth.

Each of the subjects named invites research. Not one has been developed to any degree of completion and all are fraught with possibilities. To these fourteen items might be added many others.

Readjustment and modernization in the electric railway industry and the development of new ideas is the answer to the question, "What can be done to create modern standards?"

Face to Face With Facts in Detroit

IN HIS report on the operations of the Detroit Municipal Railway, Ralph Stone appears to have settled the question of the future of the road in its effort to liquidate the cost of the system out of earnings. He says it cannot be done unless fares are advanced. That, of course, is a direction in which the system has been heading for some time. Another thing, Mr. Stone has made plain the reason for the so-called discrepancy of \$1,000,000 between the figures of the system as presented by outside auditors and the returns made by the system's own auditor. The \$1,000,000 is a tangible sum only in so far as it represents honest differences of opinion between two accounting schools. Mr. Stone has thrown the weight of his opinion in with the more conservative of the two declarations. In other words, he favors the Price, Waterhouse method as indicating conditions accurately. It is a nice point for the accounting technician to debate, the one that Mr. Hauser made to the effect that "it is impossible to pay for two plants at the same time, and that is in effect what is being done when depreciation and sinking funds are both established."

But Mr. Stone sees a legal point involved. He wants the Corporation Counsel to pass upon the matter of the interpretation of Section 14 of the City Charter. He even goes a bit further than was expected. His main finding was that unless the annual debt maturities can be met by rearrangement an increased fare will be needed to comply with the spirit of the city charter, if not the letter of that document. This he supplements with the statement that it is not possible to say that an adjustment of the existing rates of fare could be avoided by a rearrangement of the debt maturities.

Mr. Stone's is a carefully worded document, but for all that it reflects the impression long felt in quarters outside of official Detroit Department circles that an advance in fares is inescapable. The problem in all its details is too complicated for an analysis in a discussion of this kind, but the reports of operation from month to month have for some time pointed in the direction of an increase in fares. The political consequences of such a step would of course not rest lightly on those responsible for taking it, but it is to be hoped that the issue, if it is the real issue which Mr. Stone's report indicates, will be met on an economic rather than a political basis.

San Francisco Needs Street Traffic Control

Extensive survey directed by Dr. Miller McClintock reveals street traffic problems caused by unusual physical layout of the city. Report condemns jitneys and makes suggestions on electric railway service

FIRST ARTICLE



San Francisco's area of traffic concentration

SAN FRANCISCO, because of its topography and resulting unusual street layout, has developed many difficult problems. "In the hope of evolving constructive suggestions and thus bringing about improved street traffic control in San Francisco," Mayor James Rolph, Jr., appointed the San Francisco Traffic Survey Committee. This committee of 22 men from several companies, associations and clubs, organized an advisory council of 64, in which 21 associations were represented. Many business interests gave their financial support to the project and constructive co-operation was given

The large building in the foreground is the terminal for the ferries from the cities on the eastern side of the bay, like Oakland, Berkeley, etc. The broad highway leading from this terminal is Market Street, 120 ft. wide between property lines. In this part of Market Street there are four electric railway tracks, two belonging to the Municipal Railway and two to the Market Street Railway. This photograph is copyrighted by G. E. Russell, San Francisco.

formulated after a year of intensive investigation. Since the object of the study was to secure maximum fluidity of traffic by means of regulatory and minor physical improvements, and hence at a minimum cost, an exhaustive

by public officials and the press.

Dr. Miller McClintock, director of the Albert Russel Erskine Bureau for Street Traffic Research in Harvard University, was engaged to organize and conduct a comprehensive engineering survey. Theodore M. Matson was appointed chief engineer and the services of four others secured for the technical staff.

The conclusions in the report were

survey was made of the existing street facilities. Comprehensive and detailed recommendations for a system of street traffic control and proposals for administrative organization and methods to meet the problems of the future were based on the facts of street traffic conditions.

MUCH TRAFFIC DATA COLLECTED

The survey was designed to include a study of the principal factors which affect the use of the street. An intensive check of traffic flow, volume, speed, concentration, and other important elements was first conducted to obtain correct conclusions as to the conditions which have led to congestion and accidents. The analysis of the collected data with respect to the economic wastes and accident hazards involved in street traffic, constituted the second step. With the foundation thus established, there followed a consideration of the ways and means of giving relief through regulation of street use and through minor physical improvements. Lastly, attention was given to the problems of city administration in connection with traffic matters, the formulation of a new and comprehensive traffic ordinance, and the requirements for a suitable and effective enforcement of traffic regulations through the functioning of public officials and police courts.

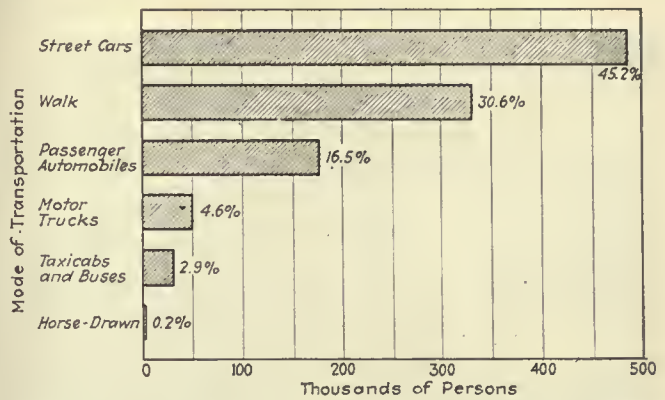
Attention was directed primarily to the area within the corporate limits of San Francisco. For the study two natural divisions were made in this area. First and most important was the central business district, along with the area immediately surrounding it. The second division included the remainder of the city, special attention being given to the principal streets leading from the residential portion of the city to the central business district.

RECOMMENDATIONS COVER ALL PHASES OF STREET TRAFFIC CONTROL

The report deals exclusively with the problems of traffic control, that is, the safest and most convenient utilization of existing street facilities to a more orderly movement of traffic. The recommendations made by the survey committee fall into several well-defined classes: first, installation and use of various safety and regulatory devices; second, enforcement of law through the police department; third, punishment of violators; fourth, administrative organization for a more systematic handling of future traffic problems; and fifth, a specific and balanced system of traffic regulations.

The report recommends that traffic direction signs be erected immediately to cover all the provisions for which signs are required in the proposed ordinance, that the enforcement of sections requiring signs be dependent upon their actual erection and that fuller use be made of paint markings for the indication of crosswalks, greater visibility of safety zones, and more accurate alignment of traffic.

For the system of control designed for Market Street it recommends that three-light electric signals be utilized, also that this type of signal be substituted gradually for existing types for general control of traffic throughout the city; and the present type of signal eventually be utilized exclusively for



Distribution by various means of transport of 1,073,963 persons entering and leaving the central business district of San Francisco on a typical week day in November, 1926

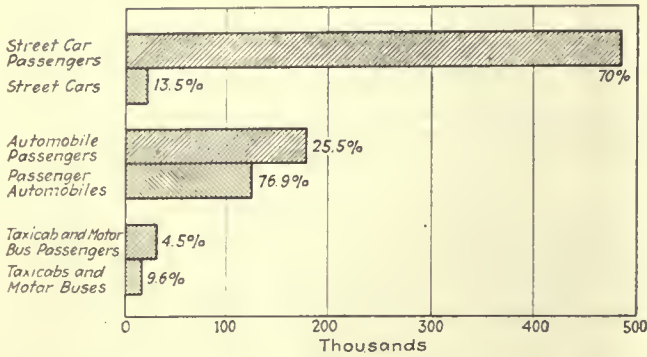
pedestrian control requirements on Market Street. A complete program of traffic signal installations is proposed in the report and the order in which they should be installed is given.

The report recommends that the personnel in the traffic division of the police department be increased in the near future to 125 officers. Inasmuch as special aptitude and training are required for effective traffic service, it also advises that the personnel for enlargement and replacement be drafted from young men who are applicants for the police department. A traffic school is proposed for the instruction of new men, the maintenance of high standards among the men already employed in the division, and for the general education of all police officers in the city in traffic control methods. Provision should be made, according to the report, for the investigation of all traffic accidents involving serious personal injury and for reports of all traffic accidents upon forms as recommended.

A more systematic enforcement of penalties against traffic violators through the establishment of a traffic fines bureau, is suggested as a substitute for the present method of citation for appearance at traffic police headquarters. Minor violators should be required to appear at the proposed traffic fines bureau, and pays penalties subject to a schedule of fines to be established by the judges of the police courts. Also, records should be



Relative vehicular traffic load on principal traffic arteries of San Francisco, based on an eight-hour count, from 8 a.m. to 12 noon, and from 2 p.m. to 6 p.m., September, October and November, 1926



Distribution by various modes of street transportation of 693,384 passengers and 160,674 transportation units, entering and leaving the central business district between 6 a.m. and 8 p.m. on a typical week day in November, 1926

kept in order that persistent violators may be classified and properly penalized.

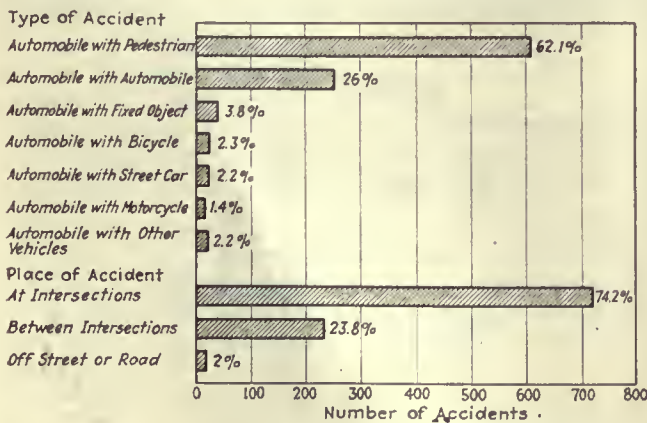
The survey recommends that a division of street traffic engineering be established in the bureau of engineering in the Department of Public Works, this division to consist of a traffic engineer and a technical staff. Its duties would be to study all traffic accidents and other conditions affecting the safe and orderly use of the public streets; to serve as the agency for application of the administrative provisions of the traffic ordinance, and to supervise the location, erection and maintenance of all physical control devices recommended in the report and required by the ordinance. The specific recommendations included in the report will be presented in the following paragraphs.

CORDON COUNT SHOWS HEAVY TRAVEL IN BUSINESS DISTRICT

Many detailed studies regarding volume, flow, and other general characteristics of the street traffic were made. On a typical day there was a total movement in eleven hours of 24,579 vehicles and 156,167 passengers. Ferry passengers make up 107,905 of the latter group.

A study of 183 intersections along the major routes of travel was made to determine the amount of traffic on and across the principal arteries. With the data obtained, a graphic chart was designed showing the relative vehicular traffic flow on the principal streets of the city. The concentration of traffic on certain routes is clearly revealed on the map.

To ascertain the degree of concentration of traffic within the downtown business district the survey under-



Analysis of motor vehicle accidents involving personal injury in San Francisco for the months of November and December, 1926, and January, 1927

took, through the co-operation of the two street railways, a cordon count of the central business district for a typical week-day. The study gives the amount of all types of traffic movement, whether inbound or outbound, and shows not only the number of each type of vehicle but also the number of persons and their modes of transportation.

During the fourteen-hour period from 6 a.m. to 8 p.m. it was found that 744,667 passengers in all types of vehicles entered or left the central business district. Besides these were 329,296 pedestrians, making a total movement of 1,073,963 persons. The total number of vehicles was 203,641. Of the total of 1,073,963 persons, 45.2 per cent used street cars, 30.6 per cent walked, 16.5 per cent employed passenger autos, 4.6 per cent were on motor trucks, 2.9 per cent rode in taxicabs or buses and 0.2 per cent were in horse-drawn vehicles. Of the total of 203,641 vehicles, 60.7 per cent were passenger automobiles, 20.2 per cent trucks, 10.6 per cent street cars, 7.6 per cent taxis and buses and 0.9 per cent horse-drawn vehicles.

On the assumption that all who enter the central district leave it during the day, its average daily population is indicated to be 536,981 persons; that is to say, the equivalent of about 85.5 per cent of the population of the city proper passes through the central business district during each week-day, between the hours of 6 a.m. and 8 p.m.

In addition to the study of volume concentration of traffic in the central business district and vicinity, an analysis of the speed of flow was made. Observations were made by traversing each street in a motor car at different times of the day. The study reveals that the average speed of vehicles within the district studied is 10.13 m.p.h. It shows further that 12.3 per cent of the time required to traverse a street is lost by actual stops, and that the average running speed, that is, average speed attained while in motion, amounts to 11.55 m.p.h. The values are for street lengths and would be much lower if only for the central business district.

The physical condition of San Francisco complicates street traffic problems. Because the hills are steep and the areas reached by them not readily accessible, the growth of the city has been forced to concentrate into the lower and more level areas. This concentrates the traffic flow to fewer arteries of travel and reduces the available street area. The steep street grades are a serious accident menace. More than 35 per cent of the total street mileage of San Francisco is at grades exceeding 5 per cent. The lack of street area and the street design are other factors which have contributed to much traffic congestion within the city.

STREET CARS AFFECTED BY STREET LAYOUT

The unique street layout of San Francisco, with a lack of arteries paralleling Market Street on the north side and the peculiar pattern by which all streets of the "western addition" branch from Market Street make acute and obtuse angles, has produced a great amount of street car congestion on Market Street. The concentration of street cars on Market Street is principally due to the inherent defects of the city plan. Yet, the duplication of service for the entire length of the street by the Municipal Railway and the Market Street Railway, and the excessive frequency of service resulting from the competition of these two systems have caused a large yearly loss to both railways. They have also materially restricted the growth of local merchandising in

other business activities, because of the congested area and street hazards. Commenting on jitney service the report says:

"In addition to the excessive rail transportation facilities on Market Street, there is a duplication of service in jitney operation. Jitney service is absolutely unwarranted. They not only add to congestion by loading and unloading in the one traffic lane left for motor vehicles, but their practice is hazardous to their own patrons as well as to the patrons of the rail lines. Moreover, the jitneys operate only during the rush hours, taking the 'cream' of the business from the street railways which furnish the public with consistent, reliable service."

Street car movement was studied in conjunction with other vehicular traffic, so that a properly balanced system of regulation and control might be set up. While it was found that as a rule regulations which are really beneficial to motor vehicle traffic are equally helpful in expediting rail movement, certain intersections demanded special study and special regulation to improve the traffic stream as a whole. In arriving at the control measures outlined for several important intersections, certain car stops were eliminated because of their effect in preventing reasonable speed. A number of mid-block crossings were also eliminated because they delay many while accommodating only a few. As a rule, it was concluded that a reduction of one stop per mile results in an increase in speed of about 6 per cent.

The far-side stop on the north side of Market Street should be eliminated at all points, the report states. The obstruction caused to traffic flow by these stops is very serious. Other changes recommended in car-operating practice included abolition of the "dead-ending" of street cars from intersecting streets on Market Street and the standing of cars there to maintain a definite schedule. The schedule could be adjusted better at some other point on the line, if necessary. The report also



This practice of reversing cars on a turntable on one of the side streets debouching into Market Street blocks traffic

says that left-hand turns of trolley cars into Market Street from such streets as Geary and Sutter Streets are the source of considerable delay in trolley speed on Market Street. Each movement of this character intercepts the flow of three lines of street cars and one line of vehicular traffic. Moreover, it prevents the smooth flow of traffic at the intersecting street running in a northerly direction. The situation, however, cannot be avoided under the present operating methods of rail movement.



Far side car stops on the north side of Market Street cause congestion, in the opinion of the authors of the report

The ultimate solution of this difficulty can only result from a comprehensive plan of rerouting.

MANY ACCIDENTS OCCUR AT INTERSECTIONS

An analysis of motor vehicle accidents in San Francisco involving personal injuries was compiled by the survey, with individual reports made by police officers for November and December, 1926, and January, 1927. The analysis shows that of 973 accidents, 62.1 per cent were caused by automobiles with pedestrians; 26 per cent automobiles with automobiles; 2.2 per cent automobiles with street cars; 3.8 per cent automobiles with fixed objects; and 5.9 per cent automobiles with vehicles other than those listed.

devices should include, among others, traffic signals, warning signs, paint marks, visibly marked safety zones and cross-walks, in accordance with the system as recommended.

The second article, to appear next week, discusses the pedestrian, parking and traffic control problems, and presents a proposed traffic ordinance.

Sunday Pass Plan Increases Riding

INSTALLATION of the Sunday pass by the Gary Railways, Gary, Ind., has been received by the public with great enthusiasm and has caused a large increase in riding and revenue, even though the plan has only been in effect since April 15. The increase in riding necessitated an increase in service on the Valparaiso division shortly after the pass was installed. The former two-

SAN FRANCISCO TRAFFIC SURVEY COMMITTEE																						
STREET <u>MASON</u>		TRAFFIC SPEED STUDIES																				
CONDITIONS <u>FAIR-WARM</u>		~LEGEND~																				
OBSERVERS <u>O. D. ...</u>		A - AUTOMOBILE C.T. - CROSS TRAFFIC A.S. - ARTERIAL STOP S.C. - STREET CAR C.C. - CABLE CAR T. - TRUCK CON. - CONGESTION T.S. - TRAFFIC SIGNAL (T.S.) - OFFICER																				
CROSS STREETS	DATE	CAB NO.	TIME OF DAY	TIME READING	TIME SEC'S	DISTANCE FEET	AV. SPEED M.P.H.	~DELAYS IN SECONDS~							TOTAL DELAY	PERCENT DELAY	RUNNING SPEED M.P.H.	REMARKS	DOUBLE PARKS	BACKS TO CURB		
								A.	A.S.	C.C.	CON.	C.T.	S.C.	T.							T.S.	
CLAY TO PINE																			STEEL HILL			
	10/11/26	94	4-5	00	37	34375	6.70															
	10/11/26	302	1-2	5.55	33		7.00									04	10.00	7.00	HILL			
	10/11/26	302	2-3	00	33		7.00															
PINE TO BUSH	10/11/26	374	12-1	2.42	27		10.15									02	8.70	11.12				
	10/11/26	374	3-4	3.34	26		8.54	02								03	10.70	9.33				
	10/11/26	94	4-5	3.7	35	34375	6.66												HILL		1	
	10/11/26	302	1-2	5.22	31		7.52									06	19.35	9.33				
BUSH TO SUTTER	10/11/26	302	2-3	3.3	31		7.52															
	10/11/26	374	12-1	2.19	25		9.33															
	10/11/26	374	3-4	3.24	20		6.34															
	10/11/26	94	4-5	1.12	43	34375	5.42									04	7.14	8.96	HILL		*2 *2	
SUTTER TO POST	10/11/26	302	1-2	4.51	163		14.3									20	66	52.71	3.03			
	10/11/26	302	2-3	1.04	127		10.4									30	*03	9.3	7320	7.70		
	10/11/26	374	12-1	7.56	20		11.70															

A portion of typical traffic speed study, as conducted by traffic survey committee

and automobiles running down passengers boarding or alighting from street cars were the chief causes of pedestrian accidents.

The analysis of accidents served as the basis for numerous recommendations. The report suggests that every effort be made to encourage the establishment of sound community habits in street use, that the simple traffic ordinance prepared by the survey be made the textbook for every motor vehicle driver in the city and that its provisions be made known to all who use the streets. To this end the survey recommends that at all times printed copies of the traffic ordinance be provided for free circulation through the police department, public schools, automobile organizations, business clubs, civic associations and all other organizations interested in traffic.

The survey further states that there should be an energetic and continuous educational campaign based upon the special traffic hazards as revealed by the future and constant analysis of accident records, and that the public officials should energetically pursue a program of protection for both motorists and pedestrians, through the construction and maintenance of the physical devices for traffic protection, direction and warning. These

hour service was replaced by hourly service, and later, on April 29, even this was inadequate and an extra car had to be added.

On the Saturday preceding the Sunday the pass went into effect, a cold rain fell all afternoon and evening, and Sunday was cold and windy, considerably dampening the company's hopes of a successful opening day. Despite the adverse conditions, 1,388 passes were sold and a total of 34,528 riders were carried for the day, an increase of almost 3,000 passengers over the average for the three previous Sundays.

On April 22, the second Sunday, the weather again was unfavorable, but 1,638 passes were sold, an increase of 250 over the first Sunday and an increase in passengers carried of nearly 3,300 over the average Sunday.

On the third Sunday, the weather was more favorable, and 1,989 were sold. This figure represented an increase of 351 over the previous Sunday and 601 over the first Sunday the passes were sold. There were 36,525 passengers carried on this day, an increase of nearly 5,000 over the average Sunday.

With the coming of more pleasant weather, the company is looking forward to a large increase in both riding and revenue as a result of the Sunday pass.



An oval practice track with stops, signals, switches and grades is used. Bus drivers practice on the macadam road shown in the center

Milwaukee Builds Practice Track and Road for Instruction

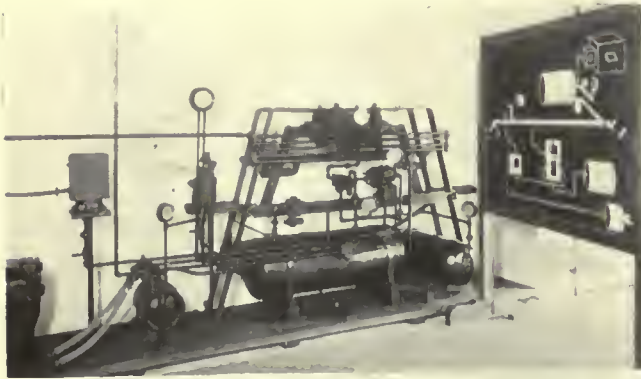
Half-mile car track, macadam bus road, and specially equipped building expand training facilities of T.M.E.R. & L. Company

FOR outdoor training of transportation employees a half-mile oval practice track and a tarvia macadam bus road have recently been constructed by the Milwaukee Electric Railway & Light Company. These, in conjunction with a transportation training building equipped with class rooms and an abundance of street railway, interurban and bus apparatus, enlarge materially the scope of the courses which can be offered the railway and bus men. The same building also has facilities to improve the organized trade training given to car repairmen.

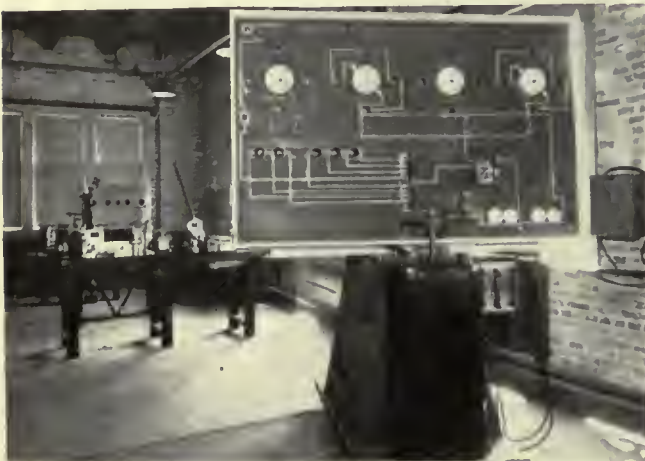
During 1927 instruction was given to 114 conductors, 147 motormen and 370 one-man operators in the building and on the training track and bus road.

The housing of training facilities in a building designed especially for them makes it possible now to offer optional courses to the railway men in electrical equipment, air-brake equipment, car repairing, and special courses in English, arithmetic and other subjects. These all supplement the regular training given to prepare them for the job of conductor, motorman, one-man operator, bus operator or repairman. Supervisors, instructors and division superintendents, in addition to the rank and file of railway and bus personnel, are taking advantage of these opportunities for self-improvement.

The transportation training is given in a two-story brick building erected for the purpose adjacent to the Fond Du Lac station, the company's largest carhouse and storage yard. One class room on the second floor is especially equipped for the use of lantern slides, opaque projections and motion pictures. Special car equipment may be mounted for testing and demonstration work. A second class room is used largely for conductor training, and for the conductor part of one-man training. This class room has large bulletin boards where the schedules, transfers, accident and car condition reports, and other forms in use are posted. Instruction in the mechanical manipulation necessary for the conductor's job is afforded by an arrangement of sockets countersunk in the floor which permit setting up the forms of standard railing that inclose the conductor's position in the various types of Milwaukee street cars. The third class room is used for training motormen and one-man operators in the motorman's part of their duties. This room is equipped with a row of controllers for giving starting and notching practice. Another room is used for instruction of the rolling stock maintenance men. The fifth class room is devoted to training bus operators, both from the transportation department and from the Wisconsin Motor Bus Lines. For optional



Set-up of interurban air brake equipment. The demonstration board at the right duplicates graphically the interlocking action of valves in air lines



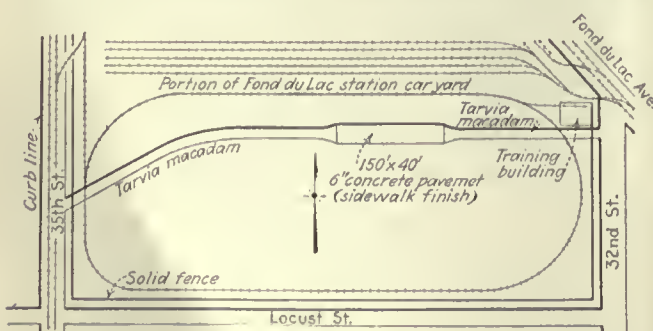
Several of these boards are used to show action of equipment and procedure in trouble hunting. In the background are cut-away demonstration bus motors, clutch and transmission mechanisms

work, any class room is used which is not in use at the time for some other purpose.

Besides the five class rooms, the top floor includes a storeroom, an interview or examination room, a private office and a general office. The general office is not only a space for instructor's work, but has complete records of the men trained, material for the several courses, etc.

The ground floor of the building is given up entirely to apparatus, to be used for laboratory instruction. On it there is installed a variety of railway equipment arranged to show the operating principles of the cars on the road.

Bus equipment includes a White poppet-valve motor, with cut away sections for illustrating motor principles,



The oval practice track, exclusive of spurs to the neighboring Fond Du Lac car yard and into the training building, is 1,997 ft. long. The bus road runs from end to end, vehicles completing their circuit through streets along the training field



This 60-ft. track pit is so constructed that either a street car or a bus can be run over it

next to which is mounted a Knight sleeve-valve motor, coupled with clutch and transmission, all having sections cut away to permit study of the mechanism.

Along one wall the air-brake equipment found on the rapid transit cars is mounted so that all of the troubles which happen out on the road may be demonstrated. Details of this arrangement of air-brake equipment are shown in an accompanying illustration. Near this equipment is a demonstration blackboard which shows by means of a schematic diagram the operating principles of interurban air brakes. Another piece of equipment is a double demonstration panel having a K-35 controller on one side and a K-6 controller on the other. These boards demonstrate graphically the principles of operation of the electrical equipment of most of the types of cars used in Milwaukee. Another board shows the hook-up of electrical equipment on the rapid transit cars, and another one the operation of the air brakes on all one-man cars.

A work bench, near a window, is used in the training of maintenance or repair men in details of soldering, chiseling and other bench work. In the center of the room is a shortened electric car, on which all of the equipment of a modern safety car is to be mounted, exposed to full view, for study by both the repairmen and trainmen. A well-lighted track pit extends the full length of the north side of the building and is connected by a concreted spur outside to the training track. This pit is built so that both street cars and buses may be driven over it. The indoor section of track is used in the training of maintenance men and car repairmen in the main uses of the various parts of the car truck. A complete truck with gears exposed assists in this instruction.

TRAINING TRACK CAREFULLY DETAILED

The outdoor training track is more than 1/2 mile in circumference, and completely incloses a plot of ground two blocks long and nearly a block wide. Five street cars can be run around this track with sufficient headway to allow for the instruction of the platform men in all phases of their work. Regular stops bearing street designations are distributed around the track, and the student is taught to stop at standard places and call streets in a standard way. The track is so located that these regular stops are made on level ground and on

grades. On each trip around the track, the student operator must open and close an electric switch, pass through a set of Nachod signals and run under a trolley circuit breaker. The spur between the training track and the training building is concreted. On this 75-ft. stretch of track, a car is derailed as part of the training practice. Every new man must learn how to use the car rerailer.

Illumination for night practice is supplied by twelve 200-watt lamps equipped with white enamel reflectors and mounted at equal intervals on the trolley poles which parallel the track.

The track has two grades, a short one of approximately 4 per cent and a longer grade of 6 per cent. As part of the operator's training he has to make emergency stops on the steeper grade after the track has been greased to simulate conditions during inclement weather.

A training road for bus instruction is partially completed. The road bisects the training track inclosure, extending the full length of the field with access to streets at opposite ends of the training ground. The road is being designed to give bus operators special training in backing and turning around, double clutching, avoiding skidding, and in maneuvers which cannot be carried out on a public street without interference to traffic. A section of this road consists of a 40-ft. pavement 150 ft. long, with a 5 per cent grade, the section being heavily cemented.

The instruction is tied in with the operating department through the supervisor of training, who reports both to the superintendent of transportation and to the educational director. There is no direct connection with the medical department, although all men must have a doctor's certificate before they can start training. Special men are given examinations at the request of the training division. During 1927 the approximate average cost of training per man trained was \$100. This included instructors' salaries and students' pay while in training.

The importance of learning to do things in a standard way is the first subject handled in the training course. One standard way of operating a car to get good results is taught, and the motormen are told that this is the only method to use, even though they will probably find older men on the system using different methods. The next classroom subject is the controller. Practice on notching to stop on every notch, to use proper feeding speed, and to respond quickly to signals is given. Controller troubles are discussed and their repair demonstrated. The air brake is next discussed with classroom practice on operating the air valve. The rest of the first day is spent on the outdoor track, practicing the proper notching of the controller and the use of air brakes on a regular street car. The functioning of Nachod signals is demonstrated on the track and also by means of parallel switching circuits located within the laboratory at a point where, through a window overlooking the track, the action of the signals can be observed.

Effort is made to get the man thoroughly familiar with the department organization, the duties of supervisors, instructors, clerks and division superintendents. A great



This two story brick building, housing the offices, classrooms, and special training equipment, was opened last October

deal of time is spent in discussing the rules of the road. Safety is strongly emphasized. The necessity of constant attention to changing conditions of street traffic is thoroughly impressed on the railway man's mind. Various dangerous situations are discussed in the hope that the new man will recognize when danger impends without needing the actual experience of an accident.

Under the supervision of an instructor each new motorman spends three days on the practice track, putting into effect the principles which have been demonstrated in the class room. About three hours of these first three days are spent in teaching the man the location of all parts of the car with which he must become familiar.

One of the first things the conductor is taught is the use of standard practice in handling his job. This is not only true in the mechanical methods of doing his work but in the method of announcing streets and in the use of standard expressions. The mechanics of making change, selling tickets, and handling transfers are explained. Signals are taught, with emphasis on safety as well as in connection with helping the motorman to speed up the schedule. One-man operators are given a combination of motorman and conductor training courses. Platform instructors are trainmen who have regular runs but are specially trained. When they have a student for road instruction they are given a day-off run so that practice may be had on all runs.

**And Now—
An Experimental, American-
Type Car in Europe**

For details, see next week's issue

Car Shop and Garage Is of Latest Design

Building erected by Hamilton Street Railway provides excellent working conditions for employees and allows maximum efficiency in performance of maintenance duties

By C. J. Porter

Construction Engineer Hamilton Street Railway
Hamilton, Ont., Canada



The size of the new building can be seen in this view, which also shows the old inspection barn and a section of the storage yard. Note the many windows in the walls of the new building

FOR some time the old car shop and inspection barn, on account of unfavorable location, lack of room and dearth of modern equipment, failed to afford adequate facilities for the maintenance and repair work of the rolling stock of the Hamilton Street Railway, Hamilton, Ont., Canada, and the interurban railway owned by the Dominion Power & Transmission Company, the parent company. The inauguration of bus service made the situation more acute because the company owned no building of suitable design or location to serve as a bus garage. The foregoing considerations in conjunction with the agreement with the city of Hamilton, made at the time a new franchise more favorable to the company was secured, resulted in the decision to undertake the construction of a modern car shop and bus garage.

Excavation work began for the building on Aug. 20, 1927. On March 1, 1928, a few days more than six months later, the new building was occupied and operating in large part. In addition to the building, the construction program included five new storage tracks and a sixth track to enter the car shop.

The building is a one-story, fireproof structure, covers an area of 85,600 sq.ft., or 1.96 acres, and has a total floor area of 109,921 sq.ft. It includes four main sections, the offices and headquarters for employees, a general storeroom, a bus garage and a car shop. In designing the building and selecting the equipment, care

was taken to provide for the comfort and efficiency of employees. Adequate heating facilities, good lighting and ventilation, sanitary conditions of the best and machines to do the heavy work were factors not overlooked. The plan also included adequate means of efficiently handling materials and equipment, and of routing work through the various departments.

BUILDING LOCATED ADVANTAGEOUSLY

Careful consideration was given the location of the new building. The requirements were that it should be as central as possible with respect to the various street car and bus routes to eliminate dead mileage of rolling stock to and from route starting points, that if possible it should be located on property already owned by the company, that it should be so connected with the existing storage yard and street railway system that it would afford maximum facility for movement of cars, and that it should require the minimum modification of existing storage yard trackage. The requirements were all met by locating the building as shown on the accompanying drawing. Certain properties were acquired and consolidated with the plot already owned by the company. Buses have access to two streets, Wentworth and Nightingale, while track connections are made on two other streets, Wilson and King. The tracks on Wilson Street, in turn, provide connection over track on Sanford Avenue to the belt lines at Barton and King Streets, and



View of the pit room and the craneway. At the left of the crane are the armature repair and machine shops, and to the rear of these shops is the general storeroom

with the Hamilton Radial Electric Railway at the corner of Sanford Avenue and Wilson Street. The storage yard connections with the belt line on King Street remain as before.

The building is 385 ft. 6 in. long, and 250 ft. wide at the widest part, narrowing to 157 ft. at the smallest width. Its total floor area of 109,921 sq.ft. is divided as indicated in Table I. The four main sections are the offices, completely equipped for the car shop superintendent, the general construction superintendent and their staffs, and quarters including locker rooms and toilets for the shop and construction employees; a general storeroom where all shop and construction materials for the Dominion Power & Transmission Company in Hamilton are stored; a bus garage where all city and interurban buses and service trucks will be repaired, serviced, cleaned and stored, and the car shops where city and interurban cars will be repaired or rebuilt. The car shop section includes a machine shop, armature repair shop, forge shop, pit room, paint shop, carpenter shop and a transfer table which serves the four latter subdivisions.

All foundations are of concrete, reinforced with steel where necessary. All exterior walls are faced with pressed brick laid in dark mortar. The building trim along Wentworth Street is of cut stone, while that of the remainder is of artificial stone. The inside face of the exterior wall and all interior walls are of high-grade building brick, painted. An outstanding feature of the exterior walls is that 40.5 per cent of their entire area is for windows. The windows are of factory ribbed glass, set in ventilated steel sash. All inside walls with the exception of those in the offices are painted white with a dado of pearl gray 4 ft. from the floor. The partition walls of the offices are of gypsum slab construction, plastered and painted in a buff shade and trimmed in chestnut. The building's interior has a very bright and pleasant appearance.

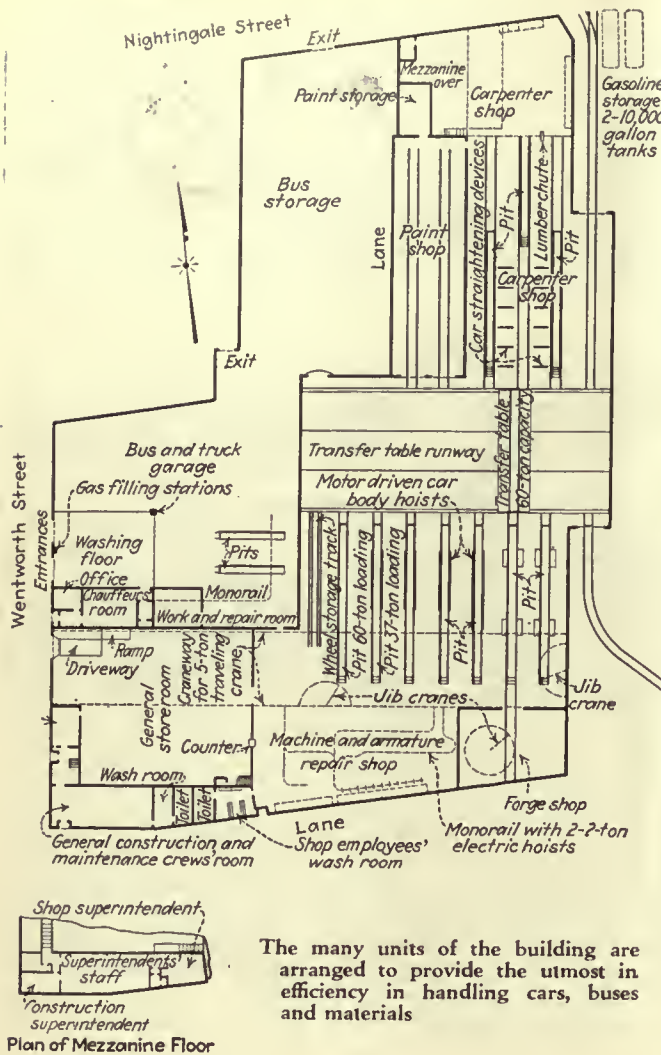
The floors in the bus garage, inspection and repair

pits, paint shop, basement and employees' quarters are of concrete treated with a hardener. The floors of the general storeroom, machine shop, armature repair shop, pit room and carpenter shop are of creosoted wood blocks, laid grain on end on a concrete slab to which the blocks are bonded by paving tar. The wood block floors resist wear, are easily cleaned and do not become slippery and hazardous for the workmen. The forge shop floor and the transfer table runway are of cinder fill on earth. The rails for the transfer table, however, are laid in a substantial concrete bed.

The building's main supports are steel columns of H section, while the roof is carried on trusses of structural steel. Close to 550 tons of structural steel were required for the entire building. The roof is of reinforced gypsum slab, laid on steel purlins and covered with three layers of roofing laid in hot tar. The great number of skylights in the roof is another feature of the building. With a total area of 10,720 sq.ft., they permit a wealth of light to enter. They are of ribbed wired glass fitted into and held by formed members of solid copper sheet. All flashing and entrance heads to downspouts are also of solid copper.

Unit heaters with motor-driven fans are placed in suitable locations throughout the building. Steam for the heaters is furnished through a main from a central heating plant, consisting of two 200-hp., Kewanee-type boilers and located in the inspection barn. A coal pit was constructed under a track just outside of the boiler room. Coal in carload lots is brought in bottom dumping cars and emptied into the pit, from where it is transported by wheelbarrow into the boiler room.

Power and lighting are supplied through transformers located in a vault under the employees' washroom. All wiring is in metal conduit with the exception of feeder mains strung open through the trusses. Switch panels for the many lighting circuits are provided at convenient points. Lighting units consist of 110-volt lamps mounted



two departments. On the main floor is an office for the stock clerk in charge of the storeroom.

The offices and storeroom were made larger than necessary for the car shops alone, so that the staffs of the Dominion Power & Transmission Company caring for rolling stock, track work and line construction could be concentrated at one point.

Quarters for shop employees and general construction crews are commodious and comfortable, with well-appointed locker and wash rooms, toilets and an assembly room. These are located underneath the offices in the section of the building facing Wentworth Street. They can be entered from the shop or from the outside.

The storeroom, with an area of 8,410 sq.ft., is used for materials for both the car shop and the line construction work. A 5-ton, motor-operated, overhead crane serves 4,000 sq.ft. of its floor area. The crane is used to unload incoming materials and equipment entering by trucks through the Wentworth Street entrance, or by carload over the transfer table and a track in the pit room. The crane also covers 6,000 sq.ft. in the machine shop, serving lathes, wheel presses, heavy drills and other machinery. That portion of the storeroom not served by the crane is occupied by steel shelving of latest design, in which a myriad of materials are stored.

TRANSFER TABLE IS IMPORTANT UNIT

The transfer table, capable of carrying a load of 60 tons, is one of the most important units in the entire shop. It operates between the ends of the machine shop tracks at one end of the building and those of the paint and carpenter shops at the other end. It also serves the bus garage through a door at the end of the runway.

The machine and armature repair shops including the pit room occupy an area of 28,070 sq.ft. The machine shop proper is equipped with every type of machine needed for efficient work. The machines doing heavy work are located in the craneway, so that heavy pieces may be lifted to and from them with the crane. Machines doing work of a lighter nature are placed in the remaining section of the shop. Materials for this section are handled by an overhead monorail system with two electric hoists of 2-ton capacity. Jib cranes with hoists are provided also at convenient locations. Lists of the more important items of equipment for the machine shop and armature shop are given in Tables III and IV.

In the pit room there are seven tracks with pits and an eighth for storage of wheels. All repair pits are open, allowing easy access from one to another, and providing room to lay aside tools or parts removed from trucks. The rail heads are 4 ft. 10 in. above the pit floor, giving good head room for working on car trucks. Lighting units are placed in the sides of all pits and project light upward.

Two repair pits are equipped with wheel pits with removable sections of rail. Three pits have motor-driven car hoists, each capable of raising the entire body of the heaviest car from its trucks.

The heating and drainage facilities of the pit are of particular interest. Three unit heaters are located below the main floor slab. The warm air, driven along the pit by the heater fan, in rising from the pit, comes in contact with the undergear of cars and is extremely effective in the removal of ice and snow in winter. Good drainage of pit floors has been effected by crowning them a little and placing drainage openings between them. This insures good drainage of the floor for the workmen and ease of cleaning.

in standard dome reflectors. The intensities of illumination provided for the various departments are listed in Table II.

OFFICES ARE SPACIOUS

The offices are located on a mezzanine floor above the employees' quarters. The shop superintendent has an office at one end of the suite with a window overlooking the shop, while the construction superintendent has an office at the opposite end. The large intervening office, which has an area of 900 sq.ft., is for the staffs of the

TABLE I—FLOOR AREAS OF THE BUILDING'S SEVERAL SECTIONS

Section	Sq.Ft.
Carpenter shop, including repair pits, main floor, basement and mezzanine	17,520
Paint shop and storeroom	4,410
Transfer runway	11,550
Machine shop, including repair pits	28,070
Storeroom	8,410
Garage, including repair pits	36,026
Offices	3,935
Total floor area	109,921

TABLE II—INTENSITIES OF ILLUMINATION FOR THE VARIOUS DEPARTMENTS

Department	Foot Candles
Storeroom	7
Machine shop	12
Forge shop	10
Carpenter shop	12
Paint shop	12
Bus garage	6
Garage workroom	14
Offices	12

The forge shop, in one of the corners of the building, is convenient to both the machine shop and the pit room. Car trucks may be rolled into the shop for repairs on an extension of one of the pit tracks. A jib crane operating through 360 deg. and equipped with a 2-ton electric hoist handles heavy parts in the shop. An exhaust fan creates a draft over the forge fires and carries away all fumes and smoke. In Table V the equipment of the forge shop is listed.

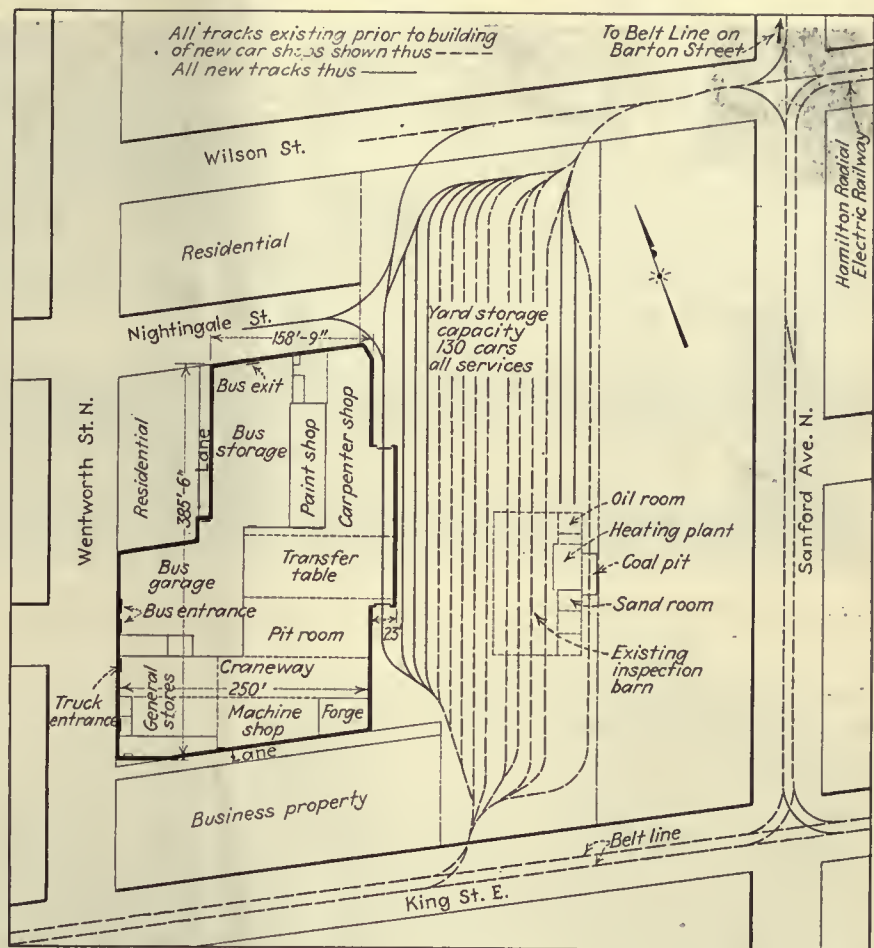
Body rebuilding and repair work for cars and buses is done in a large, well-equipped carpenter shop. Three tracks, each with a pit, accommodate six cars of any length now in use on the system. Each pit extends the full length of the longest car, allowing minor work to be done to the underbodies. A car-straightener made of structural steel buttresses which hinge into slots in the floor is a useful device of this equipment. Cars that are bowed or twisted are readily brought back into line with these buttresses, beams and jacks. The principal pieces of equipment in the carpenter shop are listed in Table VI.

The millroom section of the carpenter shop is adjacent to the section in which the tracks are located. Below the shop floor is a basement with a floor area of 2,050 sq.ft., providing ample and convenient storage. A lumber chute and stairway communicate with this basement. Upholstering work is performed on a mezzanine floor which extends over a section of the carpenter shop and paint storage room, as shown at the bottom of the plan on page 1070.

Between the carpenter shop and the bus garage is the paint shop, with a floor area of 4,410 sq.ft. It has two tracks which will accommodate four of the longest cars. The shop has excellent lighting and ventilation. It is provided with an exhaust system to change the air frequently and remove paint and varnish particles suspended in the air when spray equipment is used. Tubular posts with arms which may be moved vertically on the posts support platforms for the workmen.

**GARAGE DESIGNED FOR EFFICIENCY
IN CARING FOR BUSES**

In addition to ample office and work room, the bus garage with its floor area of 36,026 sq.ft. has space for storing 45 buses and trucks. Two doors on the Wentworth Street side are for entrance, while a door at the extreme end of the garage, and another to a lane adjacent to the west side of the building, provide exits to Nightingale Street. The garage was designed for rapid and efficient care of the buses. Wash racks and a specially drained wash floor are just inside the entrance door, so that buses can be cleaned just as they are brought in from their various routes. Warm water to temper the cold water and to assist in the removal of ice and snow in winter is supplied from a 2,000-gal. storage tank. After being washed the buses are serviced with gasoline, oil and



General plan of the present terminal showing the convenient location of the new building with respect to the storage yard and the adjacent streets. The new tracks are shown by solid lines

grease, as required, and the tires are tested and inflated at convenient air hose connections. If any repairs or adjustments of a major nature are required a bus is

TABLE III—MACHINE SHOP EQUIPMENT, IN PART

One heavy-duty wheel lathe with 18-ft. bed.	One shaper.
One heavy-duty general purpose lathe.	One bolt machine.
One intermediate lathe.	One power-driven hacksaw.
One small lathe.	One cylinder grinder for air compressor and automobile engine cylinders.
One large drill.	Three motor-driven car hoists.
One intermediate drill.	One horizontal wheel press.
Two small drills.	One cleaning and rinsing tank.

TABLE IV—ARMATURE REPAIR SHOP EQUIPMENT, IN PART

One commutator slotting device.	One coil taping machine.
One commutator turning lathe.	Two coil winding machines.
One 30-ton vertical forcing press.	One armature baking oven.
One armature banding machine.	

TABLE V—FORGE SHOP EQUIPMENT

One jib crane with 2-ton electric hoist.	Four forges with down draft.
One 600-lb. air-operated power hammer.	One combination punch and shear.
	One babbitt melting gas furnace.

TABLE VI—CARPENTER SHOP EQUIPMENT, IN PART

One circular saw.	One Radial-arm sander.
One planer.	One disk sander.
One jointer.	One wood-turning lathe.
One lightning cut-off saw.	One mortiser.
One table saw.	One tenoning machine.
One band saw.	



View of the bus garage looking toward the storage end. At the left of the doorway may be seen the ventilation hood and above the hood, the steel roof truss construction. Buses are serviced and repaired in the rear section of the garage

driven over one of the two repair pits. After servicing, the buses are placed in a storage section of the garage.

Gasoline is stored in two 10,000-gal. underground tanks remote from the building, and is forced through underground pipe to the filling stations, two of which are located at the Wentworth Street entrance. Water pressure obtained by a small water tank located in the peak of the carpenter shop forces the gasoline through the pipe. Nozzle valves of the filling station are opened by pressing a trigger and permit a flow of 20 gal. per minute.

The unit heaters of the bus garage are so arranged that they may recirculate the air of the room or draw fresh air from outdoors. When drawing fresh air from outdoors a slight air pressure is created in the garage which effectively expels the fumes.

INSPECTION BARN USED FOR CAR WASHING AND MINOR REPAIRS

The car inspection barn, built some years ago, is to be used for greasing, oiling, renewal of brakeshoes and the detection of faults. The minor repairs will be made here, while others, such as the replacement of a dam-

aged motor, imperfect wheels, etc., will be made in the new shop. Car washing is done also in the old building, where ample track space is available and where proper washing racks are being installed for the purpose. Each car in service is washed once a week.

Track additions include two storage tracks extending half the length of the yard, three extending practically its full length and one passing through the new building to serve the transfer table. A separate track was laid from the one extending through the building to join the Wilson Street track, and a wye was constructed in Nightingale Street. Two single-track curves were made at the corner of Wilson Street and Sanford Avenue, and a double-track curve at the corner of King Street and Sanford Avenue.

The general layout of the building and the arrangement of equipment were planned by the engineering department of the Dominion Power & Transmission Company of Hamilton, while the design and working out of building construction details were done by the firm of B. H. & F. Prack, architects and engineers. Most of the construction work was done by local contractors and the company's own construction forces.



Another view of the pit room, looking toward the carpenter shop and the two closed doors of the paint shop. The transfer table can be seen at the left of its runway

South American Cities Have Fine Railway Service

Lines are heavily patronized and prove profitable. Considerable pleasure riding is done in some of the cities near the equator

By ARTHUR FLOYD
Victoria, B. C., Canada

ELECTRIC railways in the various cities of the South American republics are uniformly good. Starting with the largest city of South America, Buenos Aires, the wonderful capital of Argentina, we find electric traction well established, with frequent services to all parts of the city and suburbs. Zone fares obtain in all the Latin-American cities, as in many cities in Europe. The lowest fare is the equivalent of 2 cents.

An Anglo-American company operates the service. Most of the cars are of the English type, as the American car would be too long for the narrow streets.

Turning to the west coast, we find Valparaiso, foremost seaport in Chile, a city with a topography strikingly similar to San Francisco, with steep hills in all parts of the town. Many of the cars here are of the double-deck type, as used in Great Britain. The seats inside are for first-class passengers and the outside for those paying for second-class seats. Many amusing scenes are witnessed with American and English visitors, who invariably seek the outside seats, both for the fresher air and the possibility of seeing the town to better advantage. The natives stare at the Anglo-Saxons, well dressed and seemingly prosperous, sitting outside with the hoi-polloi, not knowing that their fellow passengers paid the higher fare and preferred to sit on top to view the sights.

A picturesque feature on the Valparaiso electric railways is the woman conductor, who wears a rather jaunty



Open cars are the rule in Rio de Janeiro, owing to the tropical climate

British and German companies share the franchises to run cars in Buenos Aires. The cars are of European design and of rather small size.

In addition to the surface lines, a British company has built an excellent subway system. The cars on this line are modern and of an approved type. A feature is the embellishment of the stations, the names being strikingly prominent in mosaic lettering. The trains emerge from the subway about 3 miles from the city and continue on the surface to the more distant terminals. The Argentine Central Railway also is electrically equipped for suburban service for a distance of 30 miles. The third rail system is used. This line is well patronized.

Montevideo, the charming capital of the Republic of Uruguay, can also lay claim to a fine electric railway system. This city, one of the most Spanish of all the Latin-American towns, has a large amount of track. In spite of extremely narrow streets, the cars render service to every part of the city. They seem almost to touch the houses in passing around corners. The lines which run to Pocitos and Ramirez, two fashionable seaside resorts a few miles from Montevideo, do an enormous business.

hat not unlike a waterproof derby. These Amazons perform their work expertly and climb up and down the winding staircases of the cars with facility. How they manage when encountering belligerent males is hard to say, although it must be admitted that when the Chilean goes on the warpath he is one boisterous *hombre*. Perhaps the native Chilean gallantry asserts itself in such case and no harm is done.

São Paulo, Brazil, one of the amazingly modern and prosperous cities of South America's largest republic, possesses an excellent traction system, in common with the other places mentioned. This city, with a population of well over 400,000, is the great coffee center of the rich province of Minas Geraes. The tracks radiate from one of the central plazas to all parts of the city.

There are many beautiful trips to be had in São Paulo, not the least interesting being the ride out to the famous snake farm at Busançon. This snake farm is maintained by the Brazilian Government for the purpose of studying at close range the various poisonous snakes with which interior Brazil abounds. The cars are modern and neatly finished in cream and black and are of the European type. Traffic is exceedingly profitable, if one



Rio and Sao Paulo, two large and beautiful cities in Brazil, possess excellent tramway systems. A plaza in Rio intersected by car lines is shown at the right. The Sao Paulo view shows the Automobile Club in the background

can judge by the full loads carried at all times of the day.

All of the cars in this city, even the small ones, carry both motorman and conductor. Indeed, the writer never once came across a one-man car in the whole of the South American continent. Evidently there is not the stress of competition down there that there is in North America. One reason probably is in the fact that few mechanics there can afford to own an automobile. The joy rides of the masses are taken on the street cars.

Last, but not least, we come to the beautiful city of Rio de Janeiro, by many considered the world's most scenically grand city. Here is the finest street car service in the southern hemisphere. There is a regular electric railway terminus on the Avenida Central, in the heart of the city, from which point the system radiates to all parts of the city and distant suburbs.

In no city in the world are there so many scenic trips to be enjoyed as in Rio de Janeiro. The cars skirt the wonderful harbor, world famous for its beauty, and reach out to the lovely seaside resorts that abound near the city. A particularly charming ride takes the visitor along the Beira Mar, a crescent-shaped drive along the coast. This road is likened to the famous Corniche Road in the south of France, in the Riviera district. Another wonderful journey by electric car is to the little suburb of Santa Theresa, over canyons and crossing a fine old bridge built in the time of Dom Pedro, last emperor of Brazil.

The management of the car company in Rio makes special provision for tourists, and this class of travel proves highly profitable. One trip of note is to the Corcavado, a high prominence overlooking the sea, with an elevation of nearly 3,000 ft. The trip is through luxurious tropical foliage, with wonderful vistas on all sides. At the top of the Corcavado there is a public restaurant and beer garden, where visitors can refresh themselves before returning to the city.

The cars in Rio are well maintained and have center entrances. Owing to the tropical latitude of Rio there is no necessity for windows in the cars, and here lies one of the chief magnets for drawing customers. It is the regular thing on the part of the Rio populace to take trips around the town and along the sea front to escape the humid atmosphere, which at times is quite oppressive. A ride in an open car on one of the magnificent avenues of Rio on a hot night is a real joy, and in affording this

relief to the citizens the street car company is a benefactor to the city. A Canadian corporation controls the destinies of the Rio de Janeiro Electric Railway, which is a profitable concern.

Altogether South America can be proud of its electric traction systems, and it can be noted there is not the competition that similar systems have to contend with in North America. In fact, extensions are being made quite generally, but especially in Brazil.

The Readers' Forum

More on Car Heating Costs

CHICAGO SURFACE LINES

CHICAGO, ILL., June 21, 1928.

To the Editor:

The discrepancies between the conclusions reached in my recent letter to you on Mr. Baumgarten's article regarding "Heating Costs" and his reply to him seem to arise from a difference in interpretation and viewpoint. To attempt to reconcile the various points of difference would result merely in an extended controversy.

The point which I wished to emphasize, and which Mr. Baumgarten also brings out in his reply, is that each installation must be considered on its own merits, and the savings realized will be determined by conditions peculiar to the application. We realize that very different conditions obtain on a large property from those encountered on a smaller one, such as the required capacity and distribution of substations, and the corresponding distribution of peaks which tends to reduce the power plant demand or required capacity, resulting in a much better load factor.

We feel sure, however, of our figures and deductions presented as applying to our property and conditions. Our calculations have taken into account demand charges such as we obtain, and include only such other items as seem properly chargeable to the particular type of heating considered, but do not include those which should be common to all forms of heating. In like manner, the savings take into consideration the availability of heat when needed, and loss when generated though not required.

W. C. WHEELER,
Engineer of Equipment.

Maintenance Methods *and* Devices

Fireproof Lacquer Spray Room

By J. W. WEIR

Assistant to General Superintendent of Maintenance Kansas City Public Service Company, Kansas City, Mo.

USE OF sprayed lacquer as a maintenance item in the 10th and Lister shops of the Kansas City Public Service Company has increased rapidly in recent years. A part of the overhaul program for cars of this company calls for lacquering of numerous car parts such as window guards, seat cushions, seat frames, stanchions, window frames, etc.

In order to handle this class of work without incurring a fire or explosion hazard and in conformity with the requirements of the State Inspection Bureau, the spray painting equipment has been isolated from the remainder of the paint shop.

The accompanying diagram gives a general idea of the arrangement of the lacquer spray booth. It is located in the paint mixing room and is constructed entirely of sheet steel reinforced with angles. The sash is metal with two-wire glass. The booth is ventilated by an indirect type of blower fan and air ducts which will completely change the air in the booth every two minutes. The room will

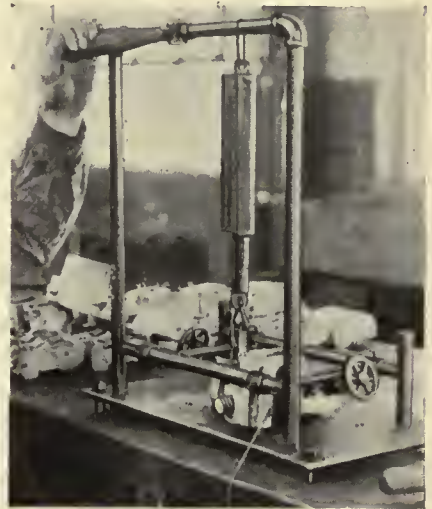
be illuminated with marine type vapor-proof lamps.

Access to the booth is through a large fire door constructed under the specifications of a class A fire door, which was made large enough to permit the hauling of material into the booth on electric-driven industrial trucks.

Fire protection will consist of three open sprinkler heads of the wet type, two mounted within the booth and one in the exhaust air duct. There will be five sprinkler heads on the same system in the mixing room.

Brush-Holder Tension Measuring Device

FOLLOWING an overhaul in the electrical department of the Coney Island shops of the Brooklyn-Manhattan Transit Lines, it is the practice to adjust and measure the brush-holder spring tension in order to insure uniformity and accuracy. For this work a device has been developed. The brush-holder is clamped in position, a spring clip attached to the brush pressure lever and the pressure read on a spring balance as the tension is raised by a lever arm. A link connects the clip attached to the brush pressure arm to the spring balance,



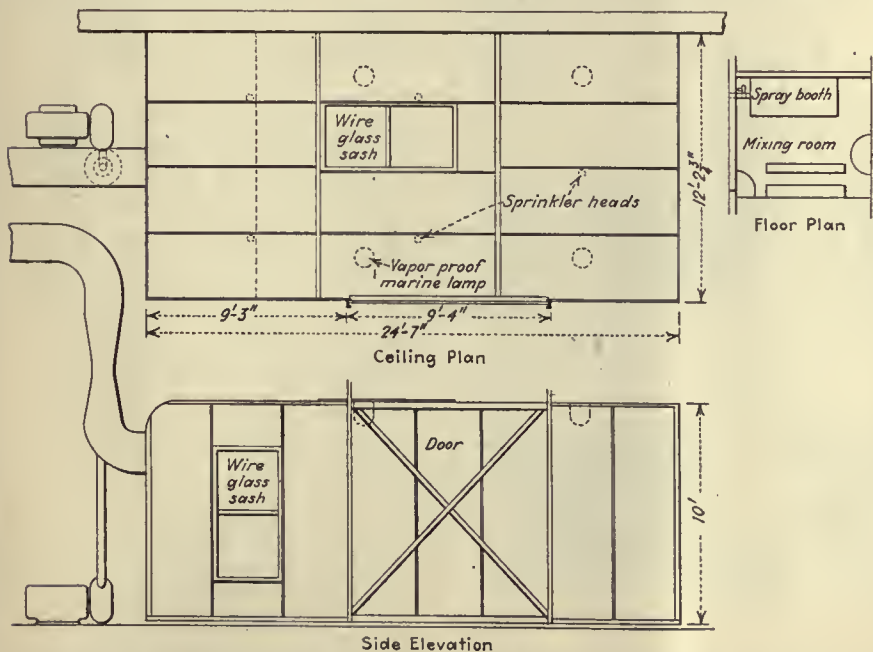
Testing brush-holder spring tension by a special device in the shops of the Brooklyn-Manhattan Transit Lines

and the top of the balance is fastened to the inside end of the lever, as shown in the illustration.

The apparatus is mounted as a unit on a plate 20x12x $\frac{1}{4}$ in. This is fastened firmly to the work bench, the plate being raised slightly from the bench by bushings. The framework for clamping the brush-holder in position and supporting the spring balance is constructed of $\frac{3}{4}$ -in. pipe in the form of a rectangle. The front and rear longitudinal pipes carry straps to which are riveted rectangular pieces that support the clamping mechanism. The straps on the front and rear pipes slide for adjustment, but when in position to fit a particular type of brush-holder they are held firmly by cotter pins.

Each of the two longitudinal cross-members carries a nut for the hand screws used in clamping the brush-holders. These nuts are also arranged to slide back and forth to provide proper adjustment. The screws are provided with a small hand wheel at the top and a swivel end at the bottom which rests on the brush-holder frame. The adjustable clamping device thus provided will clamp different types of brush-holders securely in position in a moment's time.

The two upright pipes at the front carry a crossarm on which is mounted a lever on a sliding sleeve to support the spring balance. The front end of the lever has a wooden handle



This lacquer spray booth in the paint shops of the Kansas City Public Service Company is of fireproof construction and contains latest equipment for handling this type of work

while the back end has a link to hold the spring balance.

The lower end of the spring balance is fitted with a ring and a spring clip so as to attach quickly to the brush-holder lever arm. After at-

taching it to the brush-holder arm the operator pulls down on the front end of the lever which raises the spring balance and the brush-holder lever arm. The tension can then be read on the spring balance.

service, tends to shift the neutral ahead to such an extent that the commutator sparks badly, frequently flashing from brush to brush and occasionally jumping to ground, causing the motor to blow. In addition, this poor commutation causes rapid wear, both of the commutator surface and the carbon brushes. From an economic point of view these defects justify correction. This can be accomplished readily by systematic inspection and better maintenance of these parts.

How Worn Carbons or Brush-holder Boxes Affect the Neutral Position

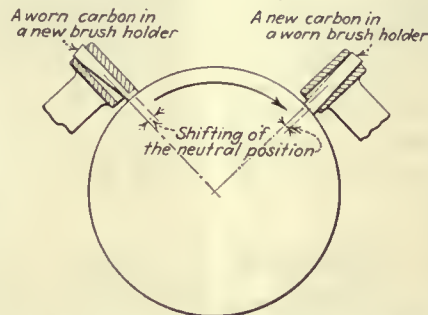
By JOHN S. DEAN
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

PRACTICALLY all railway operators appreciate the importance of setting brush-holders on the neutral position, which on nearly all standard railway motors is in line with the centers of the poles. This location is determined by the throw of the leads on the armature coils, which as a rule is equally spaced around the center line of the coil. There are some few machines made where for special design reasons the leads are unequally spaced. On these the brush-holders do not line up opposite the center lines of the poles.

In the mechanical design of railway motors, the method of clamping the brush-holders to the frame is such that when properly adjusted they are drawn up securely into the correct neutral position. This is especially true with the more modern motors using the construction commonly known as the insulated pin type.

With the brush-holders properly adjusted on the neutral position, carbons that are badly worn on the side will shift the neutral position ahead on the motor, as shown in the accompanying illustration. With the modern ventilated motor the carbon brushes are subjected to excessive side wear due to the dust and dirt which are drawn through the motor. Before the brushes are allowed to wear $\frac{1}{8}$ in. as a permissible maximum they should be replaced, as the shifting of the neutral to a forward position tends to produce sparking and poor commutation.

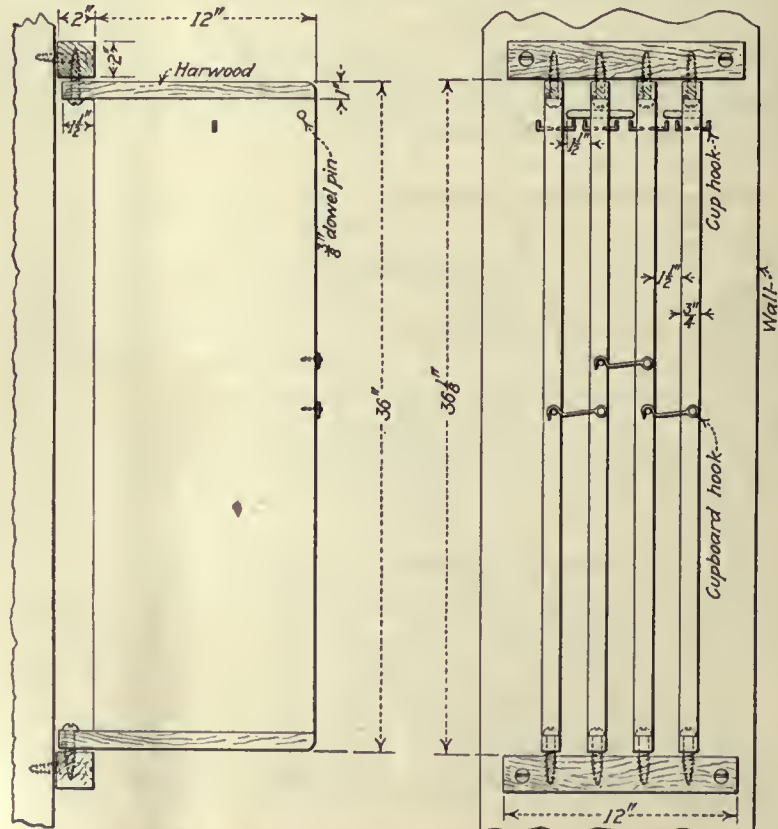
Besides shifting of the neutral due to the side wear on carbons, badly-worn brush-holder carbon boxes also affect the neutral position. This is also shown in the illustration, from which it will be seen that this also tends to shift the neutral position ahead, which will cause the motor to spark and commutate poorly. It is important to maintain the carbon box inside dimensions quite close to the original gage limits. The maximum permis-



The above shows a worn carbon in a new brush-holder on the left, and a new carbon in a worn brush-holder on the right. Both affect the neutral position

sible limit of wear on the brush-holder box should not exceed $\frac{1}{32}$ in.

Either one of the conditions mentioned has a detrimental effect on the commutation, while a combination of both, which is quite frequent in



Type of gasket rack used in the garage of the San Diego Electric Railway

Book Type Gasket Rack*

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

GASKETS for bus engines are usually large and so require considerable storage space if each type is kept separate. If they are kept in piles damage is sure to occur, especially to some of the paper and cork types. For convenient storage which will take little room a gasket rack has been constructed in the shop of the San Diego Electric Railway. This takes care of all the gaskets in general use on the system. The rack occupies a wall space of 12x40 in., and if the gaskets which it accommodates were to be spread out on a flat wall,

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

the space required would be 36x96 in. The rack is made in book form with four panel wings. Any desired number of hooks may be fastened to each side of a panel, and of course any number of wings may be used, depending on the number of gaskets stored.

A label is placed over each hook to

show the particular type of gasket to be carried on it. Hardwood dowel pins glued in place prevent wings from touching each other and causing the gaskets from the opposite wing to be caught on the hooks of another wing. End hooks are provided to hold the wings together and eliminate flapping at random.

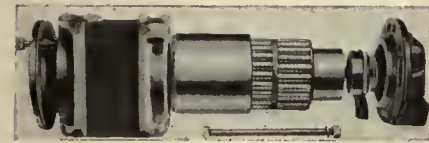
transformer when the cover is removed. Thus a block and cover are equivalent to a double-throw test switch.

Both test plugs are provided with studs and links and may be connected permanently to the testing equipment for any of the various test methods in use. Routine testing may be accomplished simply by removing the cover and substituting the properly connected test plug. Normal connections are restored by replacing the cover.

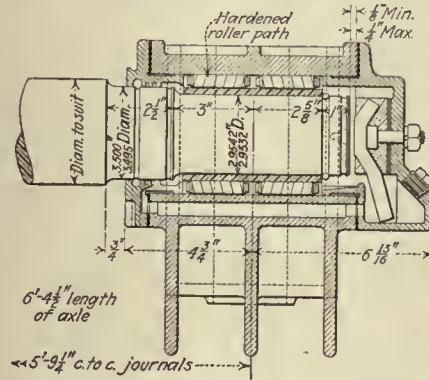
New Equipment Available

Roller Journal Bearing

DESIGNED to meet the demand for a journal bearing that requires no weekly or monthly inspection, the improved Melcher roller journal bearing has been produced by the Railway Motors Corporation, De



A Melcher roller journal bearing assembly which is Hyatt equipped



Cross-section of the type K 3 1/4 x 6 Melcher roller journal for electric railway use

Pere, Wis. This journal bearing interchanges with all A.R.A. standard equipment and is Hyatt equipped. It utilizes standard axles, is quickly and easily installed, and every part is accessible for inspection without removal from the truck.

This journal includes both radial and thrust bearings, neither of which reduces the efficiency of the other, and lateral adjustment is easily made. The center member is reversible and is made of R.M.C. alloy noted for its wear-resisting qualities. The pedestal guides and equalizer seats are heat-treated and hardened and the finished surfaces are ground accurately to the size required.

The lubricating system constantly washes and cleanses the roller path of any foreign matter, thus increas-

ing the life of the bearing. It circulates and filters from 15 to 30 drops of oil per minute under all temperatures. The normal operating temperature is only 10 deg. above atmosphere, and inspection or lubrication is only necessary every 100,000 miles. These bearings have been in operation for a considerable time on steam railways and a number of applications are now in operation on electric equipment.

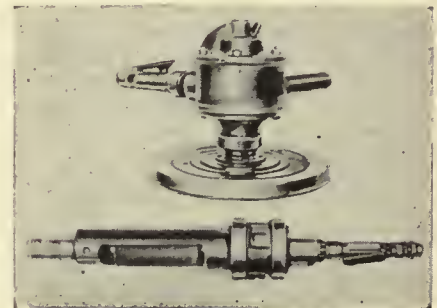
Device For Testing Meters and Instruments

TEST blocks and plugs for making connections when testing meters, instruments and relays, have been developed by the General Electric Company, Schenectady, N. Y. The new line will be designated by the type number PK.

The blocks are essentially four-pole and six-pole jacks, provided with covers having internal plug contacts which make connection when the plug is in place. The four-pole and six-pole blocks have various combinations of auxiliary contacts which automatically short-circuit the current

Improved Portable Grinder

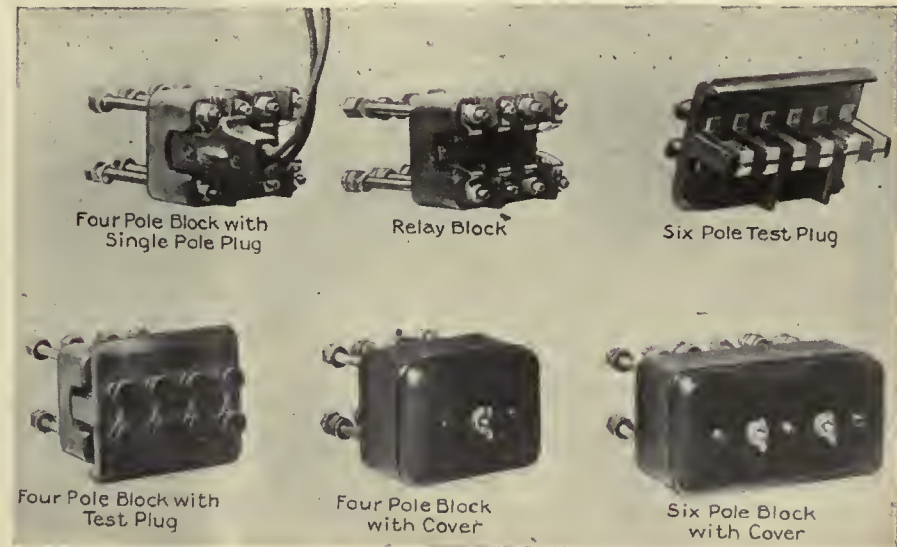
FOR grinding, sanding and polishing the Buckeye Portable Tool Company, Dayton, Ohio, has just announced the Hercules air tool. The rotary principle is used, compressed air acting against movable blades.



Air-operated tool—at top, sander; below, grinder

This is claimed to eliminate much of the vibration hitherto associated with air tools.

The only wearing parts of the new tool are the small blades in the rotor. For lubrication, grease is injected into the tool at one point and reappears at an outlet at the other end.



Four and six-pole relay blocks showing spring jacks and plugs, and the arrangement of links and studs for making various connections

Association Activities

Steam Railroad—Automotive Conference at A.R.A. Meeting

MEMBERS of the Motor Transport Division of the American Railway Association and representatives of the National Automobile Chamber of Commerce, the American Automobile Association, the Society of Automotive Engineers, and the Railway Supply Manufacturers' Association, participated in a general conference on June 23 at Atlantic City, on the occasion of the first annual meeting of the newly-organized Motor Transport Division of the A.R.A.

Sessions of the Motor Transport Division during the preceding two days were open only to railroad representatives, but the final session was thrown open for general discussion of problems of mutual interest to railroad and automotive transportation men. The question of interstate regulation of highway carriers, both passenger and freight, together with that of automotive rail car design occupied most of the attention during the meeting. In a preliminary statement A. P. Russell, chairman, explained that the Motor Transport Division was anxious to co-operate with others interested in the solution of problems incident to the development of highway transportation, and suggested that the question of the regulation of interstate vehicles was of paramount importance. He called upon A. J. Brosseau, vice-president of the National Automobile Chamber of Commerce, to voice the views of that body regarding interstate regulation.

Mr. Brosseau said that the difficulty in arriving at a satisfactory regulatory law is that of finding a common ground of thought. He suggested that one of the difficulties in the past has been that the policy of the several interested groups have been formulated by lawyers instead of practical operating men. He said that the automobile industry has on several occasions given evidence of its interest and desire to co-operate in finding a proper basis for regulation, and called attention to the statement which he had made at the hearings held by the Interstate Commerce Commission, expressing the views of the N.A.C.C. This statement, in brief, held that only a certificate of convenience and necessity, together with adequate assurance of liability responsibility, is needed to insure healthy development of interstate highway transportation. Regulatory legislation covering trucks was opposed on the ground that these vehicles in most instances are not operated as common carriers. Mr. Brosseau was hopeful that a fair and reasonable solution of the bus regulation problem can be found, and said that although

the automobile industry has at times opposed specific regulatory bills, it is not opposed to the principle of regulation of common carrier highway vehicles.

C. S. Sale, president American Car & Foundry Motors Corporation, suggested the need for uniformity of regulation regarding the dimensions of buses. He recommended that a uniform maximum width of 96 in. be advocated throughout the country. Speaking on the question of rail car design, he maintained that

the weight of rail cars can be reduced and said that a 30 to 40-passenger rail car capable of operation at speeds of from 45 to 60 m.p.h. can be produced. Representatives of various railroads operating rail cars participated in the discussion and outlined some of the operating problems of branch line service which determine the type of automotive rail equipment demanded by the railroads. Although the advantages of a more frequent service which can be given with small light rail vehicles were emphasized, the trend of thought among railroad representatives was toward larger units capable of handling the wide variations in traffic encountered on branch lines.

Paris Adopts New System of Fare Collection*

Offers 16 2/3 per cent reduction in rates to passengers who purchase coupon tickets in advance. Eighty-five per cent of passengers use the new system

BY ANDRÉ MARIAGE

Chairman of the Board of the S.T.C.R.P. (Paris Surface Lines and Bus System)

FARES in Paris are based on the zone system, with a higher charge for the first zone than for each succeeding zone. There is also a difference in charge between first-class and second-class passengers, and these fares are still further modified by reduced

The practice has been to give each passenger paying fare a ticket or fare receipt, indicating the ride to which he is entitled and the fare paid. This has meant that the conductor has had to carry a large number of each kind of ticket. This he has usually done on a board which he has carried with him. On certain long lines where a board to carry all of these tickets would be unwieldy, the conductor has been supplied with two such boards, one to use, say, during ordinary hours and the other during the hours in which workmen's tickets are sold. As he has to issue the right ticket to each passenger, mark it with a pencil to indicate the zone and often make change he has a great deal to do. In an effort to reduce the work of making change, the company tried the plan of issuing fare tokens at their cash value, but as few passengers purchased them, no great saving in time resulted.

12 A	42	11	OL171
12 A	42	11	OL171
12 A	42	—	OL171
12 A	42	12	OL172
12 A	42	12	OL172
12 A	42	12	OL172

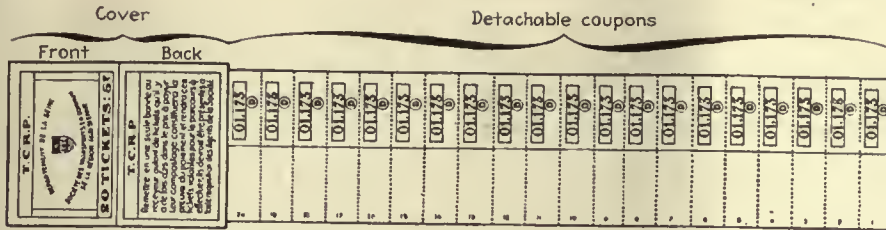
Reproduction of cancelled coupon. That at the left is for a first-class fare covering one section, that at the right for a second-class fare covering two sections

round-trip workmen's tickets, reduced rates for cripple war veterans, and double rates charged during certain hours of the night.

*Abstract of communication presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles, held in Rome, Italy, May 6-12, 1928.

NEW SYSTEM OF FARE COLLECTION

The principle by which these fare receipts are supposed to protect against fraud is that as they carry a serial number assigned to the conductor of that car, they are good only on the car on which they are issued. A record of these serial numbers is kept in the office of the company, and periodical checks are made of the tickets issued to passengers on individual cars to see that there is no trading in tickets,



Coupons are sold in strips of twenty at a reduction of one-sixth over the cash fare

overriding or use of expired tickets. In the new system adopted, the work of the conductor has been greatly reduced, as it has been changed almost entirely to that of cancelling rather than that of issuing tickets. The system is based on the following principles:

1. Where there are various rates of fare for different lengths of rides and different classes of accommodation, these rates should be multiples of a common factor.

2. The coupons issued to cover all rides should be of the same kind, and the unit value of each should correspond with the value of the common denominator mentioned in condition 1.

3. When these tickets or coupons are cancelled on the car, the cancellation should be of such form as to indicate the length of ride for which they have been accepted, and the cancelling apparatus should be arranged so as to totalize the receipts as well as the number of travelers in each class.

4. It is desirable to make obligatory, so far as possible, the use of these coupons for passage. Otherwise, it will be necessary for the conductors to carry not only the new cancelling machine but also all the equipment formerly used, such as assorted packages of tickets, change bags, ticket recording blanks, etc.

5. If it is not possible to make all passengers buy coupons, a special inducement should be given to those who do so, the purpose being to reduce the number paying cash for fares to the smallest number.

6. For this final group of passengers some system should be devised by which the new equipment can be used, so as to reduce the appliances carried by the conductor.

All of these conditions have been fulfilled by the system which we have on trial now on five of our city lines. Later it will be extended to the suburban lines.

The conditions were met in the following manner:

Thirty centimes were adopted for the common denominator of fares when paid in cash, and the fares were set as follows:

NEW SCHEDULE IN FRANCS OF CAR AND BUS FARES IN PARIS IF PAID IN CASH

Number of sections	1st Class	2nd Class
1	0.90	0.60
2	1.20	0.90
More than 2	1.50	1.20

If paid in tickets, the fares are as follows:

NEW SCHEDULE IN FRANCS OF CAR AND BUS FARES IN PARIS IF PAID IN TICKETS

Number of sections	1st Class	2nd Class
1	0.75	0.50
2	1.00	0.75
More than 2	1.25	1.00

It will be seen that these fares are all a multiple of the denominator 25 centimes and that they represent a reduction of $\frac{1}{3}$ th from the fares paid in cash. The reduction given over the cash fare is so considerable that practically all regular users of transportation will purchase the slips. The coupons are sold in strips of 20 in the way illustrated. The price of the twenty-ticket strip is 5 francs (20 cents in American currency).

The special rates for crippled veterans and workmen were arranged as follows: The veterans are allowed to travel first-class and their rate of fare is 30 centimes for one section, 40 centimes for two sections and 50 centimes for more than two sections. Their coupon unit has been fixed at

10 centimes, making the cost for a twenty-coupon strip, 2 francs. For workmen, weekly tickets carrying a coupon for each day, one for the outgoing trip and one for the return trip are sold in advance. These coupons are cancelled by being punched by the conductor on the car.

CANCELLING AND REGISTERING MACHINE

The cancelling and registering machine is carried by a strap around the neck of the conductor. It measures $7\frac{1}{2} \times 5\frac{1}{4} \times 2\frac{3}{4}$ in. and cancels the coupons by surcharging them. This surcharge gives: (1) the number of the machine, (2) the day of the month, (3) the trip number, (4) the class of accommodation, and (5) the numbers of the sections through which the passenger has paid to ride. Of these, only the two last mentioned have to be set by the conductor during the trip.

Typical cancelled coupons are illustrated. In the lower line, 17 is the day of the month and "A" is the route number. In the line above, 42 is the number of the cancelling machine. In the next line above, the first words indicate first class. If these words do not appear, the ticket is for second-class accommodation. The number 11 indicates the boarding station, and the one horizontal line on the third coupon indicates that one section only has been paid for. In the group of second-class cancelled coupons, the two horizontal lines show that two sections have been paid for.

The registering part of the apparatus totalizes the number of tickets cancelled and the number of passengers traveling first and second class.

Provision, of course, has to be made for passengers who insist on paying cash. The conductor sells them the number of special coupons which they require from a roll of 200 coupons which he carries, but charges them 30 centimes for each coupon instead of 25 centimes.

The coupons, after being cancelled, are retained by the passengers in the customary way until the end of their trip.

PRACTICAL EXPERIENCE WITH THE SYSTEM

The company was anxious, of course, when the plan was started, to learn how many passengers would purchase tickets in strips. During the first days 30 per cent continued to pay cash, but in a short time this proportion shrank to 15 per cent, made up primarily of persons like tourists, who are either unacquainted with the system or who do not use the cars or buses often enough to warrant the purchase of a strip of coupons. The company believes from its experience on the five lines on which the system has been tried that this percentage of 15 will grow considerably less.

It has been found that by this system of fare collection the average time

COMING MEETINGS OF Electric Railway and Allied Associations

July 8-12—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.

July 12—New York Railroad Club, annual outing, Indian Point, N. Y.

July 13—A.E.R.A. Executive Committee on yacht "Florida," New York, N. Y.

July 17-20—American Society of Civil Engineers, annual convention, Buffalo, N. Y.

July 19-21—Pacific Claim Agents' Association, annual convention, San Diego, Cal.

July 25-27—Electric Railway Association of Equipment Men, Southern Properties, Cincinnati, Ohio.

July 27-28—Central Electric Railway Accountants' Association, Detroit, Mich.

Aug. 16-17—Wisconsin Utilities Association, Transportation Section, Sheboygan, Wis.

SEPT. 22-28, 1928 American Electric Railway Association, 47th annual convention and exhibit, Cleveland, Ohio.

required by the conductor to collect a fare has been reduced at least 50 per cent. The saving is more than this, of course, when the time taken to make change is included. That took, on the average, 25 seconds per passenger, whereas the present system takes only seven seconds per passenger. This greater rapidity permits the conductor to watch more carefully for attempted fraud. The plan is very popular with the employees.

Another advantage of the present plan is the reduction of inspectors needed, as the work of the inspection of tickets is greatly simplified. The elaborate system of accounting in the office for tickets issued to conductors and the return by them of unused tickets is eliminated. Finally, the accounting for receipts and number of passengers carried is much reduced, as these figures are given on the totalizers on the cancelling machine.

Periodical Physical Examination of Trainmen*

By W. L. WEBER

Chief Surgeon Pacific Electric Railway, Los Angeles, Cal.

FEW large corporations as a preliminary requisite to employment subject their applicants to a thorough physical examination. Fewer still conduct periodical health rechecks of their employees. Many concerns have no medical department at all. Some that have are more or less indifferent in their attitude toward the employee.

The Pacific Electric Railway Company employs some 6,000 individuals, who, excepting the Mexican laborers, are obliged to submit to a thorough medical examination before final acceptance into the employ of the company. This examination is made by a full-time doctor whose office adjoins that of the employment bureau, thus facilitating the handling of the men. This doctor's time is largely occupied in the examination of applicants and in the re-examination of men already employed.

The medical department has a full-time staff consisting of a chief surgeon and two assistants, three office nurses, and other clerical help. The office organization is quite complete, having a well equipped X-ray laboratory in charge of a competent radiologist and technician. There is a physio-therapy department and a full-time masseur. The laboratory work is done by a competent laboratory staff, the material being called for once daily and reported upon promptly. In addition, there are in every line specialists whose services are free to the employee. Perhaps one of the most valuable acquisitions to our medical department has been the installation of a dental clinic under the direct supervision of a competent dental surgeon. While not an integral part of the railroad organization, it is so closely associated with the men that it has become a definite and important factor in our organization. The charges for dental work are very moderate, being about half of that usually made for similar work done elsewhere. The dentists are not on a salary but make a charge directly to the individual

having the work done. The service is extended to dependent family members as well as to the employee.

The aforementioned medical and dental benefits are derived through the maintenance of a hospital fund through pay roll deductions. The amount deducted varies from 50 cents to \$1.50 a month, depending on the salary received.

With such an organization the re-examination and subsequent care of any number of cases can be effectually done. During 1925-26-27, 2,956 trainmen were re-examined. Up to 1925 the re-examination of trainmen took place every three years and consisted in testing visual acuity, auditory and color perception, and noting the general appearance of the applicant. Only in isolated instances was an applicant given a detailed examination. This may account, and probably does, for the large number of men found suffering from serious organic disease, as revealed by our re-examinations of 1925. Now the trainmen take this examination every two years and are not permitted to return to duty unless they present to their immediate superior a clean bill of health from the examining doctor.

The man to be examined removes all of his clothing, even to his shoes and socks. The examination takes in the general fitness of the applicant, the cardio-vascular system, the teeth and the nervous system. Blood pressure records are taken, including in all cases both the systolic and diastolic readings, and a urinalysis of a specimen voided in the doctor's presence. Vision, hearing, and color perception are carefully noted. Where a more detailed examination is required, such as X-ray of heart, lungs, gastro-intestinal tract, including the teeth, Wasserman tests of the blood or cerebro-spinal fluid, blood chemistry, etc., the patient is referred to the laboratory doing such work. All findings, whether normal or otherwise, are carefully recorded on the applicant's blank. These blanks at the close of the day are placed before the chief surgeon for inspection, and should any very serious defect be found the man

is requested to return for further re-checking. However, should the examining doctor find any defect that in his judgment is of sufficient gravity to be a menace, the applicant is withheld from duty until further examination and disposal of the case can be made.

When the system of re-examination was first inaugurated, it created quite considerable consternation and ill feeling among some of the employees, but when they became convinced that they were the actual beneficiaries, and that it did not mean their loss of position, the feeling changed so that soon there were no more complaints. Instead of resentment the men welcomed the careful examination which they received.

The question as to the ultimate disposition of a given case in which a serious disqualifying defect might be found, naturally arises. In no case has an employee ever been discharged from service because of physical disability. Those men who were found suffering from organic disease of sufficient gravity to render them a hazard to the traveling public, their fellow employees or to themselves, were removed from the position and employment less exacting provided. Motormen with high blood pressure and serious heart disease are removed from the front end and given work as conductors, or at station, or trolley holding positions. Some were found to be too seriously ill to continue at any employment, and were given the benefits derived from their insurance in the Metropolitan Life Insurance Company. In other cases where the length of service warranted it, a monthly gratuity or pension is allowed in addition to their insurance, thus providing, at least, a living. We discovered a few platform men suffering from locomotor ataxia. These were transferred to station or similar positions and seemed to do quite well. At the present time one or two such are holding trolley jobs. They are carefully supervised both from a medical and efficiency standpoint. They report to the medical department at least once a month, and are carefully checked over for possible development of symptoms that would render them an unsafe risk, even in such a position as holding trolleys.

In 1925, 1,586 men were re-examined, and of this number 157 were instructed to return for rechecking. The following defects were found, which, in the great majority of cases showed improvement or recovery under observation and treatment: Glycosuria, 21; hypertension and associated cardiac disease, 85; hernia, 24; visual impairment, 9; faulty color perception, 4; nephritis, 4; locomotor ataxia, 12; bad teeth, 73.

In 1926 there were 133 re-examinations and nine rechecks: Hypertension, 3; glycosuria, 1; disease of the nervous system (non-syphilitic), 3; visual impairment, 2.

The reason for the small number re-examined in 1926 was that the majority of the trainmen were checked in 1925.

*Abstract of a paper presented at the annual meeting of the California Electric Railway Association, San Francisco, Cal., May 7-8, 1928.

In 1927 1,237 men were re-examined, and of this number only 84 were instructed to return for rechecking. The defects noted were as follows: Hypertension and associated cardiac disease, 42; cardiac disease without hypertension, 6; glycosuria, 17; locomotor ataxia and nervous syphilis, 6; cardiovascular syphilis, 3; nervous system disease, 8; visual impairment, 9; auditory defects, 2; impairment of color perception, 3; thyroid gland, 1; nephritis, 1.

There can be no question but that tremendous benefits have accrued to the men. Almost all have co-operated in a most satisfactory manner in the effort to detect disease and improve their health. The fact that in 1927 our X-ray laboratory took 1,000 more dental X-rays than in 1926 shows conclusively that the employee appreciates the value of detailed and careful physical examination.

Since most of the defects noted were for arterial hypertension and associated

cardiac disease, the possible cause, or causes, becomes interesting and important. The majority of our cases occurred among the motormen, and I am inclined to believe that the nervous strain incidental to running high-speed trains where traffic is frequently crossing the tracks, must be a factor. I also believe that since their occupation is largely sedentary, combined usually with overeating and consequent overweight, that these latter factors also play a considerable part in causing hypertension. I do know that the majority of these men showed marked improvement under proper dietary regime and elimination through skin, bowels, and kidneys. Any case showing a blood pressure in excess of what should be normal for his years is rechecked and made to report at stated intervals. A systolic pressure of 180 mm. disqualifies for the work of motormen—a diastolic pressure of 100 mm. or over also disqualifies, no matter what the systolic pressure may be.

Power

JUNE 11-12 the final meeting before the Cleveland convention of the standing committee on power was held at association headquarters, New York City. Those present were W. E. Bryan, chairman; C. S. Anderson, J. W. Allen, W. H. Bassett, L. W. Birch, H. W. Coddling, H. A. Kidder, John Leisenring, H. S. Murphy, J. F. Neild, F. W. Peters, W. J. Quinn, J. L. Ross, Dwight L. Smith.

Special committee No. 1 on Manual review presented a final report, which has been sent out to the various members of the standing committee for ballot. A revised report on mercury arc rectifiers was presented by special committee No. 2. This will be sent out for approval later.

Due to recent changes in the chairmanship of special committee No. 3 on power costs and power contracts, data have not yet been compiled. A questionnaire has been prepared to be sent to member companies. The questionnaire was discussed in detail and a number of changes suggested. The questionnaire was then referred back to the committee for revision. A formal report on catenary construction was presented by special committee No. 5. Suggestions for some changes were made by the general committee. Special committee No. 6 on trolley wear and breaks reported that it is compiling results of a questionnaire sent to member companies. This information will be in shape for approval soon. Regarding other assignments to the committee, no definite conclusions have been reached.

Special committee No. 7 on inductive co-ordination and radio interference has presented its final report, which has been sent to members of the standing committee. The report was reviewed for further suggestions. Special committee No. 8 on trolley wire reels submitted a formal report. After discussion it was decided that several minor changes were advisable in the drawings of the reels. These will be made and the report sent out for approval.

The report of special committee No. 9 on underground conduit specifications was discussed in considerable detail. It is proposed to substitute revised drawings in place of the present Manual drawings after these have been rechecked. Designs of manholes will be treated as a recommended design.

Special committee No. 11 on overhead versus underground distribution cable presented a progress report, but stated that information following the questionnaire as to cost, operation, etc., of underground and overhead cables was still being received. No conclusions were reached by the committee.

Special committee No. 12 on ferrous versus non-ferrous overhead material, and No. 13 on trolley voltage in congested districts, did not present reports.

A program for the various sessions of the power division at the Cleveland convention was agreed upon. These were presented to the program committee and also to the executive committee for consideration.

American Association News

Engineering Executive

DISCUSSION of work done during the year by various committees, approval of the program for the sessions of the Engineering Association at the coming convention and many other routine matters formed a busy session of the executive committee of the American Electric Railway Engineering Association, at association headquarters, New York, June 13. Those present were: President R. H. Dangleish, chairman; F. H. Miller, W. W. Wysor, C. H. Jones, L. D. Bale, P. V. C. See, F. McVittie, E. M. T. Ryder, J. W. Welsh, John Y. Bayliss, H. F. Brown, H. H. George and A. T. Clark.

A report of work being done in the rolling stock division was presented by A. T. Clark, chairman of the general rolling stock committee. In addition to the regular assignment, several special ones which have come up during the course of the work were reported on by Mr. Clark. These included the designing of a new standard axle and a study of lamp sockets for 20-in series lamps.

Work in the purchases and stores division was reported on by John Y. Bayliss. A request for the organizing of a joint committee with the National Electric Light Association to consider certain subjects of mutual interest was approved, as was also another request for arrangements to co-operate with committees of the National Association of Purchasing Agents, the National Electric Light Association, and the American Railway Association, in a joint study to establish standard packages for storeroom material. John Fleming was appointed as a representative of the purchases and stores division, to co-operate with the United States Department of Commerce.

A report of the committee on revision of the constitution and by-laws was discussed and approved with certain revisions. H. H. George presented a very complete report for the program committee covering the coming convention. It was voted to publish all advance papers for early distribution.

Correspondence covering many suggestions for subjects to be considered during the coming year were discussed, and these were referred to the subjects committee. The following personnel changes on A.E.S.C. committees and those co-operating with other societies, were approved: Messrs. H. W. Coddling and W. E. Bryan were appointed as representatives of the Association on the sectional committee on mercury arc rectifiers. H. E. Bachman was appointed to the place made vacant by the resignation of M. B. Rosevear, on technical committees 5 and 10 of the sectional committee on insulated wires and cables.

Charles R. Harte was appointed to represent the association at a conference called by the American Society of Mechanical Engineers in connection with the co-ordination of standardization activities in the mechanical industries. L. D. Bale was appointed to represent the association at a meeting of the fuels division of the American Society of Mechanical Engineers to be held in Cleveland, Sept. 17 to 20. W. W. Brown was appointed to represent the association on the advisory board of the Power Transmission Association.

It was voted to endorse the report of the revision conference on classification of iron and steel scrap put out by the Division of Simplified Practice of the United States Department of Commerce. Recommendation No. 71 on turnbuckles was also endorsed.

News of the Industry

Cardinal Fliers Organized

Transportation men embark on new venture looking toward cross-country service via the air

TO PROVIDE air transportation from Louisville, Ky., to any point within the next few years is the dream of James P. Barnes, president of the Louisville Railway, and Lee L. Miles, president of the Louisville Taxicab & Transfer Company, who recently organized the Cardinal Fliers, Inc. This company caters to general cross-country taxi and sightseeing work and has under negotiations the matter of contract with the United States Government for transportation of mail on its newly developed air routes. At the present time the regular operation consists of handling newspapers for the *Courier Journal* and *Louisville Times* between Louisville and Lexington. Flights have been made by planes of the Cardinal Fliers, Inc., to Atlanta, Philadelphia, New Orleans, Little Rock, Hot Springs, St. Louis, Chicago, Grand Rapids, Detroit, Buffalo and Kansas City, Mo.

The company was originally incorporated, early in March, with a capital of \$50,000, but since then the industry has made such strides that at a meeting of stockholders the last of May, the capitalization was increased to \$250,000.

The equipment of the company at the present time consists of five open Waco planes and one Fairchild cabin plane. An order has been placed for two additional cabin planes, and one Whirlwind Waco open cock-pit plane, the latter being equipped for night flying. In addition the company is local agent for the Monocoupe, equipped with a five-cylinder radio motor, manufactured by the Velie Auto Manufacturers, and also for a two-passenger cabin plane. The five-passenger cabin planes operate on the basis of 50 cents per air-mile and the three-passenger open plane on the basis of 25 cents per air-mile.

At a municipal election in November, 1927, a bond issue of \$2,000,000 was approved by the voters of Louisville, \$750,000 of which was for the purpose of park work, including the establishment of a municipal air port in what has been known for several years as Bowman Aviation Field. The company has just been allotted a location in Bowman Field approximately 80x200 ft. for the construction of hangars, and adjacent will be terminal buildings and offices.

The backers of the Cardinal Fliers, Inc., are men of experience in transportation matters. They are anticipating the establishment of cross-country

service in conjunction with other commercial aviation companies. At the present time the company is planning the establishment of part air and part rail trips across the country, using airplanes, for instance, from Louisville, Ky., to Omaha, Neb., traveling on sleeper by night for a portion of the journey, and making the final hop to the Pacific Coast by air. As an alternate the combination of commercial air companies has in mind flights by day, possibly from New York City to Louisville, spending the night in Louisville, hopping thence from Louisville to Denver, Col., spending the night in

Denver, and hopping the third day to the Pacific Coast.

Lee L. Miles, president of the Louisville Taxicab & Transfer Company, is president of Cardinal Fliers; Saunders P. Jones, capitalist, is vice-president; Houston Quinn, former Mayor of Louisville and vice-president of the Louisville Trust Company, is treasurer, and Miss Mary E. Clines of the Louisville Taxicab & Transfer Company, is secretary.

The board of directors consists of James P. Barnes; Graham Brown; A. H. Bowman; C. C. Webb; W. W. Crawford and J. C. Willson.

Flat Eight-Cent Fare in St. Louis

State commission passes upon plea made originally by receiver of United Railways, since succeeded by St. Louis Public Service. Valuation \$60,000,000

THE St. Louis Public Service Company has been authorized by the Missouri Public Service Commission to charge a flat 8-cent fare for adult passengers and a 3-cent fare for children between five and twelve years of age in all of the fare zones of St. Louis and St. Louis County, effective July 1. Eight cents cash or two tokens for 15 cents for adults and 3 cents for children were the former rates. The commission also found the value of the property of the company used and useful for transportation service to be \$63,500,000 and the property not used for public

service \$2,500,000, a total of \$66,000,000. This compares with the former valuation of \$52,000,000, or an increase of \$14,000,000. The commission also allowed the company to charge \$800,000 annually for depreciation.

HOW CONTENTIONS DIFFERED

The company, in its application for the higher fare, had sought an 8-cent flat fare, a valuation of \$75,000,000, a rate return of 8 per cent and a depreciation allowance of \$1,500,000, while the city of St. Louis in resisting the application contended for a fare of 7½ cents, \$53,000,000 valuation, a 7 per cent return, and only \$1,000,000 depreciation. The commission anticipates that the new fare rates will return the company 7.14 per cent net on the \$63,500,000 valuation. This is based on the passenger business of the system in 1927. A continuation of the universal system of transfers was recommended.

On the basis of past experience the commission estimated that in 1928 252,392,464 adult passengers will be carried at 8 cents for \$20,191,397 and 6,418,512 children at 3 cents for \$192,555, making total gross revenue from passengers \$20,383,952.

A recapitulation of the commission's findings shows:

Net revenue available for return in 1927, \$2,360,990; estimated increase in revenue, \$1,792,740; decrease in depreciation reserve, \$700,000; grand total, \$4,853,730. From this amount must be deducted the \$318,323 increase in income taxes, leaving an estimated \$4,525,407 available for dividends.

Explaining its decision to cut the depreciation reserve the commission said:

In view of past expenditures, the present large reserve, and the present physical

Neither Company nor City Satisfied

THE St. Louis Public Service Company on June 28 applied to the Missouri Public Service Commission for a rehearing, contending for a \$75,000,000 valuation and claiming that \$800,000 annual depreciation allowance is insufficient. The company conditionally accepted the 8-cent fare, but asked a rehearing on the valuation and depreciation items. It said the return should be 8 per cent instead of the 7.14 per cent allowed, and that the commission failed to make due allowances for intangibles and erred in allowing only \$3,000,000 instead of \$8,700,000 for going value.

City Counselor Muench has stated the city will also ask for rehearing, but did not announce the basis for such appeal. It also probably will attack the \$63,500,000 valuation fixed by the commission as too high.

condition of the property, as compared with conditions in the past, the commission is of the opinion that \$800,000 is a reasonable and just amount for this company to place yearly in its depreciation reserve fund.

The company has accumulated \$8,500,000 in the depreciation reserve.

The commission allowed \$3,000,000 for "going value" and \$2,042,164 as working capital.

The capitalization of company is \$50,843,020, leaving an excess of valuation over capital of \$15,156,980.

In arriving at the \$66,000,000 valuation the commission took a middle of the road course, as the \$63,500,000 valuation on the operating property practically "splits the difference" between the \$75,000,000 asked by the company and the \$53,000,000 contended for by the city. The set-up is:

Original cost physical property other than land.....	\$49,355,565
Reproduction cost physical property (estimated).....	73,392,609
Reproduction cost less depreciation.....	55,044,457
Land (present fair market value).....	4,700,000
Cost of franchises, amounts actually spent.....	208,522
Materials and supplies.....	1,442,164
Cash working capital.....	600,000
Going value.....	3,000,000
Rate-making valuation.....	66,000,000

In this connection the commission's ruling in part reads:

The commission is of the opinion that stress should not be put on either the original or reproduction cost of this property. The commission is attempting to fix a value that will keep the car-rider from seeking some other means of transportation and at the same time give the company a return as nearly just as is possible and still keep its customers. The commission believes that an 8-cent adult fare will not produce excessive return.

The estimated net return of \$4,535,407, which the 8-cent fare is calculated to produce, is sufficient to pay \$1,884,975 interest on all the outstanding bonds and the \$494,294 needed for the 7 per cent dividend on preferred stock. This will leave \$2,156,183 available for return to the holders of 343,645 shares of common stock, or \$6.28 a share. This stock was issued at \$12.50 a share, but had an actual valuation of about \$18.50.

Under the commission's ruling the book valuation of the common stock has been greatly increased. The total of all the outstanding bonds and preferred stock is \$46,547,458. This sum deducted from the \$66,000,000 valuation leaves \$19,452,542 valuation for the common stock, or \$57 a share.

However, the calculations of estimated net return for the company have not taken into consideration any probable increase in wages for the platform men and shop workers affiliated with the Amalgamated Association. The Public Service Commission has been selected to arbitrate the differences between the company and its workers on the wage question. The commission probably will not give its final decision in the wage question for many weeks. Neither side has presented its evidence to the commission.

The St. Louis Public Service Company on June 23 asked the Missouri Public Service Commission to establish

an 8-cent fare in each zone on the Missouri Electric Railway operating between Wellston and St. Charles, Mo., and its branch lines, effective July 1. In the past the fare on that line has followed the rates fixed for the St. Louis city lines, which on July 1 advance to a flat rate of 8 cents for adults and 3 cents for children.

S. W. Greenland, vice-president and general manager of the company, believes that the 8-cent fare will produce far less additional revenue than anticipated by the commission. He pointed out that when the state commission fixed the rate at 8 cents or two tokens for

15 cents it estimated that the company's revenues would be increased \$1,250,000 a year, but while the period covered in this estimate expires on July 5 present indications are that the increase will not exceed \$500,000. The reason has been the progressive decline in street car travel.

The company is also facing higher operating costs due to the demands of the Amalgamated Association for increased wages for carmen and shop workers of from 5 to 10 cents an hour. Company officials estimate that if these demands are met in full the payrolls will increase \$1,800,000 a year.

Subway System Suggested in Cleveland

Local railway not committed at present to \$30,000,000 project. Plan is to make new line pay for itself out of earnings

THE "penny subway" proposal, first broached two years ago, has come to the front again in Cleveland, Ohio. Raymond Cragin, author of the plan, announced recently that financing is assured and he has submitted to the City Council an ordinance authorizing the Cleveland Subway Company to build subways to cost \$30,000,000, to be operated by the Cleveland Railway when complete.

The name "penny subway" is derived from the method of financing. The plan is to allot 1 cent out of each car fare paid the Cleveland Railway for the next 35 years to a fund to pay 6 per cent interest on the \$30,000,000 bond issue and at the same time amortize the principal.

A limit of \$30,000,000 of construction is fixed because it is estimated that 1 cent on each car fare will produce enough to retire this amount in 35 years with a safe margin on the basis of the average number of fares collected each year by the Cleveland Railway for the last ten years.

Subway routes provided in the Cragin ordinance are:

Two-track subway in Superior Avenue Northwest, connecting with the lower deck of the Detroit-Superior high level bridge and looping under the Public Square.

Four-track subway in Superior Avenue Northwest, starting at East

Twelfth Street and with two loops under the Public Square.

Two-track, subway connecting with the East Superior subway at Payne Avenue Northeast, entering Chester Avenue Northeast at East Thirteenth Street and proceeding east under Chester and the proposed Chester extension, connecting with Euclid Avenue surface tracks at University Circle.

If sufficient balance is left in the \$30,000,000 fund when these units are built, the following lines will be built under the ordinance:

Two-track subway in Ontario Street from Woodland Avenue Southeast to the Public Square.

Two-track subway in West 25th Street from the lower deck of the Detroit-Superior high level bridge to a point south of Lorain Avenue, with a branch in Lorain Avenue to a point beyond West 28th Street.

The ordinance provides in addition that the Council may substitute new routes for any of those specified, provided the cost of the new route keeps the total cost within the limit of \$30,000,000.

The entire \$30,000,000 will be furnished by the Equitable Trust Company, New York, Mr. Cragin said. The profits of the Cleveland Subway Company are to be derived from two sources—advertising concessions in the subway stations and the difference between the rate at which it can borrow money and the 6 per cent charge which is to be met by the car riders out of fares.

Under existing provisions of Ohio law, a municipality is not permitted to own stock in a public service corporation furnishing transportation. But if the city ever acquires the right to take title to the subways, it may do so any time after their completion. In the meantime, the title is to be vested in a trustee. But when they are paid for the lines will be the property of the city.

The ordinance also contains provisions that the city may contribute

Bright Red Trains

ALL passenger and freight cars of the Arkansas Valley Interurban Company, operating between Newton, Wichita and Hutchinson, have been painted a bright red and equipped with musical whistles. Officials declare that motorists can see a red car at a greater distance, and the new color therefore should aid in reducing accidents.—*Topeka Capital.*

money from taxation or other sources to the funds used for subway construction, so that the proposed subway system may be extended as the need arises.

OPPOSITION TO THE PLAN DEVELOPS

Opposition to the plan developed even before the ordinance was introduced in the Council. One bone of contention is that the method of financing would place the entire burden of construction on the car riders and that no part of the cost would be paid by automobile drivers, and owners of property specially benefited. Opponents of the Cragin plan also have said that if the city intends to assess subway construction costs solely against car

riders, the city could direct the Cleveland Railway to build subways and the Cleveland Railway could finance the job through bonds at less than 6 per cent, or issue stock at 6 per cent, which would not require the accumulation of a retirement fund.

The Cragin ordinance cannot go into effect, even if passed by the City Council, unless it is approved by the Cleveland Railway. Officials of that company were unaware of the details of Mr. Cragin's plans until they were announced in the newspapers. Joseph H. Alexander, president of the company, has declined to comment on the plan, beyond saying that the company had not been consulted and had not entered into any commitments.

vice-president and general manager of the A. W. Shaw division of the business, which will be known as the "A. W. Shaw Company, a division of the McGraw-Hill Publishing Company, Inc." The McGraw-Shaw Company will also be operated as a division of the McGraw-Hill Publishing Company.

The Shaw organization publishes *The Magazine of Business, System, and Industrial Distributor and Salesman*, while the McGraw-Hill organization is the publisher, either directly or through subsidiary and affiliated companies, of more than twenty leading business papers, and of engineering and business books. Among its papers are *ELECTRIC RAILWAY JOURNAL, Bus Transportation, Electrical World, Engineering News-Record, Power, American Machinist Engineering & Mining Journal, Chemical & Metallurgical Engineering* and *Radio Retailing*.

The two companies have had a close relationship since last fall when they jointly formed the McGraw-Shaw Company, which publishes *Factory and Industrial Management* and *Industrial Engineering*.

McGraw-Hill and Shaw Company Merge

Consolidation affects twenty engineering and industrial papers and "Magazine of Business," "System" and "Industrial Distributor and Salesman"

A CONSOLIDATION affecting two large publishing interests was brought about on June 29 by the merger of the McGraw-Hill Publishing Company, Inc., of New York and the A. W. Shaw Company of Chicago.

Two reasons for the merger are stressed by the officers of the merging companies. The magazines of the two organizations are complementary in character. The Shaw papers cover business broadly, giving the business man an understanding of what is going on in all branches of trade, industry and finance. Their service is extensive in character. The McGraw-Hill service, on the other hand, is intensive. Its magazines afford a highly specialized service to given major industries and to related industrial groups. Thus the consolidated companies serve the business man in both his general and special business interests. The second reason is the very evident economy and increased effectiveness of consolidated operation, enabling a superior service to be rendered to the whole sweep of American business. A statement by Mr. Shaw said:

It is gratifying to me after long years spent in developing the Shaw publications to have them put together with the strong group developed under Mr. McGraw's leadership. The combination will strengthen both groups. *The Magazine of Business* and *System* cover broadly the problems of all business, and exchange knowledge between its different divisions. The McGraw-Hill papers specialize on the problems of a dozen or more major branches of industry and trade. The advantages of joint control of these related but differing publications is apparent.

The merger comes at a particularly gratifying time, when the Shaw organization, following a plan long contemplated, is re-establishing *System*, the pioneer general business paper and for more than 25 years the guide, philosopher and friend of tens of thousands of men conducting the smaller businesses of this country and the administrative work of the larger ones.

In his comment Mr. McGraw said:

Mr. Shaw's organization and ours have been working closely together for more than a year. It was apparent that the McGraw-Hill group of industrial and trade papers would have a new way of carrying the message of common business problems if it was allied with papers like *The Magazine of Business* and *System*. At the same time these publications would be immeasurably strengthened by being tied in with and assisted by the great editorial staff of more than 130 industrial and business specialists who edit the McGraw-Hill papers.

Every paper of the merging companies will be strengthened by the consolidation, and thus render greater service to its readers and advertisers, but the most conspicuous result will be the new and strong position of *The Magazine of Business*. Through Mr. Shaw's vision and courage it is a magazine of strength, standing and influence. It now becomes the capstone of the virile group of papers and the other publishing activities of the McGraw-Hill company, thus extending the scope of the latter organization to the whole range of American business. At the same time, drawing on the intimate contact with trade and industry of the large corps of McGraw-Hill specialist editors, it will speak with unexampled authority on the problems of business. It will be able to render an outstanding service to the business men of America by its authoritative information, its expert interpretation, and its fearless advocacy of sound business policies. It will fight for the interests of business but it will place in an equally important position the responsibility of business to the public. It will, in a word, stand for true business statesmanship.

A. W. Shaw will continue as chairman of the board and James H. McGraw will become president of the A. W. Shaw Company. Mr. Shaw will also become a director of the McGraw-Hill Publishing Company, Inc., and will continue as president of the McGraw-Shaw Company. Mr. Wheeler Sammons will become a director and member of the executive committee of the McGraw-Hill Publishing Company and senior

Another Strike Vote in Connecticut

A strike of employees of the Connecticut Company, New Haven, Conn., was scheduled to begin at midnight June 24, but was postponed. It was given out by those interested in affairs of the employees that a new vote would be taken at once on the matter of going on strike, as it was explained that many voted in favor of a strike without knowing it. The next vote will involve the simple question to each voter: "Are You Willing to Go on a Strike?"

J. T. Reardon, Worcester, Mass., international official of the Amalgamated Association, explained the decision to hold the strike in abeyance was due to a misunderstanding of the ballot on the part of the men. Another ballot was desired now so there would be no further misunderstandings.

The Connecticut Company offered a renewal of the wage agreement, which terminated on June 1. The wage demands call for an increase from 62 to 75 cents for both men on the two-man cars and proportionately more for one-man operators.

Committee Will Solve Boston Problems

Under an order adopted by the Massachusetts Legislature, after such action had been requested by Governor Fuller in a special message, a special committee of four senators and eleven representatives has been appointed to draft new legislation for the solution of the Boston Elevated Railway problem in Boston. The public hearings were started on June 21, but the public failed to respond and the committee then went into executive session. The committee will now study material at its disposal, such as reports and plans, and formulate a bill to submit to the Legislature which is waiting to receive it.

Progress in Toledo

Toledo's new transit plan, which provides for a monopoly of bus and railway service under the Community Traction Company, operation for at least five years, establishment of at least fifteen bus lines and extension lines, and a general rehabilitation program in addition to financing and power rate helps for the company, will probably go into effect on July 5 without interference.

Officials of the company have closed options for the purchase of the Ottawa Motor Coach, Inc., which operates fifteen buses, and for the Elm Street line, which has been operating eight buses. The new plan prohibits an independent line from operating within a quarter mile of any company-operated service and it is now believed that since the two most important independents have been purchased there will be no referendum on the ordinance and no challenge made by any of the smaller operators.

The Community Traction Company, had previously agreed to a plan of purchasing all independent bus lines at their physical value as determined by an independent commission appointed by Mayor William T. Jackson. Serving on the commission are James Aitken, radio dealer, Ben Groenewold, who is in the storage business, and Walter Stoepler, who is in the coal and cartage business. They have valued several of the properties but owners of the bus lines have been closing with the railway before announcement of the valuations.

The new power rate specified under the agreement has been approved by the Ohio Public Utilities commission. It provides for a refund to the railway of \$2,500 monthly by the Toledo Edison Company, for five years, and a new rate on a flat basis of 1.25 cents per kilowatt hour measured on a.c. basis without any demand or service charge.

North Shore Summer Trips

Special excursion trains are being operated by the Chicago, North Shore & Milwaukee Railroad each Sunday during the summer months between Chicago and Kenosha, Racine and Milwaukee, Wis., according to the new "bargain rate round-trip" policy announced by North Shore Line officials. The excursion specials leave Chicago and Milwaukee early in the morning and make the return trips late in the evening. This gives all those taking advantage of the special rates almost a complete day in whatever city they choose to visit. All-steel equipment is used on the excursion trains. Descriptive literature dealing with the various cities on the schedule is distributed to passengers en route.

In addition preparations have been made by the North Shore Line to furnish special service direct to the gates of Ravinia Park during the summer opera season. For the convenience of Chicago and suburban residents a special train will be operated each evening during the opera season, arriving at

Ravinia Park just before the program starts and leaving immediately after the performance. Chicago and suburban music lovers will also be afforded special facilities for reaching Ravinia Park on regular trains, according to an announcement by J. W. Simons, superintendent of transportation.

Special opera tickets, including round trip fare and admission to Ravinia Park, may be secured at North Shore Line stations. Tickets for seats in the open-air theater must be obtained through the opera ticket office.

Reduced Mileage Books in South Bend

A reduction of 15 per cent in the price of commutation mileage books between any two stations on the system has been announced by the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. Books containing coupons worth \$5 in straight cash fares may now be purchased at \$3. The old rate was \$3.75.

New York Surface Lines Asks Increase

The Dry Dock, East Broadway & Battery Railroad, New York, has applied to the Transit Commission for a 7-cent fare, effective as of July 24. The 7-cent fare schedules were referred by the commission at its meeting to Clarence M. Lewis, the commission's general counsel, for an opinion. The current fare is 5 cents.

The outstanding stock of the Dry Dock, East Broadway & Battery Railroad is owned by the Third Avenue Railroad. The Dry Dock operates from 6 to 8 route-miles of road in the East Side district of New York City.

The Drydock, organized in 1863, operates under a franchise granted by the Legislature under the railroad laws of 1860. Inasmuch as company functions under a franchise, the status of the present application differs from that of the Interborough, which is operating under a contract with the city. If the commission decides it has jurisdiction in the matter, it may suspend the increased rates and hold hearings on the justification for a higher fare.

Excursion Rates in Indiana

Permission to establish for a trial period a reduced "excursion" fare of 50 cents between Gary and Valparaiso, Ind., was granted recently by the Indiana Public Utilities Commission to the Gary Railways. The new rate, which will become effective July 1, is, in fact, a one-way fare and represents a reduction of 10 cents below the former single-trip rate. A corresponding reduction will be established at the same time between Gary and intermediate points on the Valparaiso interurban line and a cut from 24 cents to 15 cents in the regular one-way fare between Gary and Indiana Harbor. The new tariffs

will in no way affect or supercede the 25-cent Sunday pass established by the company on all lines last spring.

Upholds Fare Increase in Philadelphia

The United States District Court has ruled the Public Service Commission has a right to grant the Philadelphia Rapid Transit Company, Philadelphia, Pa., increases in fare notwithstanding the 1907 agreement which stipulated a 5-cent fare. In reaching this ruling, the court dismissed an equity suit of George Sambor and John J. Mullin, taxpayers, for an injunction to restore the 5-cent fare and a refund to the city of \$79,800,000 in fares.

Complainants previously had said they would appeal the case to the United States Supreme Court.

Hearing Set on Omaha Franchise

City Commissioners of Omaha, Neb., have set July 2 for a public hearing on the Omaha & Council Bluffs Street Railway franchise. The Council itself has agreed to the franchise in its present form. It calls for an election on Nov. 6 on the question of granting a 30-year franchise. The only change suggested by the Council from the draft as agreed upon between the corporation counsel and the Company is that the Council retain the control of stopping places for cars. This has reference to the skip-stop system, which the patrons, in a straw vote, recently decided to retain.

"When I accept this franchise," said President Shannahan, "I marry it; I accept it for better or for worse. The corporation counsel has included a provision that obligates the company to co-operate with the city in carrying it out. I enter into the agreement with no other purpose in view."

\$9 Monthly Pass on Pacific Electric Suburban Line

The Railroad Commission on June 20 by informal action authorized Pacific Electric Railway, Los Angeles, Cal., to establish on less than statutory notice, effective July 1, a \$9 monthly pass good for bearer and for any number of rides between Los Angeles and Santa Monica, Ocean Park and Venice.

The present 60-ride commutation fare is \$11.65. The pass therefore will result in a reduction of \$2.65 a month, in addition to giving the pass owner the privilege of additional transportation. The pass will be honored via either the Venice short line, Sawtelle line, or Hollywood-Venice line, and also be good on local street cars within the first zone of Los Angeles and within the 5-cent zone of Santa Monica, Ocean Park and Venice.

This reduced transportation is similar to the monthly pass now in effect between Los Angeles and Pasadena, and is established for an experimental period, July 1 to Oct. 31, 1928.

A New Start in Chicago

Important change of procedure relied upon to bring success in committee's effort to reach satisfactory agreement

THE City Council of Chicago and representatives of the local transportation companies will join forces in a new attack on the baffling railway problem. Instead of seeking to obtain enabling legislation first and afterward drafting an ordinance, as contemplated in previous negotiations, the new plan will be to determine the basic principles and features of a satisfactory ordinance. These points will then be drafted into an ordinance and submitted to the voters next November. If then approved by them the ordinance will be presented to the Legislature at the session in January, 1929.

This decision was reached on June 21 at the conclusion of a conference between members of the Council's committee on local transportation and officials, attorneys and bankers for the Chicago Surface Lines and the Chicago Rapid Transit Company.

A sub-committee of Aldermen is to be appointed to represent the city in the new negotiations. The same committee will probably be asked to draft, in cooperation with company representatives, the enabling legislation to be presented jointly by the city and companies to the General Assembly. On previous occasions, enabling bills have been presented independently, first, in June, 1927, by the companies, and last May by the city, both sets of bills having been allowed to die in the Legislature.

With the resumption of franchise discussions in the City Council, prospects for the construction of a downtown subway system in the near future have once more begun to brighten. The latest move in this direction was a request by Michael J. Faherty, president of the board of local improvements, for an appropriation by the City Council of \$647,000 to finance the preliminary work of planning the underground system. This money would be spent for engineering and legal aid and for the building of a \$25,000 model subway to be used in the trial of special assessment cases in court. Maintaining that a subway is, in reality, a lower level street, Mr. Faherty believes that it can be built and paid for like any other local improvement by special assessments and without additional legislation.

Consideration of Mr. Faherty's request for an immediate appropriation was continued until the next meeting of the Council on the plea that it would be unwise to build a subway without first obtaining a tenant.

A movement to have private citizens undertake the solution of the transit problem—entirely apart from the new program adopted by the City Council and transportation companies—was started on June 15, when invitations were sent out to some 40 civic, commercial and educational organizations of Chicago by the City Club asking them to co-operate on the plan. Each group was asked to send two representatives

to a conference sponsored by the City Club, who will be willing to devote a large share of their time for the rest of the year to study the various angles of the problem and to devise "a comprehensive, sound and business-like traction program."

The citizen's committee plan is in answer to the suggestion made by certain Aldermen that they would be glad to receive aid and advice in the settlement from public-spirited citizens. The committee will merely propound principles which it feels should be followed.

Illinois Franchise Will Go Over

The St. Louis, Mo., Board of Public Service on June 22 approved the proposed 50-year franchise for the Illinois Terminal System which provides for a subway and elevated system connecting the McKinley Bridge with a new freight and passenger terminal at Twelfth Boulevard and Lucas Avenue. Improvements planned by the McKinley System would cost \$5,000,000. The company would have the right to handle carload freight in St. Louis under the new franchise. It is restricted to package freight at present. On June 28 the Board of Aldermen voted to recommend the bill. This delays action on the measure until the fall as the Aldermen start on vacations June 30.

Queens Road Wants Six-Cent Fare Continued

General Lincoln C. Andrews, receiver for the New York & Queens County Railway, Long Island City, has applied to the New York Transit Commission for permission to continue to charge a 6-cent fare on the lines of the company. The present permission to charge the extra cent expires on July 1. The company has been charging the extra fare for nearly three years. General Andrews says the extra cent means a difference between operating at a loss and making expenses.

News from Houston

HOUSTON, TEX., June 24, 1928—Houston *Chronicle* today states "after careful survey among metropolitan newswriters here, Hope's new political guide to Washington is awarded first place among political pieces of the month. The prize, a palmetto fan, a pair of slightly used bedroom slippers and a Houston Electric Company street car token will be delivered to Mr. Hope, the author of "Alice in the Delighted States," by A. S. Draper, of the *Herald-Tribune*, and O. O. McIntyre following the convention." — New York *Herald-Tribune*.

Railway Station in New York Off the Air

S. W. Huff, president of the Third Avenue Railway, New York, has informed Radio Commissioner Caldwell that Station WBJ, belonging to that railway, is "prepared voluntarily to discontinue operation."

This station is relinquishing its broadcasting license to aid the Radio Commission to clear the air, and was not one of the 162 stations ordered off the air in the New York zone.

Mr. Huff wrote that the station was established for broadcasting safety campaigns, the relations between the public and the transportation company, relations between the employee and employer, and kindred subjects, along with sufficient entertainment to carry the more serious subjects, that it never entered the advertising field and that it was not operated more than six hours a week. Mr. Huff said:

I may add that we have taken an active part in the scientific work of radio development. Our electrical engineer is chairman of the committee of the American Electric Railway Association for the study of radio interference and we have been making a number of investigations to determine the causes and possible remedies of interferences derived from street railway currents, and we shall continue this research work, although we are no longer in the broadcasting field.

Commissioner Caldwell has expressed to Mr. Huff the appreciation of the Radio Board for his "public spirited action." Mr. Caldwell's letter concludes:

Your willingness to adopt the course indicated certainly deserves the commendation of the local millions of listeners who will benefit. It is to be hoped that this fine and unselfish example of your company will be voluntarily followed by other broadcasters in the metropolitan area, to the end of helping the commission solve its difficult problem of clearing the ether channels for good radio this fall and winter.

San Francisco Casts Longing Eyes at Private Road

The public utilities committee and the finance committee of the Board of Supervisors of San Francisco, Cal., on June 20 considered the expiring franchises of the Market Street Railway and instructed City Attorney O'Toole to file suit at once to establish the date of expiration, the city contending it is September, 1929, and the railway contending it is 1932. Mr. O'Toole has also been asked to report what legislation is needed for the city to take over the Market Street Railway system.

According to Mr. O'Toole three things are necessary: placing valuation on the properties of the Market Street Railway, studying the elimination of Market Street Railway lines, and having a conference with California Cable Car Company officials on properties to take over. The city attorney was authorized to go ahead with his work in this connection, for which a \$30,000 budget has been appropriated.

Foreign News

Japan Opens Subway

First city in Orient to resort to underground system for traffic solution

WITH the opening of the first link of an underground subway system to the public in December, 1927, Tokyo, Japan, is the first city of the Orient to adopt the subway as a means of solving traffic problems. The enthusiasm of the populace over the inauguration of what was to them a most novel scheme of travel was so great that close to 100,000 passengers crowded the trains and stations on the opening day, and many rode repeatedly back and forth.

The new subway, which is about 1½ miles long with two intermediate stations, connects two thickly populated sections of Tokyo for which surface lines had become inadequate, the terminals being at Uyeno and Asakusa, popular pleasure resorts. In their construction and equipment, the engineering features and general appearance are very similar to those of the subways of New York City. The excavation was open cut, roofed over with steel. It is of rectangular section and is located comparatively near the surface. The stations, even to the set spaces for advertising on the walls, are like those of New York City, and similar automatic turnstiles are used. The fare is 10 sen (4.6 cents). The possibility of earthquake disturbance received due consideration in the planning, and extra precautions were taken.

The subway was built by the privately owned Tokyo Underground Railway. The second part of the system, consisting of 1.3 miles between Uyeno and Manseibashi Stations, is now under way and will be open for traffic in about a year. The cost of the latter section will be about 3,000,000 yen (\$1,300,000), or less than two-thirds of the cost per mile for the first section, owing to more favorable terrain and as a result of the experience gained in the construction of the first section. When the other sections under contemplation are finished the entire city will be traversed and traffic will be facilitated between the outskirts and the business center of Tokyo.

The tunnel is 12 ft. high from the rails, 24 ft. wide, increasing to 36 ft. at the stations. It is double tracked with 100-lb. rails, 4 ft. 8½ in. gage.

Ten all-steel cars make up the initial rolling stock. These were built in Nagoya by the Nippon Sharyo Kaisha and their motors and control equipment were made by the General Electric Company. Each of the cars has two 120-hp. motors, and the maximum speed is 35 m.p.h., the schedule speed being 15½ m.p.h. Lighting equipment and accessories were furnished by the Tokyo Electric Company. The seats are longitudinal, and for standing pas-

sengers there are enameled metal hand loops overhead which swing away from the center of the aisle when not in use. Each car accommodates 40 seated passengers and 80 standing.

Two 1,000-kw. rotary converters in the substation supply the 600-volt direct current. The transformers were supplied by the Shibaura Engineering Works. To insure continuous operation the substation is provided with two different sources of power supply and the lighting and signal equipments have three sources of supply.

New Rolling Stock for London Underground Railways

Contracts have been placed for the following new equipment for the London Underground Railway companies, London, England:

For the Metropolitan District Railway, 101 car bodies, 184 trucks, 538 traction motors, and 263 control equipments.

For the Charing Cross & Hampstead and the City & South London Railways, 112 cars, 224 trucks, 128 traction motors, 127 control equipments, and 170 car bodies.

For the Baker Street & Waterloo Railway, 162 cars, 116 traction motors, and 57 control equipments.

Beside the above, 136 car bodies, 612 bogies, and 266 traction motors have been ordered conjointly for the Charing Cross & Hampstead, the City & South London, and the Great Northern & Piccadilly Railways, and 67 control equipments for the last-mentioned line.

With the exception of the 112 cars for the Hampstead line, the whole of the above will replace old cars now in service. It is hoped to have a large proportion of the new equipment in service by the end of this year, and the remainder early in 1929. All the orders have been placed with British firms. The new cars will be fitted with air-operated doors, in place of the gate system.

London Season Ticket Arrangements

To simplify purchase of season tickets on the London Underground Railways, London, England, the companies have decided that all season tickets will be issued from the station booking offices beginning July 1, just as are ordinary tickets. It will no longer be necessary for the passenger to call at appointed season ticket offices or to await tickets at their home stations sent from those offices. There has recently been a remarkable growth in the number of season tickets issued, and it is expected that the new arrangement will lead to further increase.

Bow Trolley Experiments

In Great Britain practically no use has been made of the bow collector for tramcars, the ordinary wheel trolley being in general service. On the continent of Europe the bow is better known. Two leading British municipal tramway authorities now intend to try it out. Birmingham is equipping 50 cars with the bow, and Glasgow is about to experiment on a somewhat smaller scale.

Spanish Railways Contemplate Electrification

Electrification of certain mountain sections of the Spanish railways and part of the Catalan system where traffic is intense, amounting in all to 1,200 miles, is now under consideration by a committee in Madrid, Spain. The committee expects to make its report within three months. The Minister of Public Works has set aside 300,000,000 pesetas (approximately \$50,000,000) for electrification, in the extraordinary budget of national reorganization.

The sections to be electrified are about 350 miles in the Norte system, and a somewhat shorter mileage in the Madrid-Alicante system. The latter sections are in the Pyrenees and in Catalonia.

Success of the electrification of the Pajares Tunnel, which includes very steep gradients, has encouraged the Spanish railway companies, although it is not expected that the substitution of electric traction for steam will prove equally advantageous everywhere in Spain. This is what the committee has to determine, and its task is difficult owing to the lack of comparable statistics.

Successful electrification in Spain is largely linked with the creation of a power belt around the whole country. This great work is being considered by the Ministry of Labor, which is collecting data and inviting technical proposals. It is stated that two American concerns are among the firms which through Spanish associates are undertaking to advise the Ministry. This power belt would tap water power or the so-called "white coal" in the Pyrenees and Cantabrian mountains and on the Ebro, Duero (as arranged in the recent Hispano-Portuguese agreement), Tagus and Guadalquivir and, finally, the brown coal deposits in the Teruel region.

Pending the fulfillment of the more elaborate program, it seems certain that the Spanish railways will continue to electrify such sections as may be feasible.

Improvement on German State Line

Single-phase motor-car service has been begun by the German State Railway system between Leipzig and Halle and between Leipzig and Magdeburg, 23 and 77 miles apart, respectively. The service is for local passengers, and is given by two-car trains. The through trains are hauled by electric locomotives.

Recent Bus Developments

Increased Fare Sought on Washington Suburban Line

An appeal for relief in the form of a 10-cent cash fare, or three tickets for 25 cents for the bus line operating on Bladensburg Road, between Fifteenth and H Streets Northeast, Washington, D. C., and Laurel, Md., has been made to the Public Utilities Commission by William F. Ham, president of the Washington Railway & Electric Company. The new schedule contemplates the issuance of free transfers between the buses and the cars on the payment of a 10-cent cash fare. Ticket users would be required to pay 2 cents additional for a transfer.

The existing rates of fare on the Bladensburg bus line are the same as those on the car lines of the railway. Free transfers are issued between the buses and the street cars at Fifteenth and H Streets Northeast under a five-year agreement between the commission and the company, which expired on April 11.

Mr. Ham's plea for a higher bus fare was made at a public hearing called specifically by the commission to determine whether the transfer arrangement contained in the five-year agreement should be disturbed. He declared that the bus line suffered a loss of \$44,511 in the five-year period, beginning April 11, 1923, when buses were substituted for rail service on Bladensburg Road.

Bus Line Rearrangements Look to Unification

What is believed to be a long step toward the ultimate unification of all methods of local transportation in Cincinnati, Ohio, was announced on June 22 by E. D. Gilman, public utilities director, in the transfer by purchase of a number of bus lines, in the securing of one independent competitor by the Cincinnati Street Railway and in the effacement of one company from the field. This result is a partial accomplishment of a plan set up in the Beeler report, urged by C. O. Sherrill, City Manager, and other officials for co-ordination that will include later operation of the municipal rapid transit system.

The transfers of bus properties are expected to avoid destructive competition and to provide a better distribution of lines serving sparsely settled territory. The Cincinnati Street Railway is to purchase the Cincinnati, Hamilton & Dayton Traction Company's bus connection from the Blue Bus Company, a connection operated from Government Square, in the heart of the city, to the interurban traction terminal on Spring Grove Avenue, a distance of about 6 miles. The Mount Airy line, serving a sparsely settled community, operated by

the Cincinnati Street Railway, is to be taken over by the City Transit Company, an independent. City Transit will also obtain from the Blue Bus Company five other lines feeding suburbs. All changes are to be effective July 1.

In commenting on the changes, Walter A. Draper, president of the Cincinnati Street Railway, said:

The rearrangement of certain bus lines

is a step in the direction of unification of operations. I have several times expressed the opinion that while complete unification is logical and ultimately desirable, the time had not been reached when this should be brought about, because, in my opinion, it can be accomplished gradually at less cost to the railway system (which is the carrying public of Cincinnati) than if it were done immediately.

The Beeler report recommends such unification as one of the necessary steps in connection with the operation of the Rapid Transit line. The changes secured by the city are all in this direction and will materially help the whole transportation system. It is a practical recognition of the soundness of the theory of unified operation.

Detroit Buses Run at Loss

Expert Mayo assigns cause to pioneering nature of lines. Suggests bids for 50 vehicles be rejected and new proposals called for 67 40-passenger autos

WITH administrative and overhead costs of the Detroit Department of Street Railways properly allocated between the rail and the coach lines the loss for the motor bus division for the year 1927 was \$260,492. This is shown in a report submitted to members of the Street Railway Commission by William B. Mayo, advisory engineer for the D. S. R.

The report was prepared for the commission as the result of a survey of bus operating and bus accounting systems, ordered by Mayor Lodge and the commission on March 12, 1928, at a session of the commission at which Commissioners Gorman and Barlum questioned the correctness of figures on the cost of bus operation in the monthly report of William M. Hauser, then auditor of the D. S. R. Mr. Gorman said that Mr. Hauser's figures for cost of bus operation for February, 1928, given as 25.12 cents a mile were too low and that the real figure was nearer 34 cents a bus-mile. Mr. Barlum pointed out, however, that since many of the department's motor coach lines are pioneering into new and undeveloped territory they are not expected to show a profit.

In his survey of motor coach operations Mr. Mayo was assisted by H. M. Gould, former assistant general manager of the D. S. R. Mr. Mayo is chief engineer of the Ford Motor Company and is a former general manager of the D. S. R.

The occasion for the desire for verification of figures of bus operation arose in connection with the consideration of bids submitted to the department on Feb. 23 for furnishing 25 to 50 new buses. In his recent report Mr. Mayo recommends that the former bids be rejected and that "for reasons of economy in operation," sixty-seven 40-passenger street car type coaches be purchased for use as follows: on the Plymouth line, eight; Ford-McGraw line, eleven; Livermore line, twenty-two; Conant line, seventeen; and for spares, nine.

It is further cited that by rejecting the bids now under consideration, a more careful consideration will be pre-

mitted of the specifications under which additional equipment is to be purchased, "a reasonable stipulation in the light of recent developments in coach construction."

The report states that the success of the bus enterprise is premised on a knowledge and proper application of production costs.

Sections of the report are quoted as follows:

Because of the distribution of population in the outlying sections of the city, some of the D. S. R. coach lines are of a pioneering nature and will continue to be so for some time, and any default accruing from such operations must necessarily be offset by a profit from coach lines in more settled districts or else from the rail lines.

There is nothing new in a situation of this kind as the same condition exists in respect to rail lines serving sparsely settled districts not only in Detroit but elsewhere. Business principles dictate that the number and amount of pioneering lines should be kept to a minimum, unless some form of subsidy is forthcoming, such as a direct contribution from the party or parties desiring the operation of such lines, or an indirect subsidy in the form of a general fare increase.

That D. S. R. motor coach operations comprise about 20 per cent of the department's activities is set forth, and it is stated that it might properly be expected that the former would bear a proportion of the interest, sinking fund and managerial charges, which is not now the case.

\$260,492 Bus Loss

It is in the setting of these proportionate costs against bus operation in 1927 that the Mayo report shows a loss of \$260,492, for the year in the motor bus division, whereas the department's financial statement for the year ending Dec. 31, 1927, shows "there is an inferred profit amounting to \$231,656 from coach operation. Mr. Mayo says:

Not only should the proper allocation of costs be made between the rail lines and the coach lines, but it should be determined which lines are paying their way and which are not. This refers to both the rail and coach lines, but more especially to the

latter, as they are used to a great extent in a pioneering type of service with a tendency for such use to increase because of a shifting in population to the outlying districts.

In referring to individual lines the report states that by allocating proportionate costs for insurance, interest, sinking fund, etc., the Chalmers line actually operated at a loss of \$17,190 and similarly the Livernois line showed a deficit of \$14,768 rather than a net profit of \$19,893. The Chalmers line, as shown in the department's financial statement, showed a profit of \$50,127.

In regard to the uses to which various types of coaches might be put the report says:

The 21-passenger coach has a definite use in sparsely settled territory and also in some thickly settled territory where frequent headway is necessary or desirable. The 29-passenger coach is the logical vehicle where the 21-passenger coach does not give the requisite capacity, while the 40-passenger and the 61-passenger coaches are admittedly for use where the loading is concentrated. For the economical use of vehicles continuous research should be made of population, traffic and transportation trends.

Mr. Mayo recommends that the Jefferson Avenue express service, now running between St Antoine Street and Lillibridge Avenue be extended easterly 2 miles to the city limits and that after a suitable trial period a plebiscite be taken to ascertain the opinion of the riders. Here the report says:

If it is found that the cost of such service is greater than street car service alone, the plebiscite might also be employed to ascertain the reaction of an increase in the fare to cover the extra cost of a faster service.

The shifting of population to the outlying districts warrants a faster service than that given by any vehicle stopping five to eight times per mile, and a faster service if it costs more, warrants a higher rate of return.

Figures are available which show that the per capita riding of mass transportation vehicles is decreasing, thereby making it necessary to employ means other than those used in the past if such vehicles are to retain their position in the transportation field.

Schedule changes, the elimination of certain outlying coach lines, or their amalgamation with other lines are contained in the engineers' suggestions and recommendations in the report cover shop and garage services, time keeping and material issuing methods, with recommendations for cutting costs and eliminating duplication of effort.

Trial Operation on St. Joseph Line in Prospect

Motor coaches will be operated parallel to the Grand Avenue car line of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., starting about July 1, according to Fred E. Henderson, superintendent of the railway department. A permit to operate the coaches for 60 days was asked by the company and granted by the City

Council, and the company is now awaiting the arrival of the new equipment. Three coaches will be operated at the regular street car fare, with transfers acceptable on all street car lines except Grand Avenue.

Extension of New Jersey Bus Service

The Port Authority of New York announced on June 27 that the two new bridges between Staten Island and New Jersey would be opened officially for traffic at 5 a.m. the following day.

At the same time the Public Service Interstate Transportation Company announced that it would operate bus lines between St. George and Elizabethport and Perth Amboy over the new bridges beginning June 29.

By acquiring the crosstown service and the Paterson-Lodi bus lines the Public Service Co-ordinated Transport now controls every passenger bus operating wholly within Paterson. Both of these companies are affiliated with the Public Service Corporation of New Jersey.

Competitive Rights Sought

Chicago Motor Coach Company's petitions for 100 miles of new routes being heard by Illinois Utility Commission

PLANS for a major expansion of the lines of the Chicago Motor Coach Company to cover approximately 100 additional miles on 40 streets in all sections of the city of Chicago are involved in hearings now being conducted by the Illinois Commerce Commission in Chicago.

Three petitions for certificates of convenience and necessity, one each for west, north and south side extensions, are being heard one by one in a series that is expected to extend through most of the summer. With its present 145 miles of route mileage, the Chicago Motor Coach company would, in case the applications are granted, operate a total of 245 route-miles. The motor coach company operates 456 single and double-deck buses at present and is adding to its fleet each month.

The Chicago Surface Lines and several city Aldermen have been attempting to obtain permission from the commission to operate buses on many of the same street as a part of, and in supplement to, the surface lines system with a 7-cent fare and free transfers to connecting car lines.

In a similar project contemplating bus service on Addison Street between Sheridan Road and the west city limits, for which privilege both the motor coach and surface lines companies had applied, the commerce commission last month granted the petition of the bus company.

The legality of the right of the Illinois Commerce Commission to empower bus lines to operate in Chicago streets without a franchise has been pending in the Illinois Supreme Court for more than two years.

Bus Extension Planned by East St. Louis Company

The East St. Louis & Suburban Railway filed with the Illinois Commerce Commission at Springfield, Ill., on June 21, three applications for permission to abandon electric railway service in St. Clair and Madison Counties and substitute buses. The company would abandon electric railway service from the northern city limits of Collinsville to Edwardsville; through service from Collinsville to Edgemont, and all passenger service from St. Louis and East St. Louis to O'Fallon and Lebanon, Ill., via Edgemont and French Village. It has also asked the right to take up its tracks between Collinsville and Edwardsville from French Village to Long's Junction, on the outskirts of Collinsville, and from Lebanon to O'Fallon.

Simultaneous with these applications the Blue Goose Motor Company, Inc., the bus subsidiary of the railway, filed requests to operate bus service from Collinsville to Edwardsville, from Edgemont to Collinsville and the Eads Bridge station in St. Louis, Mo., through East St. Louis via Eighth Street, St. Clair Avenue and Illinois Highway No. 12 to French Village, O'Fallon and Lebanon, Ill. This company now operates a de luxe motor coach service from the Eads Bridge station to Belleville, Alton and Vandalia, Ill.

Hollywood Board Wins on Improved Services

A petition of the Hollywood, Cal., Chamber of Commerce for a permit to operate a crosstown bus service in Hollywood, Cal., was denied by the Board of Public Utilities on June 19. The board did grant permits, however, for crosstown extensions totaling 6 miles, to the Los Angeles Railway and Pacific Electric Railway motor coach divisions with the approval of the Hollywood Chamber of Commerce.

North Shore Feeder System Transferred to Subsidiary

The Metropolitan Motor Coach Company will, on July 1, take over the extensive motor coach service of the Chicago, North Shore & Milwaukee Railroad. In the official announcement on June 26 Fred A. Klock, general manager of the Metropolitan system, said: "We will continue to operate coaches over established routes on regular schedules as cross-country feeders to North Shore Line trains. Bringing the bus lines under a centralized management, however, will permit of more efficient operation such as should be of great benefit to motor coach patrons."

Service of the Metropolitan Motor Coach Company has been restricted in the past to the operation of coaches on limited schedules between the Chicago Loop and downtown Milwaukee. Upon taking over the North Shore

Line's bus facilities it will extend its operations over twelve routes connecting North Shore communities with principal resorts in the northern Illinois and southern Wisconsin lake regions and important communities to the west of the rail lines. The Metropolitan Motor Coach Company operates the popularly known "Marigold Coaches." All the coaches of the Metropolitan system are painted goldenrod with green trim and bear the monogram reading "Marigold Coaches—Metropolitan System."

Other companies included in this network of motor coach lines serving communities throughout the Chicago metropolitan area are: The Western Motor Coach Company, operating coaches between Chicago and western suburbs in the Fox River Valley; the Niles Center Transit Company, furnishing service between Chicago and suburban points to the northwest; the Northwestern Transit Company, operating local bus service in Oak Park, Ill., and the Evanston Bus Company, furnishing local coach service in Evanston, Ill. The new Union Bus Depot, at Roosevelt Road and Wabash Avenue in the downtown section of Chicago, is the main terminal for all coaches of the Metropolitan system operating in and out of Chicago.

Service Between Joliet and Chicago Arranged

The Chicago & Joliet Transportation Company, the Illinois Traction System and the Alton Transportation Company, the first and the last bus subsidiaries of electric railways, have been granted certificates of convenience and necessity for the operation of bus routes which will hook up a Chicago-St. Louis through schedule and are believed to be a forerunner of the granting of one certificate, covering the entire route, to one of the companies, as soon as satisfactory schedules and agreements are worked out among the three transportation concerns.

The Chicago & Joliet will run between Chicago and Joliet, the Alton Transportation between Joliet and Carlinville and the Illinois Traction System from Carlinville to St. Louis. The franchised companies plan to establish from two to four buses each way daily within the next 60 days with more frequent trips between the Joliet and the Chicago terminals.

Substitution in Prospect in Lincoln

A. H. Cuppley, manager of the University Transit Corporation, Champaign, Ill., was in conference with Lincoln, Ill., city officials recently and as a result it is likely that bus service will be installed, probably by July 1. The bus lines will supplant the railway service, suspended on May 15. Bids will be received by the city on July 23, for junking the cars, tracks and all other equipment.

Financial and Corporate

Three Class "A" Massachusetts Roads

The Springfield Street Railway, Springfield, Mass., is one of three electric railways in the state whose securities are listed by the Department of Public Utilities as legal investments at this time for Massachusetts savings banks. The other two are the Boston Elevated Railway and the Union Street Railway, New Bedford.

Capper of Kansas Seeks Help on Washington Merger

Senator Capper, chairman of the Senate Committee on the District of Columbia, in a letter to the Bureau of Efficiency on June 22, requested that the bureau make a study of the plan now under consideration for the merger of the street railways of the District of Columbia. Mr. Capper said in part:

"I should be glad, if, during the recess of Congress, your bureau could study the railway merger problem in Washington, as presented for the consideration of our committee in the proposed unification agreement and joint resolution. I leave to your own discretion the amount and character of your study of this matter.

"The sub-committee of which I am chairman, under authority of a Senate resolution, is authorized to expend not exceeding \$10,000 for expert assistance, and we have engaged Dr. Milo R. Maltbie, to assist us. There is no reason, however, why we should not have the benefit of an independent investigation conducted by your bureau, if you are willing to undertake a study of the problem and have available whatever assistance may be needed.

"I leave to your judgment the form and plan of your investigation, as well as its scope, but the full committee and the Senate, as well, would be better able to deal with the problem of the merger if equipped with information on these subjects:

1. Fair value, for rate-making purposes, of the properties to be merged.
2. Physical condition of the properties, including equipment.
3. Condition of income and profit accounts of the carriers (whether accurately and uniformly kept in accordance with standard practice.)
4. Present depreciation reserves and provisions for reserve after merger.
5. Comparison of rates of fares in other cities.
6. Comparison of operating costs ratio in Washington and elsewhere.
7. Comparison of fixed costs ratio and general administration expense in Washington and elsewhere.
8. Comparison of power cost to street railways now and after merger. Practice

of railways in other cities as to purchase or manufacture of power.

9. Possible economies through merged operation.

10. Car-miles operated per revenue passenger here and elsewhere (to determine possible economies in routing, etc.).

11. Future of bus relationship to railway operation, and particularly, question of transfer charges.

"I should like to have your comments, in due time, upon any features of the proposed merger agreement that you care to discuss after investigation. If, your study of the situation convinces you that the merger proposal is the best possible under the circumstances, I shall be glad to have your reasons for that opinion."

Conferences Look to Ontario Acquisition

Negotiations are under way looking to the acquisition of the Windsor, Essex & Lake Shore Railway, a 36-mile railway extending from Windsor to Leamington, Ont., Canada, by the municipalities and its operation on their behalf by the Hydro-Electric Power Commission.

J. F. Collins Receiver as Part of Readjustment Plan

John F. Collins, vice-president and general manager, has been named receiver of the Michigan Electric Railway, operating city lines in Lansing, Battle Creek, Kalamazoo and Jackson and interurban lines between these cities, and to Owosso and St. Johns, by U. S. District Judge Charles S. Simons in Detroit. The move is a forerunner of a general reorganization of the company, to be negotiated at an early date.

The appointment of Mr. Collins as receiver marks the third post that he is occupying for Michigan electric lines in that capacity, he having been named receiver for the Detroit, Jackson & Chicago Railway and the Michigan Railroad some time ago.

Mr. Collins was also acting for the Michigan United Railways, when it was reorganized into the Michigan Electric Railway in 1923.

Lack of business, due to competition of the automobile and buses over concrete highways is ascribed as the reason for the inability of the Michigan Electric to pay its bond interest since Jan. 1, 1925. To date the accrued interest amounts to \$1,550,000.

When the Michigan United Railways went into the hands of a receiver in 1920, a similar condition existed, and in 1923, when a reorganization was effected, bondholders agreed to accept 50 cents on the dollar. Approximately 255 miles of electric railway lines are

operated by it, having an appraised value of \$15,000,000.

The receivership, according to Mr. Collins, will bring no immediate changes in the personnel of the road, and business will be carried on as usual, both in Jackson and in other cities where the lines touch.

Meanwhile the company will continue its efforts to secure franchises to operate trucks and buses on highways paralleling its lines, Mr. Collins announced. Hearings on this subject have

already been held before the State Utilities Commission, and a ruling is expected to come within a few weeks.

The Michigan Electric Railway, if it is given franchises on state highways, would operate a store to door system, used its facilities to carry on the work. Whether interurban or city street car lines would be abandoned in the event the motor freight franchise would be granted, would depend on its future income from these sources, officials of the company have declared.

in revenue to the Municipal Railway was in no way in keeping with the increased cost of operation.

The loss in the operation of buses causes operating deficits which make serious inroads on the reserve funds and call for grave consideration. Mr. Boeken says:

While the Municipal Railway's ability to do all these things on a 5-cent fare has been marveled at, it would have been wiser had a different policy of financing been pursued, to the end that the reserves for depreciation, etc., had been kept to a healthy level, thereby saving the necessity of undoing some of these acts.

The total bonds issued for the railway was \$5,481,000, as against a present road and equipment account of \$8,636,839, showing a difference of \$3,155,839 spent for additions and betterments, as of June 30, 1927. But the superintendent says:

In the face of the growing ratio of operating expense to revenue the depletion of the reserve funds to an ebb so low was not wise and some other method of financing some of these extensions should have been followed. If only the extensions indorsed by those qualified to pass on such matters are submitted to the people at a bond election they will receive the hearty support of the voters.

Wants Municipal Road Out of Politics

Superintendent of San Francisco system sees this as immediate need. Confidence of public in system shaken. Condemns construction of extensions for purposes of political expediency

NO ACTION has been taken on the report made by Superintendent Boeken of the San Francisco Municipal Railway, San Francisco, Cal., to the Board of Public Works on the future financial outlook for the system. It will be recalled that Mr. Boeken said that it must be plain that in order to remove the railway, as well as other public utilities, as far as possible from political control and influence, it is imperative that a non-political public utility commission be created and be intrusted with the future destinies of all of San Francisco's public utilities.

Twice has Mr. Boeken been called before meetings by the Mayor and the Supervisors and cross-examined, but he has stuck to his guns. The superintendent submitted his report with the hope that it "will bring clearly to the mind of everyone just what the railway has done, is doing and will be able to do in the future on a 5-cent fare if a proper policy is adopted." He is confident that "if the recommendations and suggestions are carried out there need be no cause for alarm as to the future financial welfare of the railway in so far as it is now developed." He says in conclusion:

It is unfortunate that the confidence of the public in those intrusted with the wel-

fare of the Municipal Railway has been shaken, at least to a certain extent, as evidenced by the defeat of the proposed bond issues for extensions last year.

The yielding to unreasonable requests for extensions, increased service, etc., which resulted in using up large sums of money from the reserve funds, requests that in some instances had very little merit and deserved very little consideration and which did not have the unqualified indorsement of those competent to pass upon such matters, is no doubt largely responsible for this loss of confidence.

It is vitally important that anything hinting of politics be removed from the future policies and operation of the Municipal Railway, to the end that public confidence shall be fully restored.

Of the ability of the system to expand he says:

There is no doubt but that the ability of the system to pioneer and develop new districts, furnish through service to those districts long before the revenue received warranted the same, all on a 5-cent fare and without any additional financing therefor (moneys being taken from reserve funds to buy new equipment, lay new tracks, start bus lines, etc.), has been overrated, and with the completion of the Judah Street line the moneys in the old depreciation fund will be practically exhausted.

These expenditures helped to develop certain districts and added to the assessment roll of the city, but the increase

RATIO OF OPERATING EXPENSE TO REVENUE, IN PER CENT

1918	1919	1920	1921	1922
59½	69½	75	73½	74½
1923	1924	1925	1926	1927
77	77½	78	79½	84½

A statement of funded debt was offered to show what the Municipal Railway has done in the way of paying off the original debt. Almost half of the bonds have been retired, and the balance is being paid off at the rate of \$200,000 a year. The report says:

It will not be possible, nor does it seem fair, in view of the present high cost of operation, to expect the Municipal Railway to be able, out of receipts, to set aside 3 per cent of the total cost of the road and equipment, amounting to more than \$250,000 a year, as provided for by Ordinance No. 7060, May 1, 1926, for replacement, reconstruction and depreciation, and at the same time pay off the original debt of the system to the extent of \$200,000 a year.

The result of operation for the calendar year 1927 indicates that about \$140,000 would have been all that could have been placed in the depreciation fund had there been no other funds available to meet the bond redemption payments. Due to the fact that reserves, in so far as the old depreciation fund is concerned, will be practically all used up in the completion of the Judah Street Line, it will be necessary to look to the present depreciation fund for relief in meeting the semi-annual bond redemption payments. Mr. Boeken then says:

With certain savings to be made, as recommended in this report, and with a gradual increase in receipts, as indicated, of more than 2 per cent since November, 1927, it should be possible without resorting to any drastic measures in the way of service reduction (which I believe would

STATEMENT OF FUNDED DEBT AT SAN FRANCISCO

Issue	Total Issued	Annual Maturity	Interest Rate Per Cent	Final Redemption	Unmatured	Retired	
Geary Street.....	1910	\$1,900,000	\$95,000	4½	July 1, 1934	\$665,000	\$1,235,000
Market Street.....	1910	81,000	3,000 and 6,000	4½	July 1, 1934	30,000	51,000
Municipal Railway..	1913	3,500,000	100,000	5	Dec. 1, 1952	2,500,000	1,000,000
Totals.....		\$5,481,000	\$198,000 and 201,000			\$3,195,000	\$2,286,000

Note—Geary Street and Market Street redemption date is July 1 of each year. Municipal Railway redemption date is December of each year.

OBLIGATIONS TO BE MET

Bond redemption, July 1, 1928.....	\$96,000
Bond interest (Municipal Railway bonds) June 1, 1928.....	62,500
Bond interest (Geary Street and Market Street bonds), July 1, 1928.....	15,637
Market Street Railway account, Crossing Litigation.....	32,000
Total obligations.....	\$206,137

AVAILABLE RESOURCES AT SAN FRANCISCO

Cash balance, Municipal Railway operative fund, Jan. 31, 1928.....	\$61,943
Accrued interest on securities owned.....	12,089
Due account West Portal Avenue.....	2,715
Due from Harbor Commission.....	8,228
Estimated subsidy from Harbor Commission on, five months at \$475 (Feb. 1 to July 1, 1928).....	2,375
Estimated income from operations, February to July, 1928.....	\$25,045
Total resources.....	\$112,397
Estimated deficit.....	\$93,739
In addition to the resources listed above, there are Accounts Receivable as follows:	
Due from general fund account Twin Peaks Tunnel.....	\$32,152
Due from general fund account Stockton Street Tunnel.....	48,971
Due from general fund account Ocean Shore Switching.....	1,000
Total accounts receivable.....	\$82,123
Unencumbered balance accident reserve fund, Jan. 31, 1928.....	\$109,856
Unencumbered balance depreciation reserve fund, Jan. 31, 1928.....	378,781
Unencumbered balance depreciation fund Jan. 31, 1928.....	51,547
	\$540,186

NOTE:—The construction of a garage, estimated at \$50,000, including land, is considered very necessary for the housing and repairing of buses.
 * For the seven months ending Jan. 31, 1928, operating revenue showed an increase of \$37,377.78, or 1.8938 per cent. During the same period operating expenses increased \$88,721.63, or 5.3153 per cent. Assuming the same ratios of increase in revenues and expenses for the remaining five months of the fiscal year will leave a net income of \$25,045.97, after deducting \$107,960.50 for Depreciation reserve and \$36,250 for Accident reserve.

be unwise) materially to build up the depreciation fund, at least to a greater extent than was done last year. Any deficits in the future might well be considered as "Deferred Depreciation Liabilities" to be repaid as soon as the annual bond redemption payments are reduced, which will be in 1934.
 A very clear idea of the state of Municipal Railway finances, as of Jan. 31, 1928, since operating under the provisions of Ordinance No. 7060 of the Board of Supervisors, effective May 1, 1926, is conveyed in the accompanying statement of obligations to be met.

INCREASE IN RECEIPTS FOR PAST FIVE YEARS

Calendar Year	Receipts	Increase Over Previous Year	Per Cent
1922	\$2,922,720		
1923	3,077,991	\$155,270	5.3125
1924	3,202,252	124,261	4.0371
1925	3,328,099	125,847	3.9300
1926	3,341,940	13,840	.4159
1927	3,355,981	14,041	.4202

In summing up the car line schedules, it did not appear to Mr. Boeken that any appreciable reduction in service could wisely be made; in fact, while slight reductions might be reasonably made on some lines, the saving would hardly meet the increases properly due other lines. The superintendent said that the excellent record made by the men who operate the cars, good roadbed and perfect condition in which the rolling stock has been maintained have, to a great extent, been responsible for keeping down accidents and made possible the large saving under the amount estimated as necessary.
 Since May 1, 1926, 2½ per cent of the gross passenger revenue has been set aside for accident reserves, with

\$100,000 from the former fund as an initial deposit.

In commenting on the item "Revenue Credits" Mr. Boeken says it is not a proper method to pursue, as no like allowance is made to street car lines for transfers received from bus lines, the result being that bus lines are credited with 7½ cents and the car lines with 2½ cents of each round-trip fare.

A table of bus fare rates charged by the various railways operating buses was introduced to bring out the fact that the Municipal Railway, with a charge of 5 cents with nothing additional for a transfer, is receiving a much lower rate of fare than the average of 8.48 for 245 other comparable installations.

Mr. Boeken said the elimination of transfers between buses and street cars would not create an unreasonable rate of fare, taking into consideration the length of route, etc., and he recommended that these transfer privileges be discontinued.

The estimated increase resulting from the recommendations made in the report approximate \$50,000 a year and "will very materially build up our reserve funds." He frowned upon any further reduction of schedules.

Loss on Bamberger Line \$6,642

A loss of \$6,642 was suffered by the Bamberger Electric Railroad, Salt Lake City, Utah, in 1927. The reports show the operating revenues were \$559,229, or \$14,118 less than in 1926. Operating expenses were \$444,711, or \$156 less than in 1926, leaving the net revenue

TOTAL LOSS ALL SAN FRANCISCO MUNICIPAL BUS ROUTES

	Calendar Year 1927	Five Years
Receipts.....	\$98,144	\$269,825
Mileage.....	691,814	2,194,720
Number of passengers (cash).....	1,962,401	5,397,801
Number of transfers.....	977,039	3,334,115
Number of quartermaster tickets.....	300	723
Number of school tickets.....	55,368	186,458
Loss exclusive of revenue tickets.....	\$108,679	\$279,524
Loss including revenue credits.....	82,853	191,469
Operating cost per mile.....	.29896	.25031
Operating revenue per mile, including revenue credits*.....	.17920	.16307
Operating revenue per mile exclusive of revenue credits.....	.14187	.12294

* The item "Revenue Credits" consists almost wholly of an allowance of 2½ cents for each transfer received on buses from street cars.

from railway operations at \$114,578. This is a sum \$13,961 higher than the preceding year. From a gross income of \$82,996 the company had total deductions amounting to \$89,639.

Receiver Likely for Auburn & Syracuse Road

T. C. Cherry, president of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., is slated for appointment as receiver of the company. More than a year ago the company defaulted in the payment of the interest on its bonds. Since then a protective committee representing the bondholders has been at work securing pledges of the bonds. That committee now has about finished its task. Mr. Cherry is receiver of the Empire State Railroad. Recent moves in connection with both of these companies presage their probable early reorganization.

\$155,344 Deficit in Indianapolis

Total net earnings of the Indianapolis Street Railway, Indianapolis, Ind., less taxes for the year ended Dec. 31, 1927, were \$940,770. From this figure \$639,914 was subtracted for interest deductions, leaving a surplus exclusive of accrued depreciation of \$300,855. After the consideration of deductions from this surplus the balance was a deficit of \$155,344. These figures were disclosed in the annual report of the company

EARNINGS AND OPERATING EXPENSES OF THE INDIANAPOLIS STREET RAILWAY

	1927	1926
Earnings.....		
Passenger receipts—		
City lines.....	\$4,313,446	\$4,425,529
Transfer receipts—		
City lines.....	293,938	310,866
Miscellaneous earnings—		
Track rentals.....	807,285	782,398
Gross earnings.....	\$5,414,670	\$5,518,794
Operating expenses—		
Maintenance of way and structures.....	\$588,132	\$610,914
Maintenance of equipment.....	499,122	502,982
Total maintenance.....	\$1,087,255	\$1,113,896
Operation of power plant and substation.....	\$760,689	\$756,813
Operation of cars and buses.....	1,911,591	2,028,500
General expenses.....	418,440	444,135
Total operating expenses.....	\$4,177,976	\$4,343,346
Net earnings.....	\$1,236,693	\$1,175,447
Less taxes.....	295,923	294,872
Net earnings, less taxes.....	\$940,770	\$880,575

and presented at the annual meeting of the stockholders June 13, 1928.

On the subject of buses the report says that the company recognized the necessity of a co-ordinated system of street railway and bus transportation in the city of Indianapolis and so through an order of the Public Service Commission acquired the entire capital stock of the People's Motor Coach Company. At the present time 45 buses are being operated by the People's Motor Coach Company and 27 by the Indianapolis Street Railway.

During the year the erection and installation of equipment of five new substations were completed. Many im-

provements in replacement and renewal work were also effected.

Benefits resulting to employees and their families from the operation of the pension fund and benefit association justified the company's annual contribution of \$5,000. During the year 1927 \$30,354 was paid to employees and beneficiaries out of these two organizations.

Bonds to Finance Improvements on Indiana Line

Authority to issue \$1,000,000 of 25-year 6 per cent first mortgage bonds and to issue 10,000 shares of common stock and sell 100 shares at \$100 each was asked in a petition filed with the Indiana Public Service Commission recently by the Indianapolis & Southeastern Railroad. The company recently took over the property of the Indianapolis & Cincinnati Traction Company following its sale under foreclosure. The petition sets out that proceeds from the securities are to be used to consummate the deal and make other purchases and additions, including ten new cars to cost \$185,000.

Amendments Sought to Central Public Service Charter

At a meeting to be held on July 9 stockholders of the Central Public Service Corporation, Chicago, Ill., will be asked to approve amendments to the corporation's charter whereby the class A stock will be given full rights of participation with the common stock in both earnings and surplus in liquidation. It is proposed to give the class A stock priority over the common stock to the extent of \$1.75 a share annually in earnings and \$30 a share in liquidation. In addition the class A stock is to participate equally with the common stock in earnings and surplus in liquidation after the common stock has received an amount equivalent to class A priority. President Pierce said:

The very material increase in the properties of Central Public Service Corporation, combined with the normal growth in the company's business, has made it advisable to augment the present features of the class A stock in a manner to make it attractive to a wider class of investors.

The present limitations with respect to dividends and to surplus in the event of liquidation are such that possibilities of material market appreciation are negligible. Furthermore, the vast number of investors in utility common stocks have not been interested in the Central Public Service class A because of its definite limitation in participating in the future of the properties.

The gross earnings of the corporation are at the rate of \$13,500,000 annually at the present time and the balance available for dividends on the preferred, class A, and common stocks is more than \$1,800,000, or several times the amount required. The class A stock is currently paying dividends at the rate of \$1.75 yearly.

The Central Public Service Corporation recently came into ownership of the Rockford, Portsmouth, Huntington, Roanoke and Lynchburg railways.

Personal Items

T. A. Kenney Allied Vice-President

Officer of Hodenpyl-Hardy companies and chairman of railway association's finance committee in executive post with new consolidated company

T. A. KENNEY has been elected a vice-president and director of the Allied Power & Light Corporation, New York, formed recently to consolidate the interests of Hodenpyl, Hardy & Company, Inc., and Stevens & Wood, Inc. He was recently made a director of the Commonwealth Power Corporation.

Mr. Kenney's entire business career has been spent in the utility business.



T. A. Kenney

In 1912 he joined the Hodenpyl-Hardy organization in the capacity of manager of the production and transmission department of the Consumers Power Company, with headquarters at Jackson, Mich. That company was then consolidating a great many widely scattered hydro-electric companies in the state and interconnecting them—all of which required further pioneering work. This resulted in the development and successful operation of the first 140,000-volt transmission system. Four years later he came to New York as assistant to B. C. Cobb in charge of operations of the Hodenpyl-Hardy properties, one of the largest public utility groups in the United States.

Mr. Kenney was born in Mechanicsville, N. Y., on Jan. 5, 1882. After he left school, Mr. Kenney entered the employ of the Hudson River Power Transmission Company, which subsequently became a part of the Adirondack Water Power Corporation. This early association, which afforded him experience at first hand with the electrical industry, included not only high voltage power transmission (so-called)—12,000 volts, but local electric distribution, industrial power application and electric railway operation as well.

In addition to his executive duties, Mr. Kenney has been prominently identi-

fied with the National Electric Light Association and the American Electric Railway Association activities. He is at present a member of the public policy committee of the National Electric Light Association, and in addition to being a member of the executive committee of the American Electric Railway Association is chairman of the finance committee of that organization.

In addition to his duties with the Commonwealth Power Corporation and the Allied Power & Light Corporation, Mr. Kenney is vice-president of the following companies: The Tennessee Electric Power Company, Northern Ohio Power & Light Company, Consumers Power Company (Michigan) and Nashville Railway & Light Company. He is a member of the board of directors of the Northern Ohio Power & Light Company, Northern Ohio Power Company, Consumers Power Company, Tennessee Electric Power Company, Electric Railway Securities Corporation, Southern Michigan Light & Power Company and Nashville Railway & Light Company.

B. H. Saunders Chairman of North Jersey Commission

Bertram H. Saunders, Paterson, N. J., has been elected chairman of the North Jersey Transit Commission to fill the unexpired term of Daniel A. Garber, Ridgewood, who resigned following his recent appointment as general manager of the Association of General Contractors, with headquarters in Washington. This is a position which has taken Mr. Garber to the Mississippi River territory as a member of a government subcommittee on flood control and has necessitated his continued absence from New Jersey.

Mr. Saunders and Mr. Garber were appointed by Governor Silzer of New Jersey on the original commission set up by the State Legislature in 1922 to study means of improving mass transportation in northern New Jersey. Mr. Saunders served as chairman from 1924 until 1926, and was replaced by Mr. Garber that year.

W. C. Slade Heads New England Street Railway Club

Walter C. Slade, vice-president of the United Electric Railways, Providence, R. I., since 1925, was recently elected president of the New England Street Railway Club at the meeting held in Boston on May 24. Mr. Slade has been identified with the Providence property since September 1915 when he became superintendent of power and lines of the company then known as the Rhode Island Company. Mr. Slade's first position was with the General Electric Company at Pittsfield, Mass. His work

in Providence has been especially noteworthy for the modernization program affecting the power system which involved an expenditure of slightly more than \$2,000,000.

Mr. Slade was born in Providence in 1885 and was graduated from Brown University with the degree of Ph.D. in 1907. Later he was graduated from the Massachusetts Institute of Technology.

As a result of an error in the telegraphic account of the meeting which appeared recently in the JOURNAL it was made to appear that Ralph Bauer, one of the speakers at the meeting, had been elected president.

M. R. BOYLAN, vice-president of Public Service Co-ordinated Transport, Newark, N. J., and Martin Schrieber, manager of plant and equipment of the company, sailed on the *Majestic* on June 22 on a visit to London, Paris and Berlin. They will, so far as the opportunity presents, study co-ordinated transportation in its possible application to the lines of the company of which they are officers. They plan to return to the United States in August.

R. P. Stevens Elected by Commonwealth Power

R. P. Stevens, president of Stevens & Wood, which was recently linked with Hodenpyl, Hardy & Company in the Allied Power & Light Combination, has been elected vice-president, director and member of the executive committee of the Commonwealth Power Corporation, in which the new utility company owns a substantial interest. T. A. Kenney, as noted elsewhere, and H. S. Scarritt, member of Bonbright & Company, have also been elected to the Commonwealth board. They succeed Earl S. Colman, W. M. Flook and Waldo S. Reed.

C. T. DeHore Heads Reorganized Company

Charles T. DeHore and L. E. Eastman, purchasers of the property of the Indianapolis & Cincinnati Traction Company at receivers' sale, are among the organizers and incorporators of the Indianapolis & Southeastern Railroad, the successor company. Mr. DeHore became president and Mr. Eastman vice-president of the new company. Other incorporators were Frederick D. Rose, Muncie, banker; A. M. Miller, Rushville; Miss Theresa Reardon and Donald L. Smith, attorney.

JOHN H. DELANEY, chairman of the Board of Transportation, New York, N. Y., was reappointed to that position for a period of six years on June 23. Mr. Delaney's term did not expire until July 1, 1930, but the term of Commissioner Frank X. Sullivan was about to expire. Commissioner Sullivan was sworn in for the rest of Commissioner Delaney's term.

Luke C. Bradley Leaves Providence

President of Rhode Island Public Service to become connected with Electric Bond & Share Company

LUKE C. BRADLEY, president of the Rhode Island Public Service Company, which some time ago took over the United Electric Railways and the Narragansett Electric Lighting Company, announced on June 23 that he will submit his resignation to the directors of the company at their July meeting. The resignation is to become effective Aug. 1. He will assume an executive position with the Electric Bond & Share Company, New York.

Mr. Bradley's statement announcing his resignation follows in part:

I am resigning to become associated in an executive capacity with the Electric



Luke C. Bradley

Bond & Share Company of New York City. I am leaving Providence with real regret and only because of the larger opportunity presented to me.

Above all I regret to sever my connection with the men and women of the United Electric Railways and the Narragansett Electric Company, from whom I have received the fullest co-operation and loyal support.

Early in February, 1927, Mr. Bradley was elected president of the service company, to succeed Louis C. Gerry. Mr. Bradley resigned a similar position with the Virginia Electric & Power Company to accept the Providence offer.

Associated with Stone & Webster, Inc., Boston, in executive positions for many years, Mr. Bradley had varied experience as directing head of utility companies in different parts of the country. As president of the Virginia company, he had direct supervision over electric light and power properties, electric railways, bus systems and gas properties operating in more than 40 cities in the states of Virginia and North Carolina.

Mr. Bradley was also executive vice-president and division manager of utility properties under the management of Stone & Webster in the Southwest serving more than 100 towns and cities. He is recognized as one of the

most successful executives in the public utility field.

The Electric Bond & Share Company, with which Mr. Bradley is to be affiliated, supervises probably the largest number of electric light and power companies in the United States.

F. D. Comerford to Succeed Mr. Bradley in Providence

Frank D. Comerford, president of the New England Power Association, will probably be elected to succeed Luke C. Bradley as head of the Rhode Island Public Service Company.

It is learned also that William C. Bell, formerly general manager of the Rhode Island Public Service Company and recently elected vice-president of the power association, which controls the service company, will supervise operations of both the Narragansett Electric Company and the United Electric Railways, which make up the service company. Frank L. Swan, successor to Mr. Bell as general manager of the service company, will continue in that capacity.

No changes are expected in executive positions of either the Narragansett Electric Company or the United Electric Railways.

In addition to heading the parent company, Mr. Comerford is a director of the Public Service Company. He is only 34 years old, and was named last November to succeed Henry I. Harri-man as head of the power association, which controls public utilities throughout New England.

Obituary

FREDERICK HUNTINGTON PARKE, a veteran engineer of the Westinghouse Air Brake Company at Wilmerding, Pa., died on June 16. He became connected with the Westinghouse Machine Company at East Pittsburgh, early in his career, remaining with that organization until 1898, when he entered the employ of the Westinghouse Air Brake Company. Soon he was sent to Russia to assist in the construction of the air brake plant at St. Petersburg and in the formation of the engineering organization. He remained in Russia until 1902 when he returned to Pittsburgh. Since then he has been at the Wilmerding works, where at the time of his death he was general engineer. Mr. Parke received his early education at St. John's School in Manlius, N. Y. He was graduated from Cornell University as a mechanical engineer in the class of 1892.

WILLIAM B. JOHNSON, sales representative for Ross F. Hayes, railway supplies, New York, N. Y., died on May 27. Mr. Johnson was 28 years old.

PAUL V. CLODIO, formerly sales manager of the Bragg-Klicsrath Corporation, Long Island City, N. Y., died recently.

Manufactures and the Markets

\$1,000,000 for Montreal Track

Of the principal track jobs being done by the Montreal Tramways, Montreal, Canada, this year, two are for extension of the company's lines farther into the outlying sections. On Delorimier Avenue, the double track is being extended from Rachel to Masson Streets, about 1 mile. On this job the rails will be welded instead of using plates.

The other extension into new territory is on Van Horne Avenue. Double tracks on this street will be extended for approximately 1½ miles, from Hartland Avenue, the present terminus of that line, to Cote des Neiges Road.

Two important city jobs are: On St. Denis Street, between Craig and St. Catherine Streets, where new tracks are being substituted for old, the job being about half accomplished at this date; and on Craig Street, from St. Denis to Papineau Streets, where the tracks also are being renewed. In addition there are quite a number of minor jobs, including a few intersections.

One million dollars is being spent by the company on this work during the present year, which is an average appropriation for the construction and reconstruction activity of the company for one year.

D. S. R. Track Improvements Finished This Year

Approximately \$1,000,000 is to be expended during this summer on track rehabilitation by the Detroit Street Railway, Detroit, Mich. This will make the system modern as far as tracks are concerned.

The new rails, ties and pavement laid last year on Woodward Avenue from the Boulevard to Philadelphia Avenue, will be extended north several blocks this year, while the plans also call for new equipment in Grand River Avenue from Trumbull Avenue west. A number of construction projects are now under way.

New York Cars to Have Safety Devices

The New York Transit Commission has made public an order to all electric railways in the city to install additional safety devices. The order followed hearings before Commissioner Lockwood at which it was found that of 1,110 one-man cars in operation, 85 were without safety devices, and 510 were only partially equipped. The order provides specifically that all one-man cars shall be equipped with the following devices:

1. Sliding or folding doors, interlocked with either the controller or the air brake system.

2. The so-called "dead man button," which requires the weight of the motor-man's hand on the controller handle, or his foot on the control valve. When either hand or foot is removed from the operating position, the power is cut off and the brakes automatically are set.

3. An emergency exit in addition to the regular entrance door.

The companies are directed to equip 25 per cent of their one-man cars with the devices within six months, an additional 25 per cent within a year, and the remainder in from eighteen months to two years.

Improved Facilities for Steel in Miami Valley

Linking of the American Rolling Mill Company and the Hamilton Iron & Coke Company by the transportation of a ladle of hot metal from the blast furnace at Hamilton, Ohio, to the East Works of Armco at Middletown, Ohio, by way of a special track built by the Baltimore & Ohio Railroad, marks another epochal event in the industrial life of the Miami Valley. The event heralds the beginning of a new era in steel making in the valley, which has already become a great factor in the commerce and industry of the world, as it will tend to permanently stabilize the industry in this location.

Not only in steel making, but also in

Exhibitograph No. 13

Important to Exhibitors!
Return orders for current, compressed air, furniture, flowers and drinking water to

Exhibit Committee

American Electric Railway Association

292 Madison Avenue
New York City

NOW

if you haven't already done so.

railroad transportation, is this event widely significant. Molten metal will be carried daily over 10 miles of track specially constructed for the purpose. Due to the concentrated load of such large tonnage, it was necessary to design and build a special bridge over the Miami River having almost 50 per cent greater capacity than any other railroad bridge ever built. It requires about 2½ hours to make a round trip to Middletown and there will be an average of four trips every 24 hours.

Three specially designed mixer ladles, double lined with fire brick, are used to carry the molten metal, which can, when necessary, be held in the ladle 48 hours. The capacity of these ladles is 150 tons each. The metal is poured from the large ladle car into a small open ladle, from which it is poured directly into the

Specifications on Ten Monongahela Cars

Five interurban and five city type cars are being built for the Monongahela-West Penn Public Service Company, Fairmont, W. Va., by the G. C. Kuhlman Car Company, as mentioned in the April 21 issue of the JOURNAL. They are of the one-man, two-man, motor driven, double-end, double-truck type.

Each car is 45 ft. 3 in. long, 8 ft. 6 in. wide and weighs 32,000 lb. The city type cars have a 30-in. seat spacing and

accommodate 48 passengers. The interurban cars have a 33-in. seat spacing and seat 44 passengers. Window post spacing is 42 in. on all cars. The seats are wood in the city cars and leather upholstered in the interurban cars. The bodies are of semi-steel construction with arch roofs and folding end doors. Each truck is equipped with two inside-hung motors, and 22-in. rolled steel wheels. Further details are given in the accompanying specifications.

Weights:	
Car body.....	16,500 lb.
Trucks.....	9,000 lb.
Equipment.....	6,500 lb.
Total.....	32,000 lb.
Bolster centers.....	23 ft. 4 in.
Length over all.....	45 ft. 3 in.
Length over body posts.....	33 ft. 3 in.
Truck wheelbase.....	5 ft. 4 in.
Width over all.....	8 ft. 6 in.
Height, rail to trolley base.....	10 ft. ½ in.
Window post spacing.....	42 in.
Body.....	Semi-steel
Roof.....	Arch
Doors.....	End, folding
Air brakes.....	Westinghouse
Armature bearings.....	Ball
Axles.....	Brill
Car signal system.....	Faraday
Compressors.....	Westinghouse DH-16
Conduit.....	Flexible, Duratube
Control.....	K-75-A
Curtain material.....	Pantasote
Destination signs.....	Railway standard
Door mechanism.....	National Pneumatic
Finish.....	Glidden Ripolin enamel
Floor covering.....	Linoleum—interurban cars
Gears and pinions.....	Westinghouse W-N drive

Glass.....	D. S. A. selected
Hand brakes.....	Peacock
Heat insulating material.....	Celotex
Heaters.....	Consolidated Car Heating Company
Headlights.....	O-B
Headlining.....	Agosote
Interior trim.....	Mahogany
Journal bearings.....	Plain
Journal boxes.....	Brill
Lamp fixtures.....	Ivanhoe
Motors.....	Four Westinghouse No. 1425, inside hung
Painting scheme.....	Orange
Roof material.....	Wood, canvas covered
Safety car devices.....	Safety Car Devices Company
Sash fixtures.....	Adams-Westlake
Seats.....	Brill
Seat spacing.....	City cars, 30 in.; interurban cars, 33 in.
Seating material.....	City cars, wood; interurban, leather
Steps.....	Folding and stationary
Step treads.....	Kass
Trolley.....	O-B
Trolley base.....	Westinghouse
Trolley wheels.....	Westinghouse
Trucks.....	Brill 177-E1-X
Ventilators.....	Brill
Wheels, type.....	Rolled steel 22 in. diameter
Wheelguards.....	H-B

open hearth furnaces for the necessary refining process. This constitutes an important economy over the regular practice of charging cold pig iron into the open hearth, which practice requires many hours of high temperature to bring it to a molten state. The new practice saves much fuel, time, labor and wear on the furnace.

It is expected that the new arrangement will not only work out to the material advantages of the three interests, the railroad, the furnace company, and the rolling mill company, who cooperated in making it possible, but will be of considerable influence in the increased growth of the cities of Hamilton and Middletown and the improved facilities will further enlarge the market for steel products.

Talk on British Market at Advertising Convention

J. Heritage Peters, head of the Heritage Peters Advertising Service, Ltd., Coventry, England, is to be one of the speakers at the International Advertising Association Convention at Detroit in July. Mr. Peters is scheduled to make several addresses while he is in this country. He will discuss the peculiarities of the British market and will illustrate how American advertising has to be refashioned to appeal to the British reader.

Conference Held on Shipping Tags

Manufacturers of shipping tags held a preliminary conference at the Department of Commerce on June 25, under the auspices of the Division of Simplified Practice, Bureau of Standards, and considered a report that had been compiled from a survey of variety among manufacturers.

This conference concluded that further study of all phases of the situation, as revealed by the report, would be necessary before a tentative recommendation could be presented for final action. A committee was appointed to make this study, which will include nomenclature to clearly define stock, including thicknesses, sizes of tags and color of stock. George Schuster, representing the Division of Simplified Practice, will assist this committee in making the study.

The personnel of the committee is as follows: O. L. Moore, chairman, secretary, Tag Manufacturers' Association, Chicago; William R. Eastwood, Reburn Manufacturing Company, Philadelphia; E. B. Graupner, International Tag Company, Chicago; George M. Huey, Denney Tag Company, West Chester, Pa.; H. E. Reynolds, Dennison Manufacturing Company, Framingham, Mass.

ROLLING STOCK

BRYAN-COLLEGE TRACTION COMPANY, Bryan, Tex., will purchase one new car.

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

	June 26, 1928
Metals—New York	
Copper electrolytic, cents per lb.	14.525
Copper wires, cents per lb.	16.625
Lead, cents per lb.	6.30
Zinc, cents per lb.	6.525
Tin, Straits, cents per lb.	46.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, .o.b. vessel, Hampton Roads, gross tons	4.175
Somerset mine run, f.o.b. mines, net tons	1.875
Pittsburgh mine run, Pittsburgh, net tons	1.8
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.6
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.3
Weather rptt wire base, N. Y., cents per lb.	17.125
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bb lots) N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.75
Turpentine (bbl. lots), N. Y., per gal.	\$0.6125

NEW YORK STATE RAILWAYS, Rochester, N. Y., is rebuilding cars purchased from the New York & Harlem Railway.

PACIFIC ELECTRIC RAILWAY, Los Angeles, Cal., has ordered eighteen all-steel interurban cars and ten all-steel local passenger cars from the St. Louis Car Company, St. Louis, Mo.

DETROIT DEPARTMENT OF STREET RAILWAYS, Detroit, Mich., has been advised by W. B. Mayo to reject former bids on 25 to 50 new buses and to purchase sixty-seven 40-passenger street car type coaches.

COMMUNITY TRACTION COMPANY, Toledo, Ohio, is trying out two Twin Coaches of 40-passenger capacity on the Upton Avenue line.

CHICAGO & WEST TOWNS' RAILWAY, Oak Park, Ill., has accepted delivery of five Mack four-cylinder chassis, 225-in. wheelbase buses.

CONNECTICUT COMPANY, New Haven, Conn., has accepted delivery of four Mack four-cylinder chassis, 230-in. wheelbase coaches.

TRACK AND LINE

BRITISH COLUMBIA ELECTRIC RAILWAY, Vancouver, B. C., Canada, has ordered \$88,000 worth of underground cable for use in proposed underground subways from the Main Street subway and the subway being constructed to serve the New Westminster elevator.

MONTREAL TRAMWAYS, Montreal, Canada, plans about 11.9 miles of single track extension this year and about 14.55 miles of track renewals. A petition from residents has been laid before City Council for the extension of track on Rosemount Boulevard to the Franciscan monastery.

SASKATOON MUNICIPAL RAILWAY, Saskatoon, Sask., Canada, has applied to the local government board for approval of expenditures of \$23,000 for double tracking existing lines.

ARKANSAS POWER & LIGHT COMPANY, Pine Bluff, Ark., is constructing

new track on Ash Street from Second Avenue to Rollin Street.

SEATTLE MUNICIPAL STREET RAILWAY, Seattle, Wash., has received a bid from Bethlehem Steel Company of \$33,195 for eight pieces of special track work.

SHOPS AND BUILDINGS

OKLAHOMA RAILWAY, Oklahoma City, Okla., is remodeling and extending the waiting room at its terminal station in Oklahoma City, at a cost of approximately \$25,000.

PETERSBURGH, HOPEWELL & CITY POINT RAILWAY, Petersburg, Va., has had its carhouse and two cars destroyed by fire. The loss is estimated at \$30,000.

CHICAGO & JOLIET ELECTRIC RAILWAY, Joliet, Ill., will begin installation of an automatic electric substation at Lemont, July 1. C. K. Gibbon, Schenectady, N. Y., is preparing plans and will have charge of the installation which is expected to be completed by August 1.

PACIFIC GAS & ELECTRIC COMPANY, San Francisco, Cal., has approved a fund of \$278,000 for a substation.

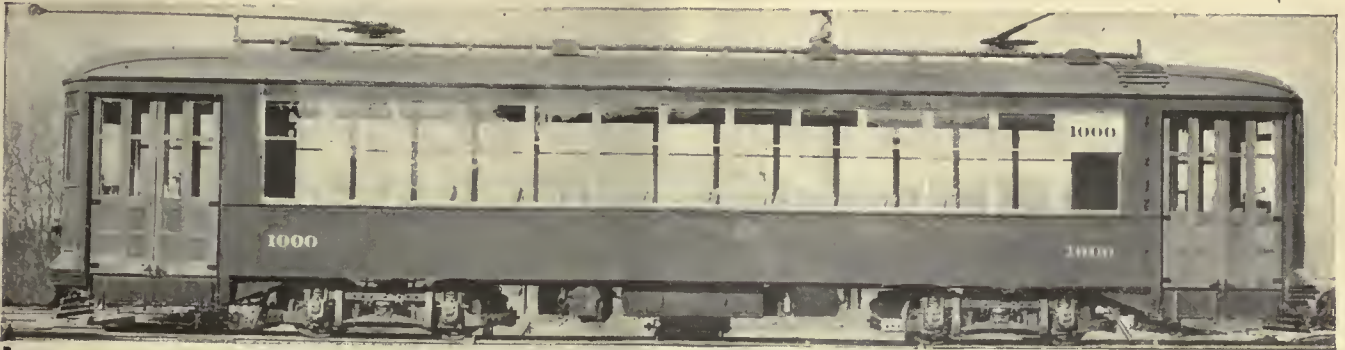
PHILADELPHIA RAPID TRANSIT COMPANY, Philadelphia, Pa., will have erected a one-story brick and steel surface car terminal building at the corner of Broad Street and Olney Avenue. The work will be done by the Rapid Transit Construction Company at an estimated cost of \$40,000.

TRADE NOTES

WALTER JACKSON, Mount Vernon, N. Y., fare and motor bus consultant, sailed for Europe on June 27 on the *Berengaria* to make transportation studies in his specialties as in past years. He will study fare problems in the larger cities and will spend part of his time on vacation in Southern France and Austria. Communications to reach London by Sept. 5 may be addressed to him care of J. P. Thomas, operating manager, London Underground Railways. Mr. Jackson plans to return in time for the American Electric Railway Association Convention in September at Cleveland, Ohio.

ROLLER-SMITH COMPANY, New York, announces that the state of Texas is now being handled by John A. Coleman, 1006 Washington Avenue, Houston, Tex., and the states of Colorado, Utah, Wyoming and northern New Mexico are now being handled by H. T. Weeks, U. S. National Bank Building, Denver, Col.

FRED W. ROTH, who has been with the Ohio Brass Company for the past eleven years introducing and selling its car equipment devices in the South, Southwest and Middle West, has now joined the supply sales division of the J. G. Brill Company, for which he will travel the Eastern and Southern states.



Typical exterior of one of the twenty new cars for the New Orleans Public Service, Inc.

*Twenty more for
New Orleans—
equipped with
“Peacock” Staffless Brakes!*

*Reg. U. S. Pat. Off.

Again the New Orleans Public Service, Inc., repeats on “Peacock” Staffless Brakes!

Twenty all-steel, one-man, two-man, double-truck, double-end cars, thus equipped, were placed in service about February 1st. These new cars are but a small part of the present rehabilitation plan for the Company. And on all of the new rolling stock “Peacock” Staffless Brakes are standard equipment!

Their reliability and dependability are factors that influence repeat orders from operators throughout this country and Canada.

Many advantageous features especially adapt “Peacock” Staffless Brakes to modern cars. Shall we tell you about them?

National Brake Company, Inc.

890 Ellicott Square

Buffalo, N. Y.

Canadian Representative:

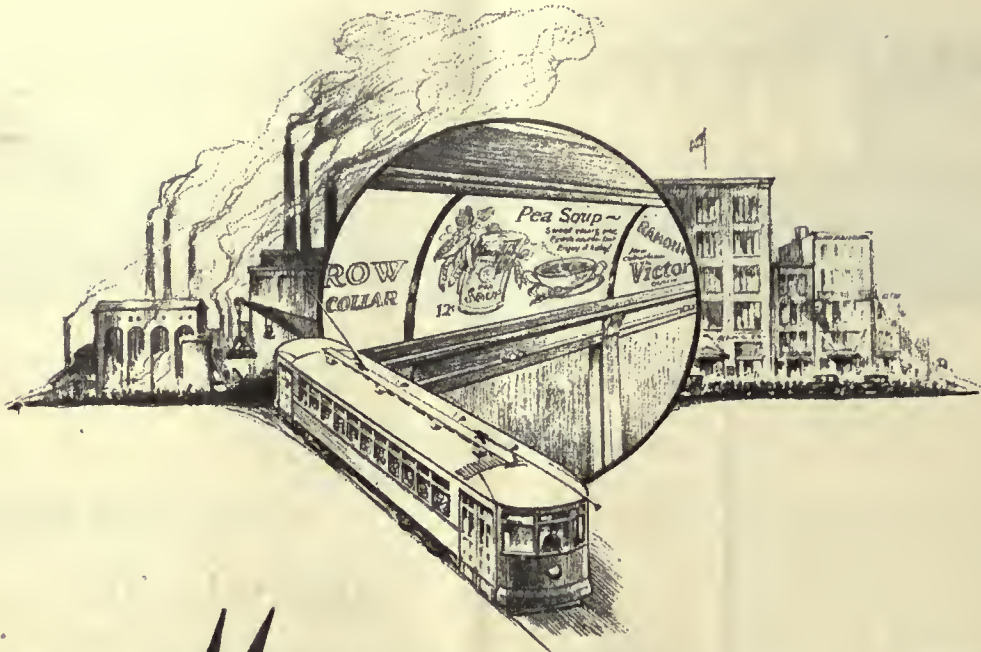
Lyman Tube & Supply Co., Ltd., Montreal, Canada



The Peacock Staffless



Interior view of one of the twenty cars for the New Orleans Public Service, Inc.



Mutual Service

TO the manufacturers and distributors of America and the street railway systems that transport the millions of America's potential buyers, Collier offers a mutual service.

This service has brought the street railway riders in thousands of cities and towns throughout the country to look upon car cards as extremely useful and pleasing features of up-to-date street car service. It has given national and local advertisers a medium thru which they can get their messages to selected territories easily, economically and convincingly.

Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



CANDLER BUILDING
NEW YORK, N. Y.

New York *to* Miami— **STUDEBAKER** *Comfort all the Way!*

“Headin’ South” in Studebaker busses means more comfort for passengers—more business for the Scenic Transportation Co., which operates three Studebaker busses between New York and Miami.



The Scenic Transportation Company, realizing the vital importance of selecting the type of bus that would successfully meet every requirement, bought Studebaker “Seminole” busses after a thorough investigation. Studebaker won the order because this equipment cost less to buy and less to run. Proof of economy was found in the experience of hundreds of Studebaker bus operators who reported low operating and maintenance expense, low depreciation, long life.

Each day the New York-Miami busses average 325 miles, stopping at night at good hotels in principal cities. So popular is this new line, that, on February 4, the demand for seats was so heavy on the north-bound trip that 24 passengers were turned away.

Pronounced Rider Appeal

Ability to perform under all conditions with

train schedule regularity is an established reputation of the “Seminole” on this long run. The deep leather cushions, set at restful angles with plenty of knee room, insure a relaxed, comfortable ride. Wide windows, ample ventilation, and odor-free heating are features that attract riders and insure profitable operation to the operator.

L first cost
operating cost
maintenance
depreciation
Lower

* * *

Studebaker Bus Models and Prices

<i>75 Junior Chassis—158-inch W. B.</i>	
Chassis only, single or dual rear wheels.....	\$2410
15-Pass. Cross-Seat Sedan.....	4520
<i>76 Special Chassis—184-inch W. B.</i>	
Chassis only, single or dual rear wheels.....	\$2775
15-Pass. Cross-Seat Sedan.....	5275
20-Pass. Parlor Car De Luxe.....	6395
22-Pass. Seminole Observation Parlor Car.....	6395
<i>75 Heavy Duty Chassis—184-inch W. B.</i>	
Chassis only, dual rear wheels.....	\$3275
21-Pass. St. Car Bus.....	5895
All prices f.o.b. factory. Purchase can be arranged on Studebaker's liberal budget payment plan	

STUDEBAKERS

**ARE PROFIT
MAKERS**



BARGH HAI

In India the wizard selects a native susceptible to his hypnotic powers.

—cloaks him in a panther skin.

—gives him a magic beverage.

—stares into his eyes and says "bargh hai" meaning "you're a panther."

Then he bids him go after an enemy who is termed an antelope.

The action is then a mixup of imitation panther vs imitation antelope, and the result is the same as putting some hocus pocus on misapplied carbon brushes and saying to the buyer "now you will get the service of Morganite brushes."

But when the spell wears off, the buyer comes to.

To what?

To Morganite, of course!



Main Office and Factory

3302-3320 Anable Ave., Long Island City, N. Y.

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.

Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.

Cleveland, Electrical Engineering & Mfg. Co., 520 Union Building.

Baltimore, O. T. Hall, Sales Engineer, 432 North Calvert St.

Revere, Mass., J. F. Drummey, 75 Pleasant Street.

Los Angeles, Electrical Engineering Sales Co., 502 Delta Bldg.

San Francisco, Electrical Engineering Sales Co., 222 Underwood Bldg.

Toronto, Can., Railway & Power Engineering Corp., Ltd., 133 Eastern Ave.

Montreal, Can., Railway & Power Engineering Corp., Ltd., 68-70 St. Antoine St.

Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

"SEARCHLIGHT" Want ads Talk—

They go direct to those in the industry you wish to reach and tell your story in a forceful and business-like way.

They don't mince words but get right to the point.

Use them for—

- | | |
|-----------------------------|------------------------|
| Agencies Wanted | Industrial Sites |
| Agents Wanted | Labor Bureaus |
| Auction Notices | Machine Shops |
| Bids Wanted | New Industries Wanted |
| Books and Periodicals | Partners Wanted |
| Buildings For Sale | Patent Attorneys |
| Business Opportunities | Patents For Sale |
| Civil Service Opportunities | Plants For Sale |
| Contracts to be Let | Positions Vacant |
| Contracts Wanted | Positions Wanted |
| Desk Room For Rent | Proposals |
| Desk Room Wanted | Property For Sale |
| Educational | Receivers' Sales |
| Employment Agencies | Representatives Wanted |
| Foreign Business | Salesmen Wanted |
| For Exchange | Specialties |
| For Rent | Sub-Contracts Wanted |
| Franchises | Water Front Property |
| Help Wanted | Work Wanted |

Miscellaneous for Sale, for Rent or Want Ads

For Every Business Want
"Think SEARCHLIGHT First"



We Repeat...

"Salesmanship may play a part in the initial purchase but repeat orders are placed on the the strength of performance and knowledge gained by experience."

have
re-ordered



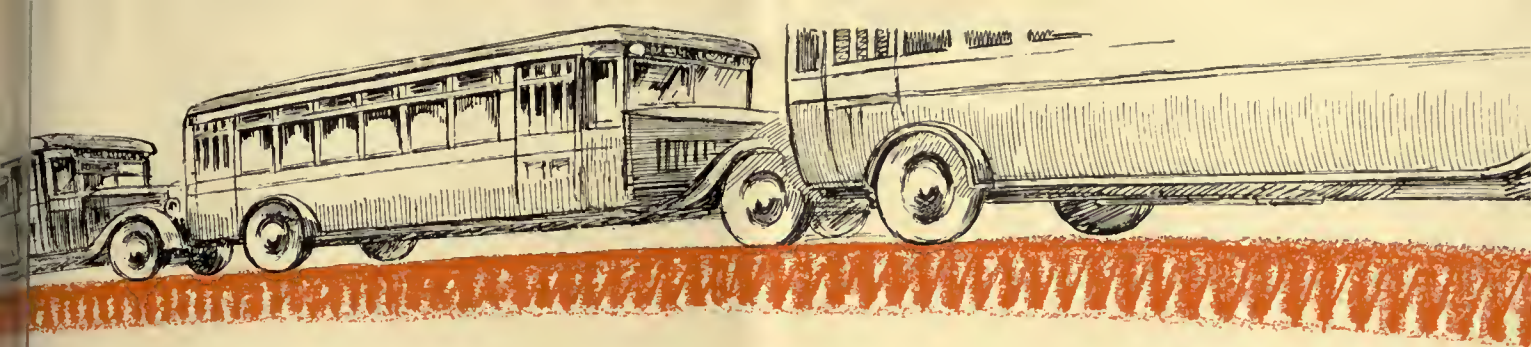


Of the 152 companies who operate 5 or more **Yellow Coaches**, 124 or **82%** have placed repeat orders *at least once!*

98 of these companies or **64½%** have placed repeat orders *at least twice!*

These 124 companies have placed a total of 535 repeat orders and operate a total of

4231 YELLOW COACHES



Yellow Coach fleets

of 5 or more coaches
(Compiled to April 30, 1928)

Fleets of 100 or more:

		Coaches	Reorders
1. Public Service Transportation Company,	Newark, N. J.	819	11
2. Philadelphia Rural Transit Company,	Philadelphia, Pa.	573	6
3. Chicago Motor Coach Company,	Chicago, Ill.	436	26
4. Peoples Motor Bus Company,	St. Louis, Mo.	189	14

Fleets of 50 to 99 Units:

5. Peoples Motor Coach Company,	Detroit, Mich.	87	7
6. International Bus Company,	Buffalo, N. Y.	81	5
7. Connecticut Company,	New Haven, Conn.	74	11
8. Fifth Avenue Coach Company,	New York, N. Y.	70	6
9. New England Transportation Company,	New Haven, Conn.	68	4
10. Shore Line Motor Coach Company,	Gary, Ind.	65	20
11. Toronto Transportation Commission,	Toronto, Ont., Can.	61	7
12. Montreal Tramways Company,	Montreal, Que., Can.	60	7
13. Milwaukee Electric Railway & Light Company,	Milwaukee, Wis.	55	13
14. Northern Ohio Power & Light Company,	Akron, Ohio	55	8
15. Washington Railway & Electric Company,	Washington, D. C.	53	15

Fleets of 25 to 49 Units:

16. Worcester Consolidated Street Railway,	Worcester, Mass.	43	7
17. Boston & Mine Transportation Company,	Boston, Mass.	42	4
18. Department of Street Railways,	Detroit, Mich.	41	
19. Detroit Motorbus Company,	Detroit, Mich.	40	
20. Washington Rapid Transit Company,	Washington, D. C.	36	2
21. Indianapolis Street Railway Company,	Indianapolis, Ind.	33	6
22. Camel City Coach Company,	Winston-Salem, N. C.	32	7
23. Chester Valley Bus Line, Inc.,	West Chester, Pa.	31	4
24. North Shore Bus Company, Inc.,	Flushing, L. I., N. Y.	30	13
25. Atlantic Coast Transportation Company,	Allenhurst, N. J.	29	5
26. Springfield Street Railway Company,	Springfield, Mass.	29	7
27. Pittsburgh Motor Coach Company,	Pittsburgh, Pa.	28	5
28. Colonial Motor Coach Company,	Watertown, N. Y.	27	1
29. Los Angeles Railway,	Los Angeles, Calif.	26	12
30. Boston Elevated Railway Company,	Boston, Mass.	25	9
31. Kansas City Railways,	Kansas City, Mo.	25	1

Fleets of 10 to 24 Units:

32. Baltimore & Ohio R.R. Company,	Baltimore, Md.	21	3
33. Blue Bus Company,	Cincinnati, Ohio	21	4
34. De Camp Bus Lines, Inc.,	Livingston, N. J.	21	8
35. Illinois Power & Light Company,	Peoria, Ill.	21	6
36. Southern Pacific Motor Transportation Company,	Portland, Ore.	21	4
37. Capital Traction Company,	Washington, D. C.	22	7
38. Gary Street Railways,	Gary, Ind.	22	6
39. Portland Electric Power Company,	Portland, Ore.	22	5
40. Arrow Bus Line Interstate Company,	Montclair, N. J.	21	2
41. White Transit Company,	Wilkes-Barre, Pa.	20	14
42. British Columbia Rapid Transit Company,	Vancouver, B. C.	19	8
43. Illinois Power & Light Company,	Galesburg, Ill.	19	6
44. Northland Transportation Company,	Minneapolis, Minn.	19	3
45. Houston Electric Company,	Houston, Texas	18	8
46. New Orleans Public Service Company,	New Orleans, La.	18	3
47. Midland Trail Transit Company,	Charleston, W. Va.	17	4
48. Butler-Newark Bus Line, Inc.,	Newark, N. J.	16	2
49. Danbury Power & Transportation Company,	Danbury, Conn.	16	2
50. Dominion Power & Transmission Company,	Hamilton, Ont., Can.	16	2
51. Evanston Bus Company,	Evanston, Ill.	16	6
52. North Coast Transportation Company,	Tacoma, Wash.	16	4
53. United Electric Railways Company,	Providence, R. I.	16	2
54. Wisconsin Power & Light Company,	Madison, Wis.	15	1
55. Illinois Power & Light Company,	Decatur, Ill.	11	2
56. Interstate Coach Company,	Spokane, Wash.	14	4
57. Kentucky Coach Company,	Lexington, Ky.	11	4
58. Miami Beach Electric Company,	Miami, Fla.	14	
59. Valley Bus Company,	Cincinnati, Ohio	11	5
60. Illinois Power & Light Company,	Quincy, Ill.	13	2
61. Monongahela West Penn. Public Service Company,	Falemont, W. Va.	13	5
62. Topeka Railway Company,	Topeka, Kans.	13	2
63. United Motor Coach Company,	Des Plaines, Ill.	13	4
64. Cannonball Transportation Company,	Portsmouth, Ohio	12	2
65. Community Traction Company,	Toledo, Ohio	12	1

Fleets of 10 to 24 Units (Continued)

	Coaches	Reorders
66. Egyptian Transportation Company,	12	6
67. Oklahoma Railway Company,	12	3
68. Tennessee Transportation Company,	12	
69. Brooklyn Bus Corporation,	11	1
70. Louisville Railway Company,	11	1
71. San Antonio Public Service Company,	11	3
72. A. B. & W. Rapid Transit Company,	10	
73. Atlanta Coach Company,	10	
74. Chicago, North Shore & Milwaukee R.R. Company,	10	2
75. Cleveland Railway Company,	10	
76. Consolidated Cab Company, Ltd.,	10	3
77. Grove Street Crosstown Bus Line,	10	
78. Key System Transit Company,	10	2
79. New York & Philadelphia Bus Line, Inc.,	10	1
80. Southern Public Utilities Company,	10	3
Marlon, Ill.	12	6
Oklahoma City, Okla.	12	3
Nashville, Tenn.	12	
Brooklyn, N. Y.	11	1
Louisville, Ky.	11	1
San Antonio, Texas	11	3
Alexandria, Va.	10	
Atlanta, Ga.	10	
Chicago, Ill.	10	2
Cleveland, Ohio.	10	
Montreal, Que., Can.	10	3
Irvington, N. J.	10	
Oakland, Calif.	10	2
Brooklyn, N. Y.	10	1
Winston-Salem, N. C.	10	3

Fleets of 5 to 9 Units:

81. Denver & Interurban Motor Coach,	9	3
82. East St. Louis & Suburban Railway,	9	5
83. Edwards Motor Transit Company, Inc.,	9	4
81. Erie Coach Company,	9	4
85. Louisiana Electric Company, Inc.,	9	
86. Rockford & Interurban Railway Company,	9	1
87. Twin City Motor Bus Company,	9	
88. Wisconsin Public Service Company,	9	4
89. Gray Line Motor Tours,	9	1
90. Municipal Railways,	8	3
91. Tennessee Electric Power Company,	8	
92. Central Passenger Railway Company,	8	2
93. Illinois Power & Light Company,	7	2
94. Kentucky Utilities Company, Inc.,	7	1
95. Logan Valley Bus Company,	7	1
96. New Jersey Interurban Coach Company,	7	4
97. Portland-Seattle Stage Line,	7	3
98. Red Bird Transit Company,	7	
99. Schuylkill Transportation Company,	7	5
100. Shawnee-Tecumseh Traction Company,	7	1
101. Smith Motor Coach Lines,	7	1
102. Tri-City Railway Company,	7	1
103. West Ridge Transportation Company,	7	1
104. Wyoming Auto Bus Company,	7	1
105. Bay Cities Transit Company,	6	2
106. Consolidated Coach Company,	6	1
107. Delaware, New Jersey Transportation Company,	6	2
108. Durham Public Service Company,	6	1
109. Eastern Massachusetts Steel Railway,	6	3
110. Eastern Texas Electric Company,	6	
111. Illinois Power & Light Company,	6	1
112. Illinois Power & Light Company,	6	
113. Interstate State Lines,	6	1
114. Key West Electric Company,	6	
115. Kingston Consolidated Railway Company,	6	1
116. LaCrosse & Southwestern Railway,	6	1
117. London Street Railway Company,	6	3
118. Madison Railways Company,	6	1
119. Midland Trail Bus Line, Inc.,	6	1
120. Northwestern Transit Company,	6	1
121. Philadelphia Suburban Transportation Company,	6	
122. Roanoke Railway & Electric Company,	6	
123. Sao Paulo Railway, Light & Power Company,	6	
124. Chicago, South Bend & Northern Indiana Railway,	6	1
125. Springfield Traction Company,	6	2
126. Sutherland-Tiangua Stages,	6	2
127. Blue Goose Motor Coach Company, Inc.,	5	3
128. Blue Line Stage Company,	5	1
129. Campbell & Cuddy Motor Tours,	5	3
130. Citizens Traction Company,	5	1
131. Colorado Springs & Interurban R. R.,	5	2
132. Empress Taxi & Sightseeing Company,	5	2
133. Ferguson-Wellston Bus Company,	5	4
134. Greyhound Lines,	5	1
135. Illinois Power Company,	5	1
136. Interurban Transportation Company,	5	1
137. Kansas Public Service Company,	5	2
138. Metropolitan Coach Company,	5	
139. Montgomery Bus Company,	5	
140. Nashville, Chattanooga & St. Louis Railway,	5	1
141. Niles Center Bus Line,	5	1
142. Olympia Grays Harbor Transportation Company,	5	2
143. Pacific Electric Railway Company,	5	
144. Pennsylvania-Ohio Power & Light Company,	5	
145. Reliable Motor Coach Company,	5	
146. Richmond-Washington Coach Company,	5	5
147. Sunflower State Lines,	5	2
148. Terre Haute, Indianapolis & Eastern Traction Company,	5	
149. Union Transfer Company, Inc.,	5	1
150. Wuer Bus Company, Inc.,	5	
151. Western Motor Coach Company,	5	1
152. Yellow Cab Company,	5	
Denver, Colo.	9	3
East St. Louis, Ill.	9	5
Dulles, Pa.	9	4
Erie, Pa.	9	4
Lake Charles, La.	9	
Rockford, Ill.	9	1
Minneapolis, Minn.	9	
Green Bay, Wis.	9	4
Chicago, Ill.	8	3
St. Petersburg, Fla.	8	
Chattanooga, Tenn.	8	2
Atlantic City, N. J.	7	2
Danville, Ill.	7	1
Paducah, Ky.	7	1
Altoona, Pa.	7	1
Camden, N. J.	7	4
Tacoma, Wash.	7	3
Charleston, W. Va.	7	
Philadelphia, Pa.	7	5
Muskogee, Okla.	7	1
Memphis, Tenn.	7	1
Davenport, Ia.	7	1
Girard, Pa.	7	1
Wilkes-Barre, Pa.	7	2
Santa Monica, Calif.	6	1
Lexington, Ky.	6	2
Bridgeton, N. J.	6	1
Durham, N. C.	6	3
Boston, Mass.	6	
Beaumont, Texas	6	1
Granite City, Ill.	6	
Oskaloosa, Ia.	6	
Topeka, Kans.	6	1
Key West, Fla.	6	
Kingston, N. Y.	6	1
LaCrosse, Wis.	6	1
London, Ont., Can.	6	3
Madison, Wis.	6	1
Olney, Ill.	6	1
Oak Park, Ill.	6	1
Philadelphia, Pa.	6	
Roanoke, Va.	6	
Sao Paulo, Brazil	6	
South Bend, Ind.	6	1
Springfield, Mo.	6	2
San Diego, Calif.	6	2
East St. Louis, Mo.	5	3
Walla Walla, Wash.	5	1
Boston, Mass.	5	3
Oil City, Pa.	5	1
Colorado Springs, Col.	5	2
Victoria, B. C., Can.	5	2
Ferguson, Mo.	5	4
Cincinnati, Ohio.	5	1
Springfield, Ill.	5	1
Alexandria, La.	5	
Atchison, Kans.	5	2
Chicago, Ill.	5	
Bryn Mawr, Pa.	5	
Nashville, Tenn.	5	1
Niles Center, Ill.	5	1
Olympia, Wash.	5	2
Los Angeles, Calif.	5	
Youngstown, Ohio	5	
Monticello, N. Y.	5	5
Alexandria, Va.	5	2
Kansas City, Mo.	5	
Indianapolis, Ind.	5	
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Chicago, Ill.	5	1
Oklahoma City, Okla.	5	

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If there were anything as good at lower costs,

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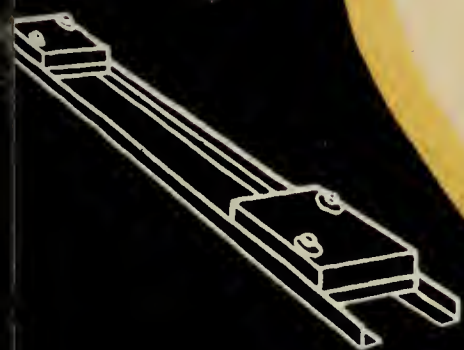
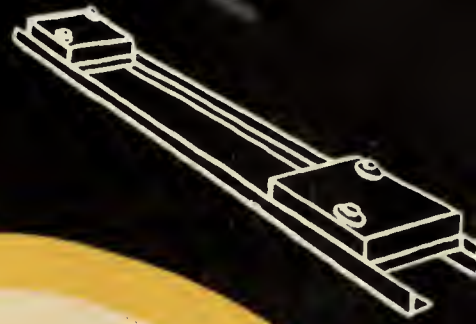
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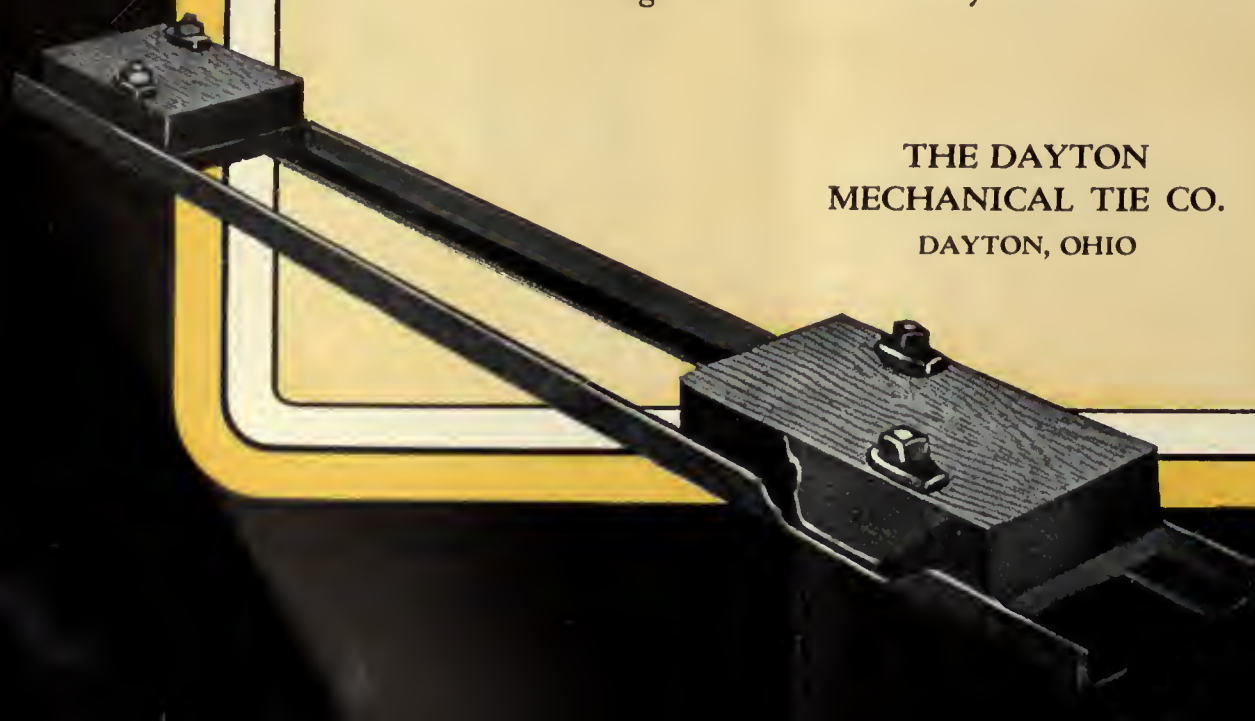
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Advertising, Street Car
Collier, Inc., Barron G.

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Westinghouse Tr. Br. Co.

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Ohio Brass Co.
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Elec. Corp.

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Ramapo Ajax Corp.

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Cincinnati Car Co.
Illinois Steel Co.
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Babbittin Devices
Columbia Machine Works

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Inter. Cash Reg. Co., The

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Columbia Machine Works
Westinghouse E. & M. Co.

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Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bearings, Thrust
Timken Roller Bearing Co.

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Columbia Machine Works
Elec. Service Supplies Co.

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Brill Co. The J. G.

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Babcock & Wilcox Co.

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Illinois Steel Co.

Bolts, Case Hardened
Bemis Car Truck Co.

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Bonding Apparatus
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Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
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Westinghouse E. & M. Co.

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Brill Co., The J. G.

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Cincinnati Car Co.
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Morganite Brush Co.
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General Electric Co.

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Twin Coach Corp.
Versare Corp.

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Brill Co., The J. G.
Cincinnati Car Co.
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Differential Steel Car Co.

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General Electric Co.
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Brill Co., The J. G.

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Cincinnati Car Co.
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Wason Mfg. Co.

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Cleveland Fare Box Co.
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Johnson Fare Box Co.

Coin Sorting Machines
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Johnson Fare Box Co.

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Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
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Wm. Wharton, Jr. & Co.

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Crossings, Track (See Track Special Work)

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Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
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(Continued on page 40)

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- Signal Systems, Highway Crossing**
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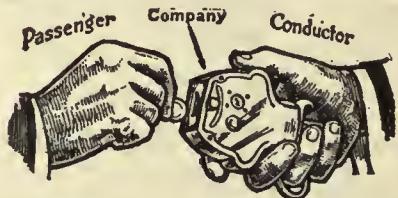
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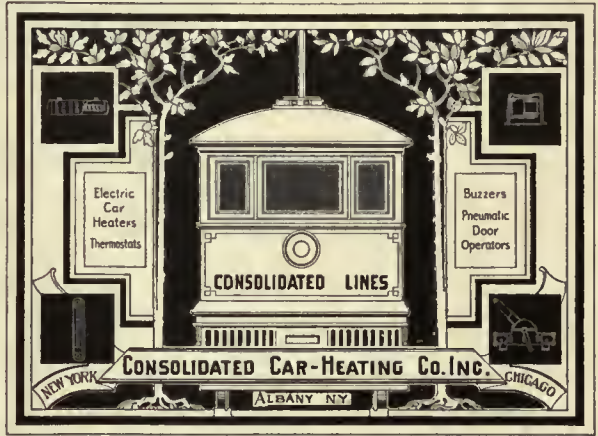


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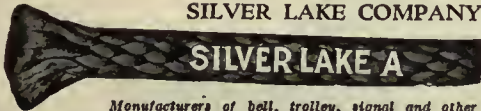
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