

ELECTRIC RAILWAY JOURNAL

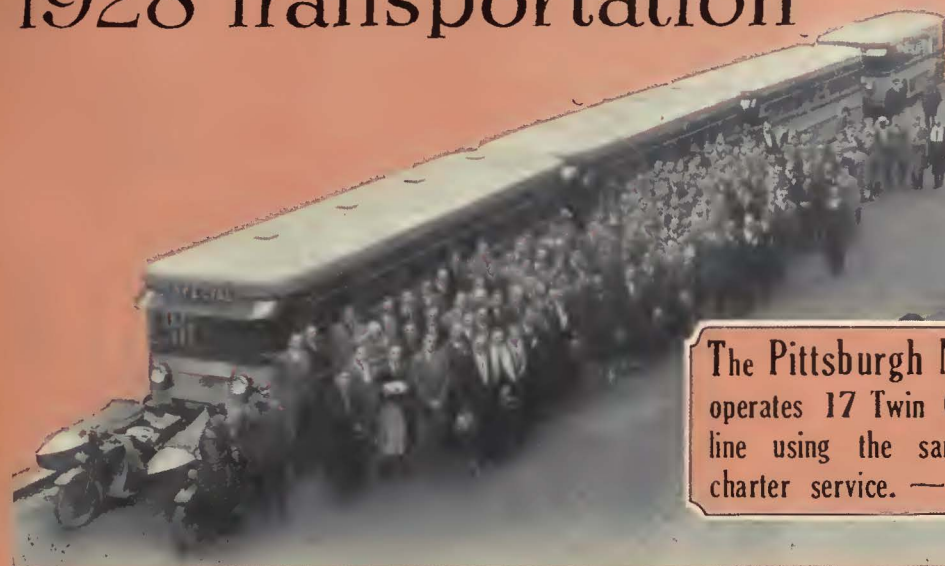
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MAY 5, 1928

Twenty Cents Per C



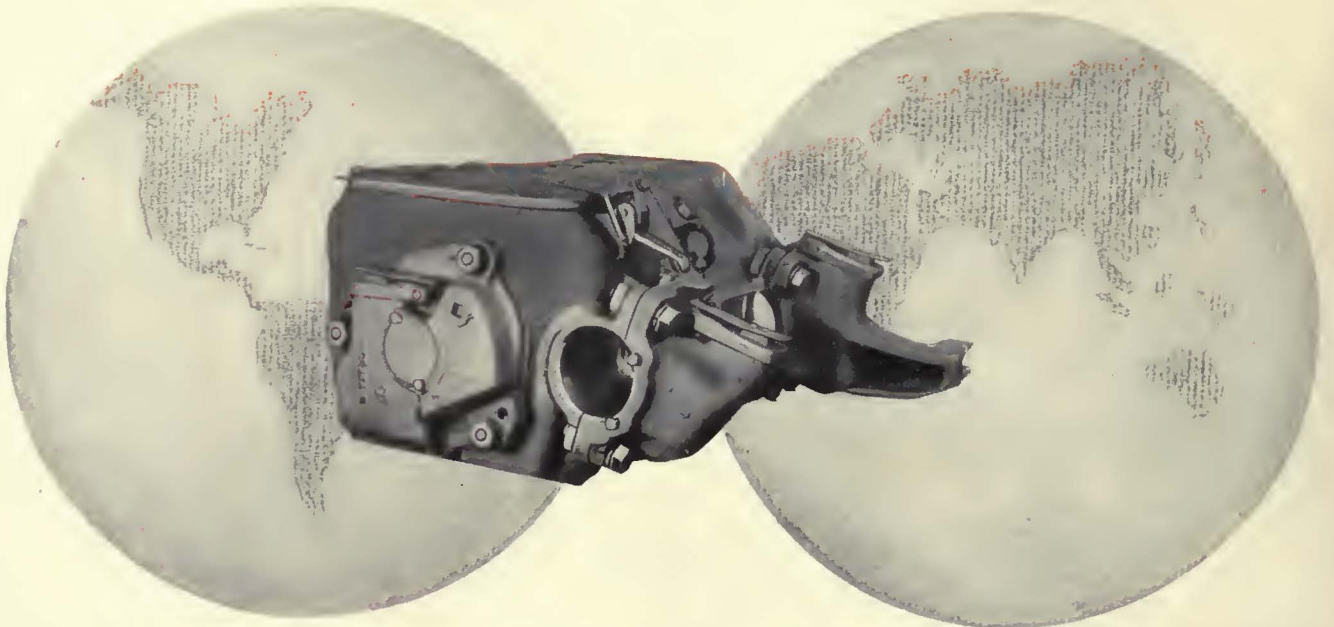
*The Most
Significant
Vehicle in all
1928 Transportation*



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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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.

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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
- Engineering News-Record*
- American Machinist*
- Power*
- Chemical and Metallurgical Engineering*
- Cool Age*
- Engineering and Mining Journal*
- Ingenieria Internacional*
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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.

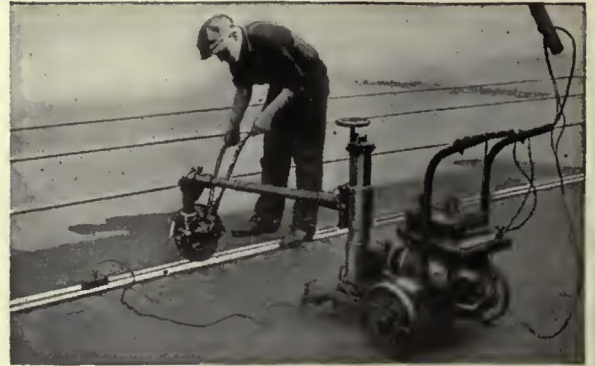
Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

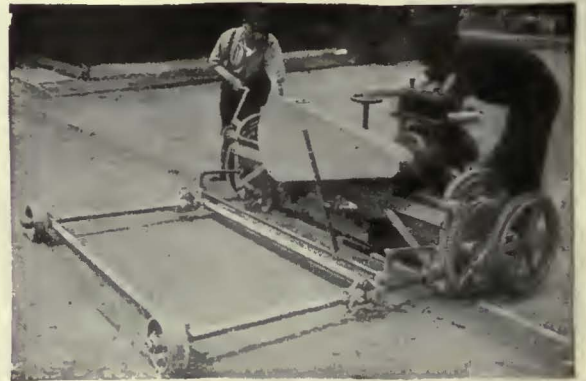
AGENTS:

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⊕ 2335



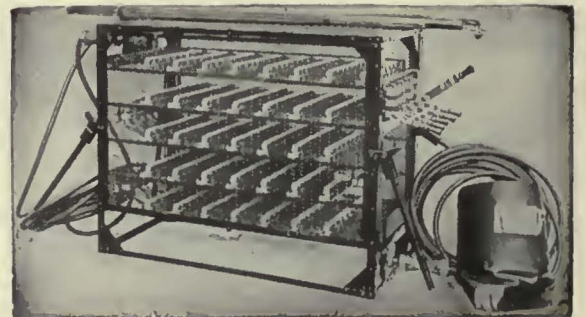
Eureka Radial Rail Grinder



Vulcan Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder



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.

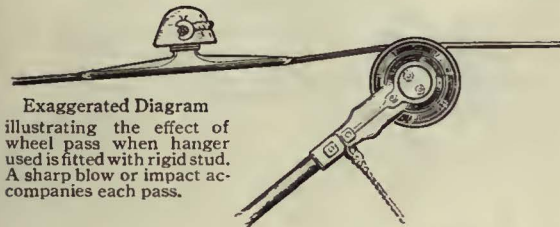


Cushion the Hammer Blow



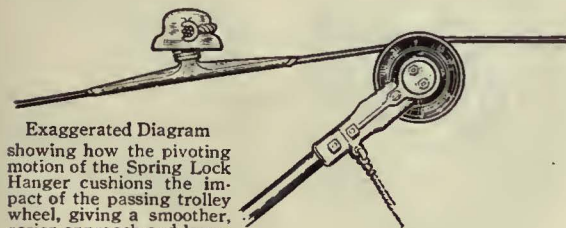
The O-B Spring Lock Hanger provides a flexible connection between hanger and ear, and alignment of ear and trolley wire without affecting the tight union between ear and hanger stud.

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.



NEW YORK CHICAGO
PHILADELPHIA

PITTSBURGH ATLANTA
ST. LOUIS SAN FRANCISCO

CLEVELAND
LOS ANGELES

PORCELAIN
INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING
MATERIALS
VALVES



“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.

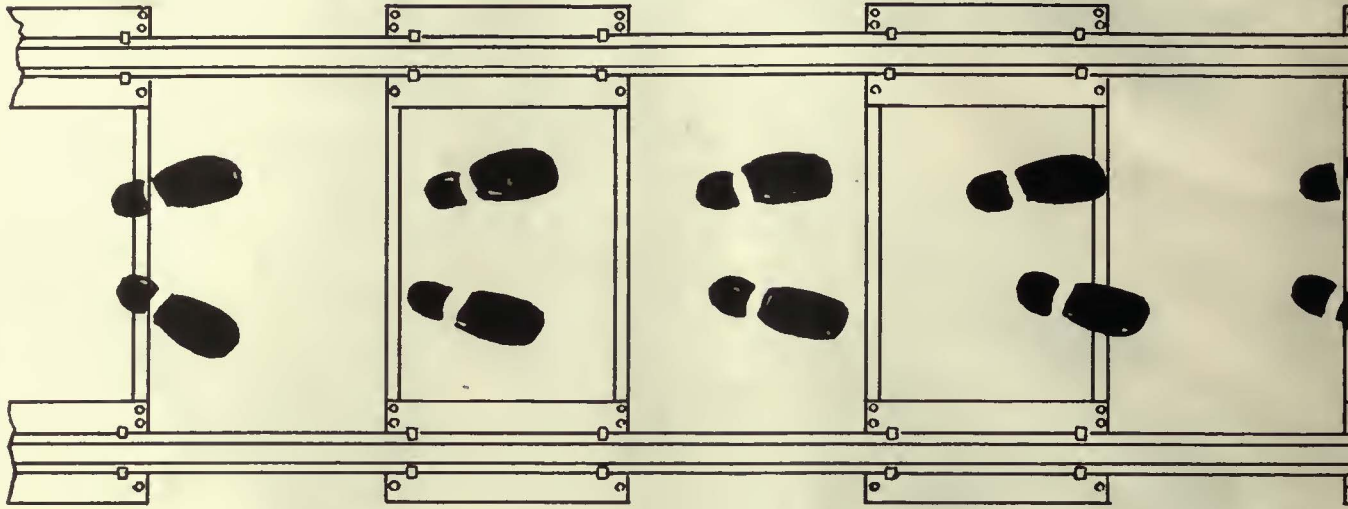
ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

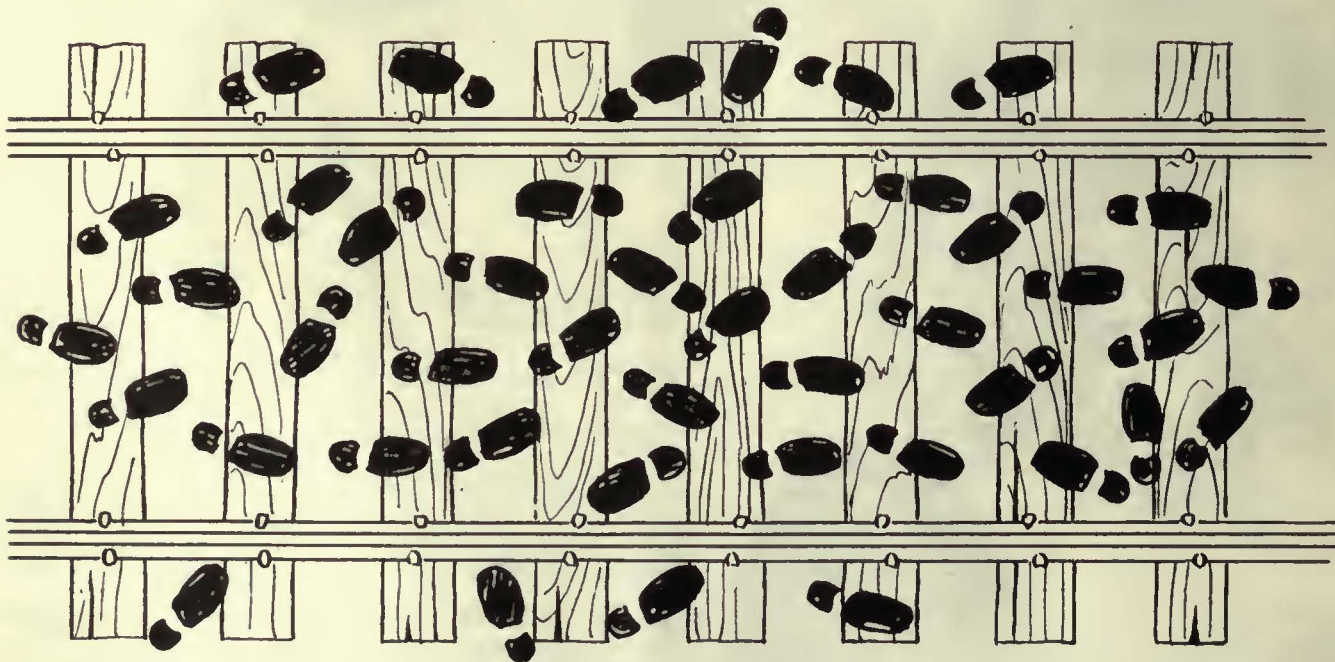
AND INDUSTRIAL ELECTRICAL MATERIAL



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.

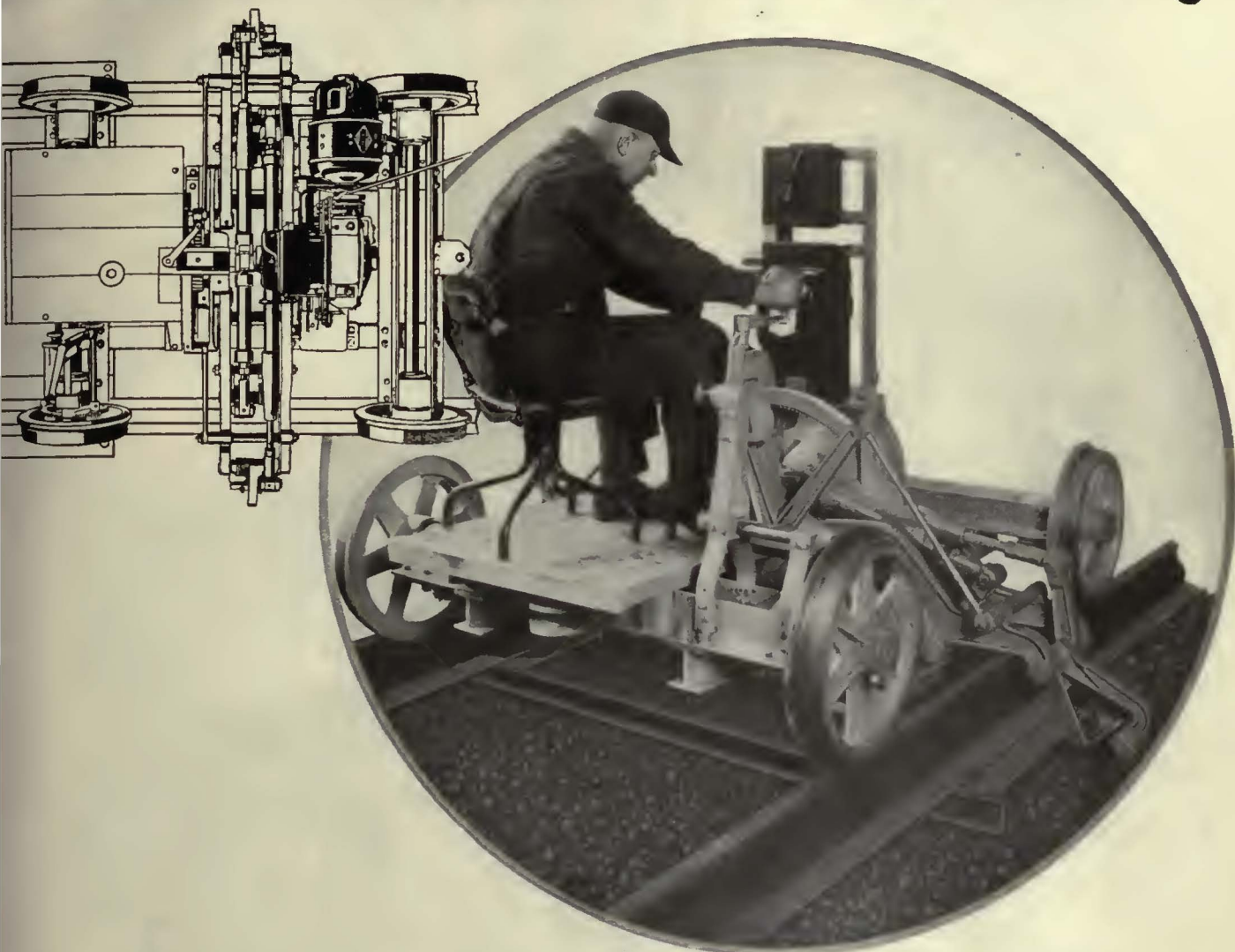


THE path of *man* production is the path of labor gangs with picks, shovels, mauls, tongs, tampers and other tools that utilize *man* power. It is the path of high labor costs, inefficiency and hazardous results. Good paved track *has* been built with labor gangs—but with modern machinery *better* track 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.

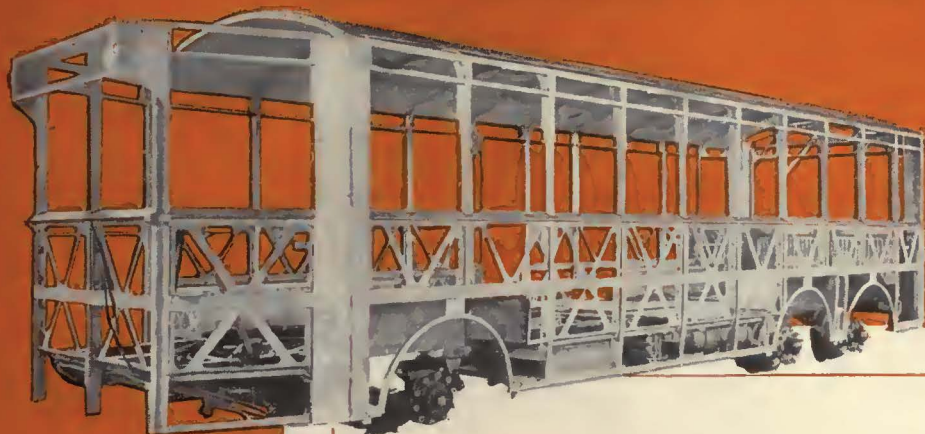
All space is utilized with ample capacity for 37 seated passengers and 37 standees. Seats are wide and comfortable. Features that appeal to passengers are absence of engine fumes, vibration and noise, wide doors, low steps, unobstructed view, convenient push-buttons, separate entrance and exit doors,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

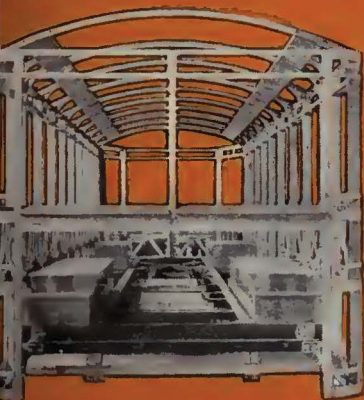


The rear cross seat above the engine. Notice that this is normal and comfortable in height. Drastic insulation, against noise, heat, and fumes, precludes any trouble from these sources.

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.

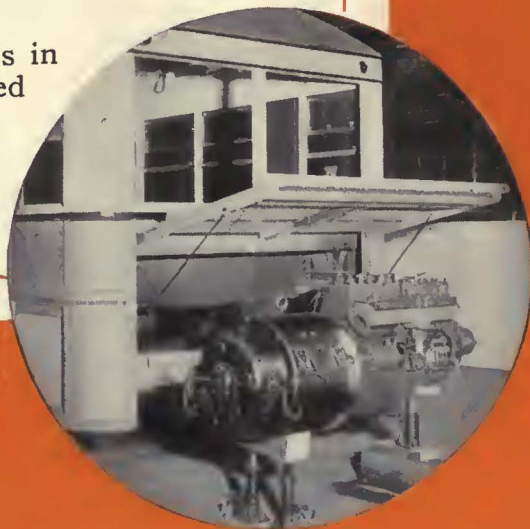
PARTICULARLY pleasing to the experienced engineer is the rigid, trussed girder construction of the Versare body. It follows the design of the strongest modern bridges, securing utmost rigidity and stiffness.

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.

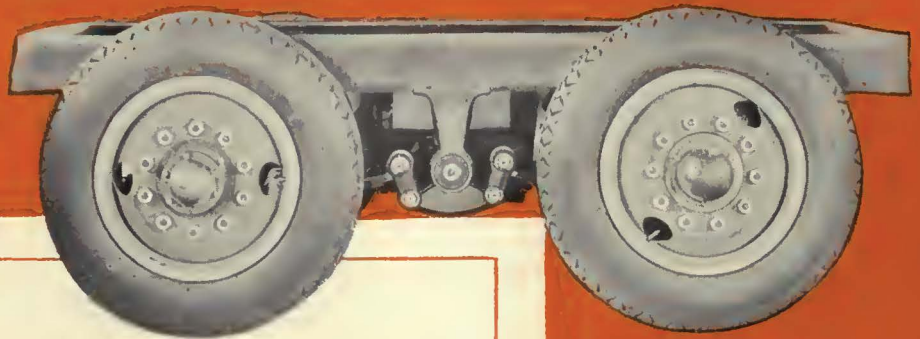
The 125 hp. gas-electric power unit is the latest development—with quick pick-up, extraordinary hill climbing ability under full load and fast.

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.

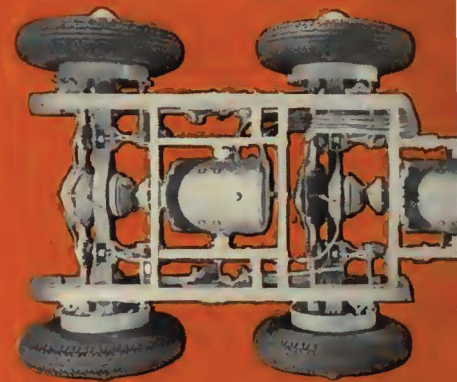
General Specifications

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.
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.

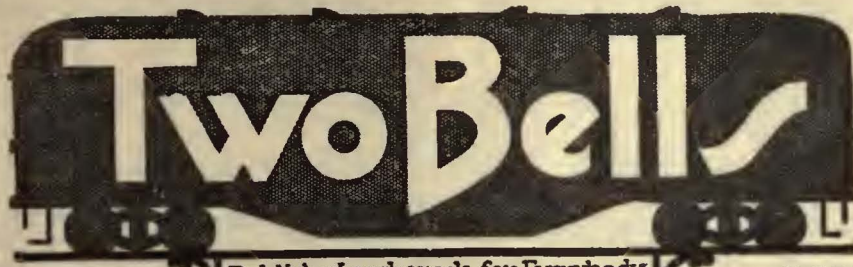
Side view of rear truck showing the Versare Patent Equalizer which distributes road shocks over four springs and achieves "floating ease in riding."



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

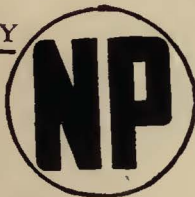
Yes, Genevieve, this is "Neglected Kitchen Week," but that doesn't mean you have to neglect your kitchen until the calendar turns over a new leaf. It simply means that the Georgia Power Company and Davison-Paxon Company week are sponsoring a movement aimed to modernize all neglected

Kitchen is one of the most interesting rooms 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 popular demands for color are porcelain enamels—imperial red, jade with soft grays and other pleasing colors.

Georgia Power is displaying a variety of colors, during the week.

CONSTANTLY



BETTER

And that, dear readers, is the definition of a treadle as found in the dictionary of W. H. McAloney, the Company's Superintendent of Equipment. However, it doesn't begin to tell of the many advantages 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 impossible 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 convenience. Use it!

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

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

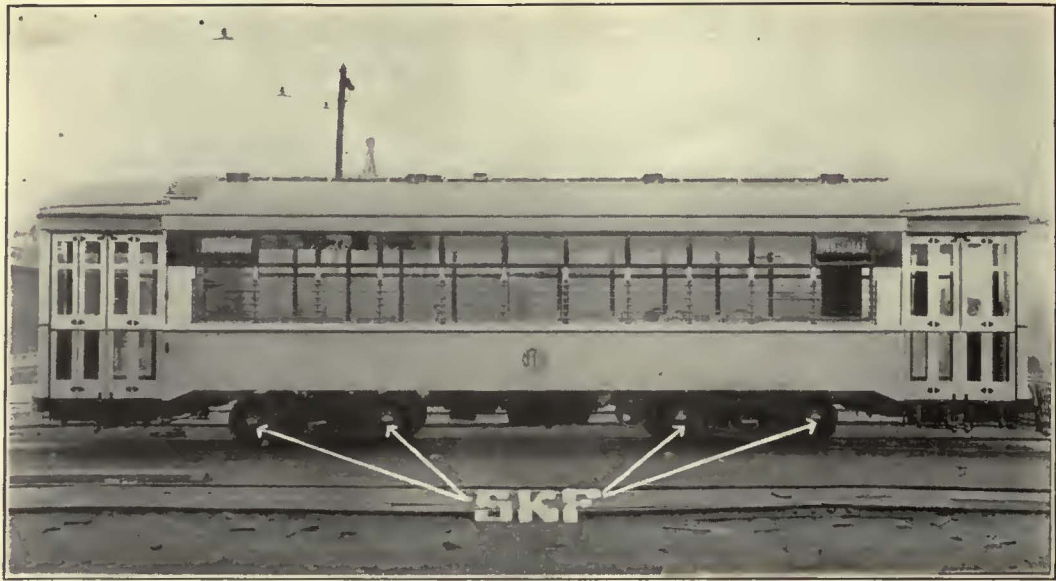
CHICAGO
518 McCormick Building

General Works, Rahway, New Jersey
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.

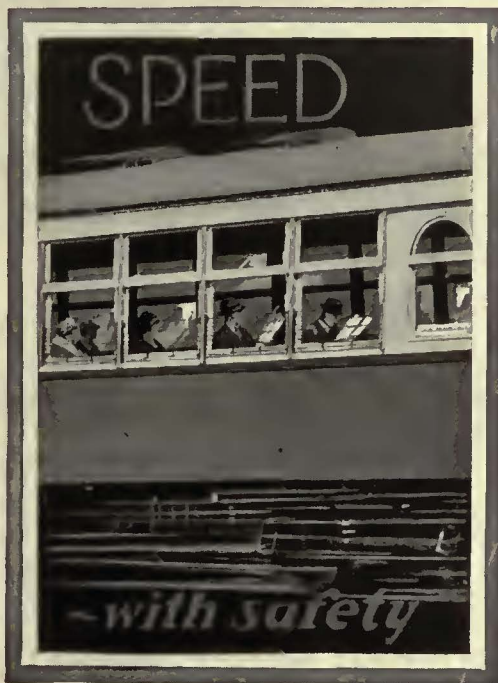
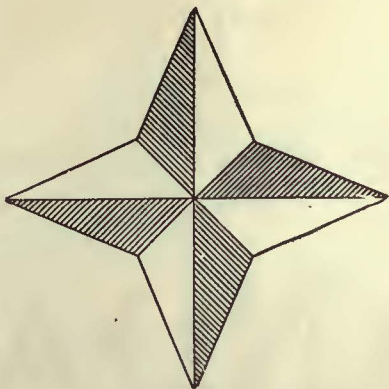
2057

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

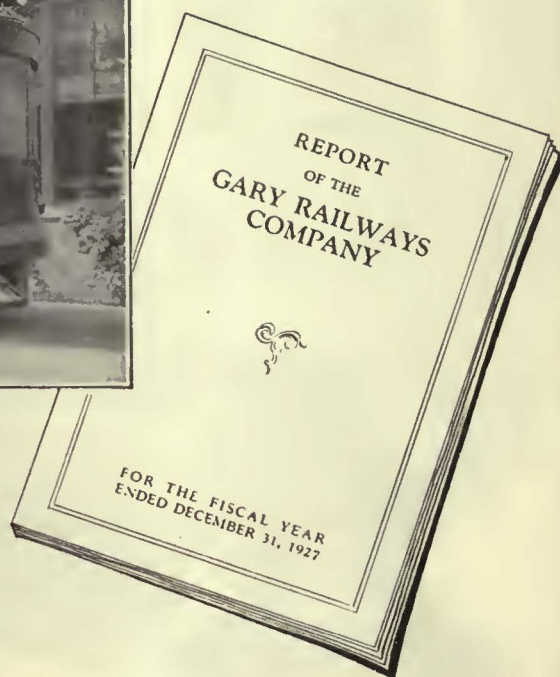
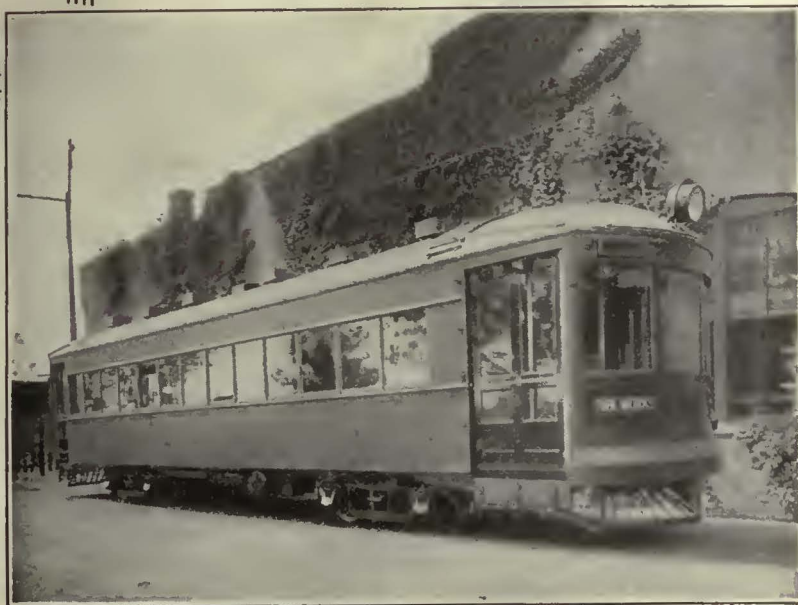
NEW YORK
HOUSTON

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.

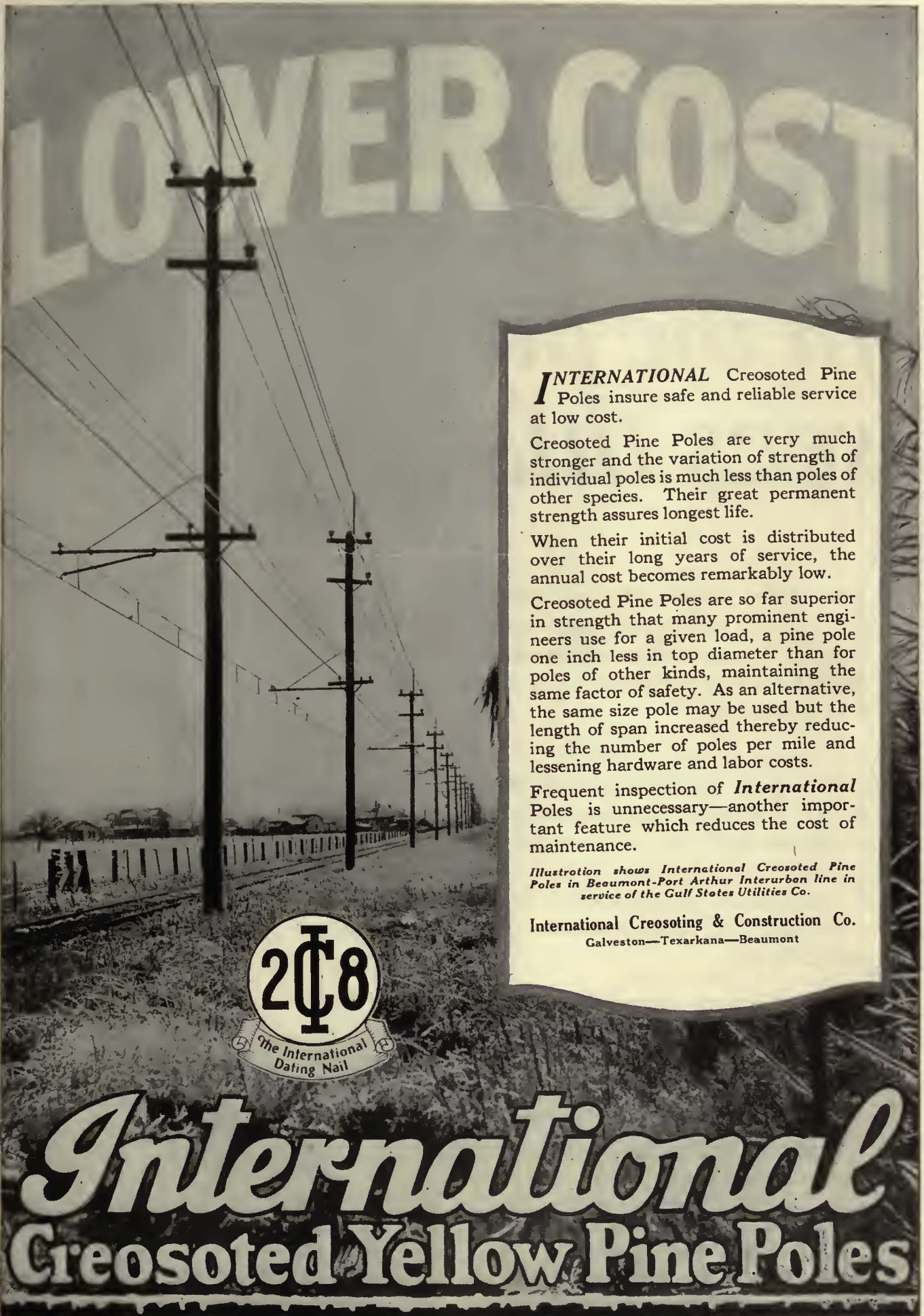
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I*INTERNATIONAL* Creosoted Pine Poles insure safe and reliable service at low cost.

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Frequent inspection of *International* Poles is unnecessary—another important feature which reduces the cost of maintenance.

Illustration shows International Creosoted Pine Poles in Beaumont-Port Arthur Interurban line in service of the Gulf States Utilities Co.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont



International Creosoted Yellow Pine Poles

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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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.

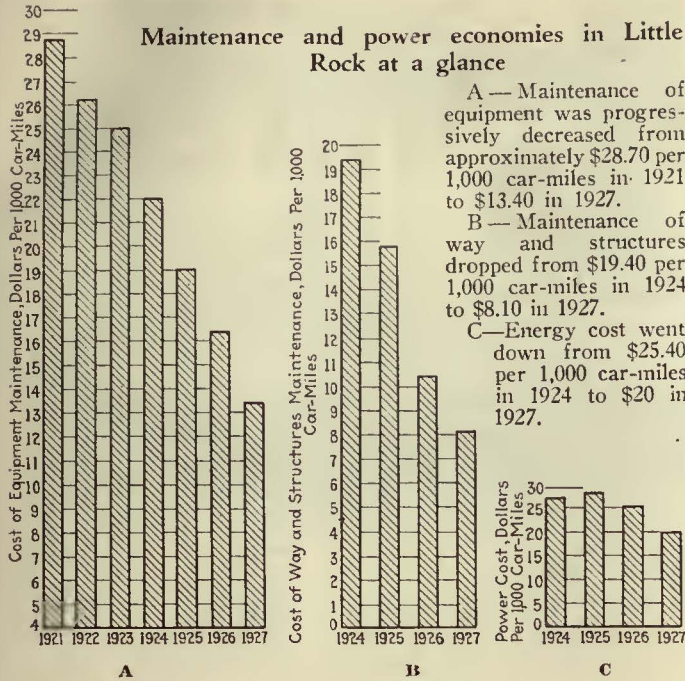
In the modernization program the one-man system has

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.

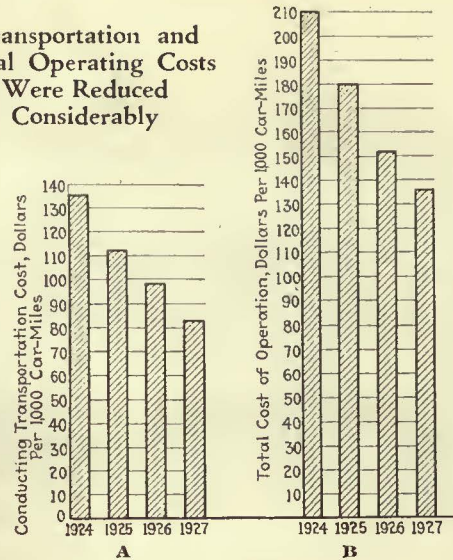
Because of the increases that were made in service when one-man cars were introduced, the total number of trainmen employed was not radically decreased. Subsequent resignations, discharges, and transfers to other positions have reduced the number of trainmen from 185 in 1925 to 105 as of March 1 of the 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

Maintenance and power economies in Little Rock at a glance



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.

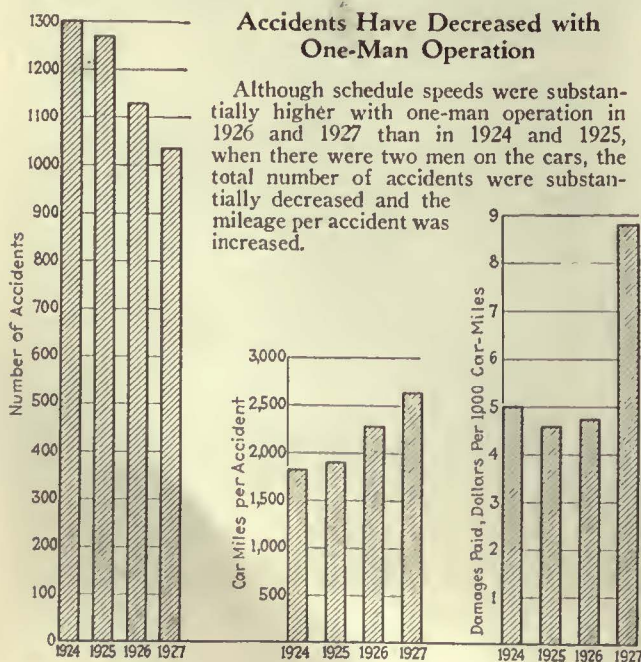
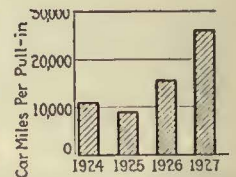
Coincident with the introduction of one-man service, street fare collectors have been stationed at three of the more important downtown corners which are transfer points. These men issue and collect transfers, sell tokens and make change prior to the arrival of the street cars. It has been found that 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 steeple 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.

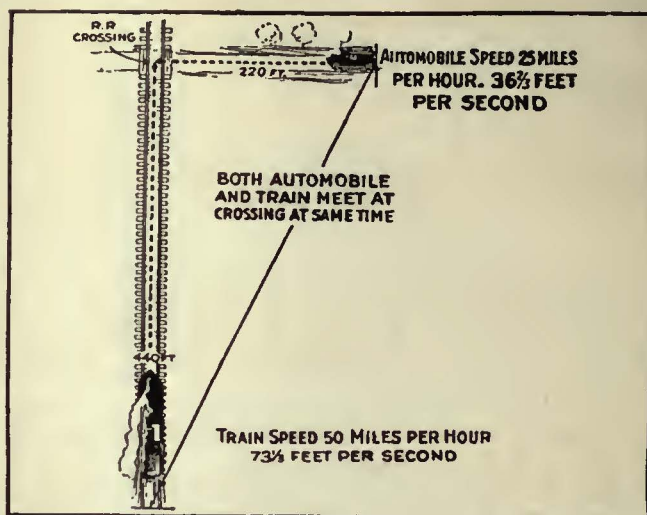
The 1927 banquet was held at the Albany Hotel, with Superintendent of Transportation J. L. Adams, as toastmaster. He introduced the officials and department heads of the company, including the president, chief surgeon, general attorney, chief engineer, auditor, purchasing agent, superintendent of power, 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.

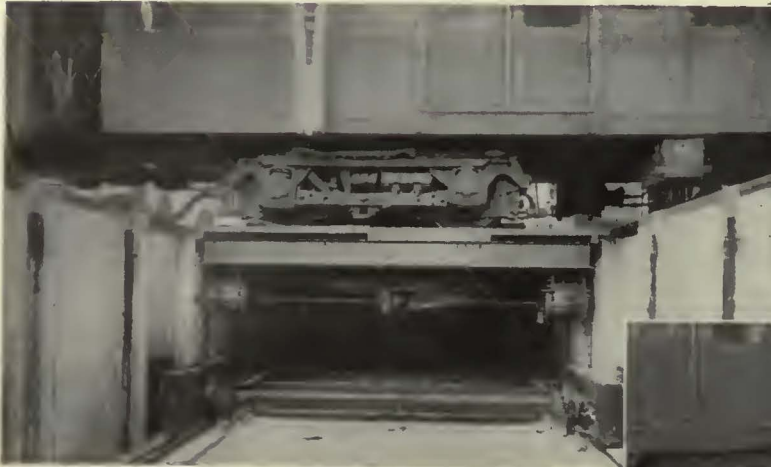
In considering this method it might appear that a large number of spare trucks would be needed. On the contrary, as the work is carried out on the Brooklyn-Manhattan Transit Lines, only six spare trucks have been found necessary, besides those actually required for car bodies, to take care of the truck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



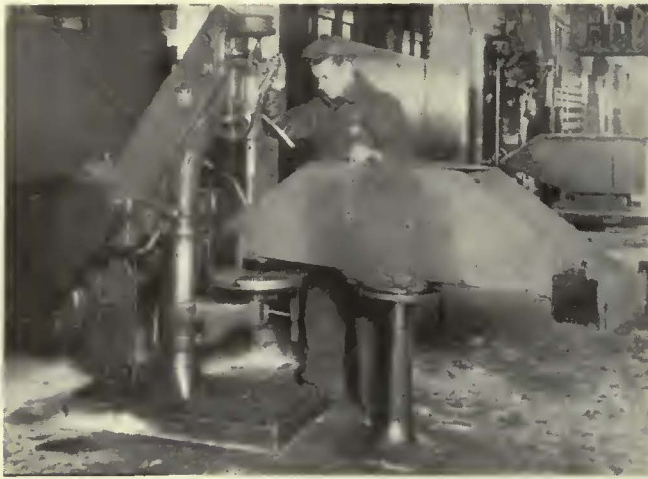
Stirrups fit over the ends of elliptic springs and lifting by the crane compresses them so that they fall into position readily

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.

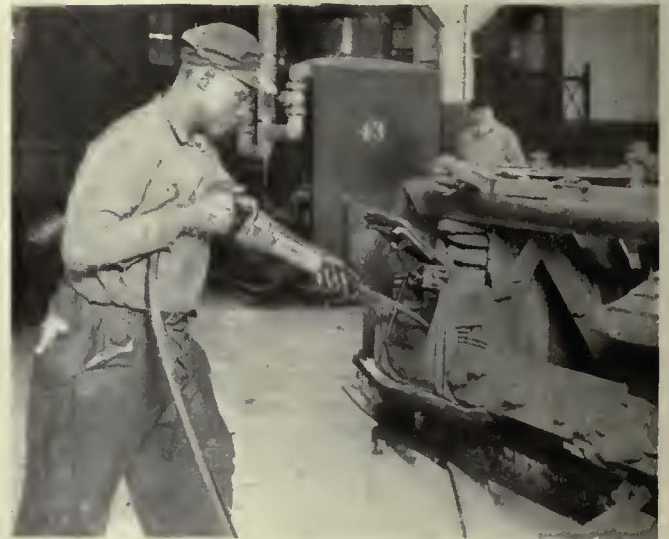
At present the truck repair section has a working force of 20 men during the daytime and 21 men at night and the section repairs an average of from 20 to 25 trucks per day. Running repairs are made only and no general overhauling is attempted. Some of the defects which



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.

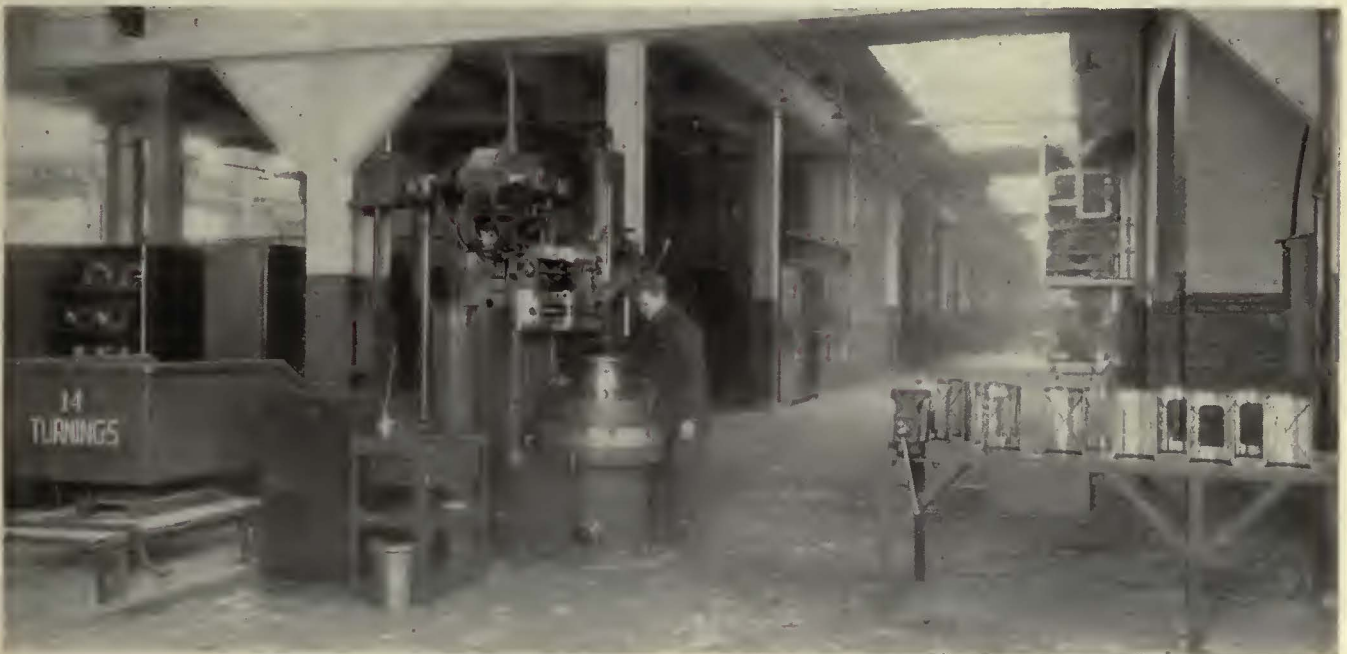
A crew of three men does the riveting. When not at work on the trucks these men make up spare ends for trucks, transoms, etc., so that these parts are ready to be installed whenever a defective one needs replacement. Packing of journal boxes is speeded up considerably through the use of a pneumatic gun 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

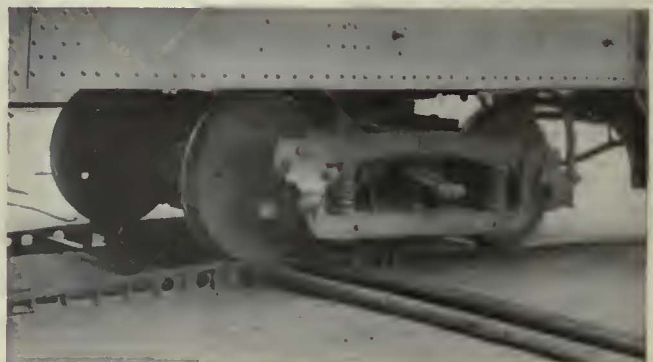
a 1:2:3 mixture, reinforced with $\frac{3}{4}$ -in. corrugated steel rods. A strip of linoleum covers the floor. The weight of the floor adds to the effective weight of the locomotive.

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

.....192

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.

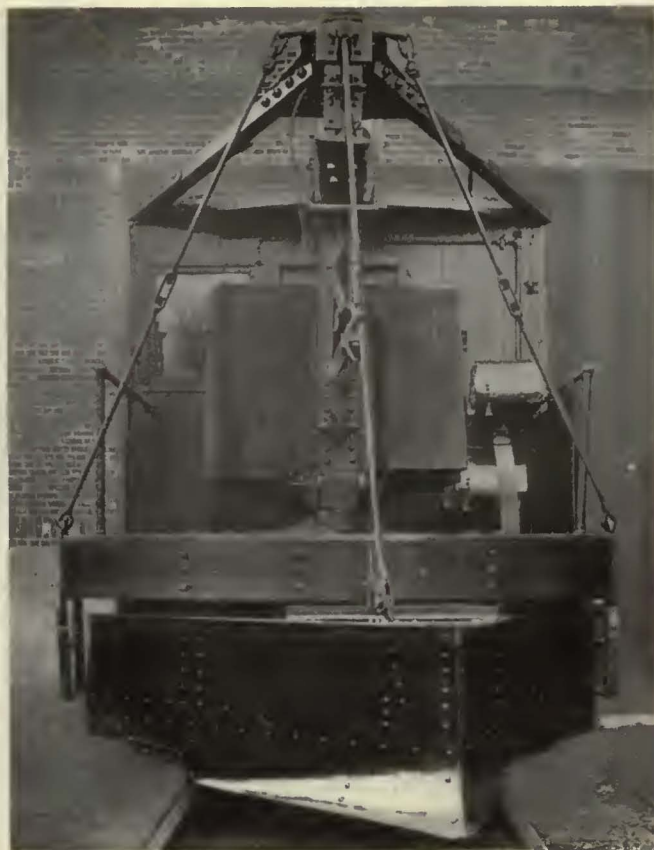
At the finish of the storm the snow is removed from yards, station roofs, subway and tunnel approaches, the East Cambridge viaduct and the Lechmere Square terminal, as well as the car roofs and the elevated structure.

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

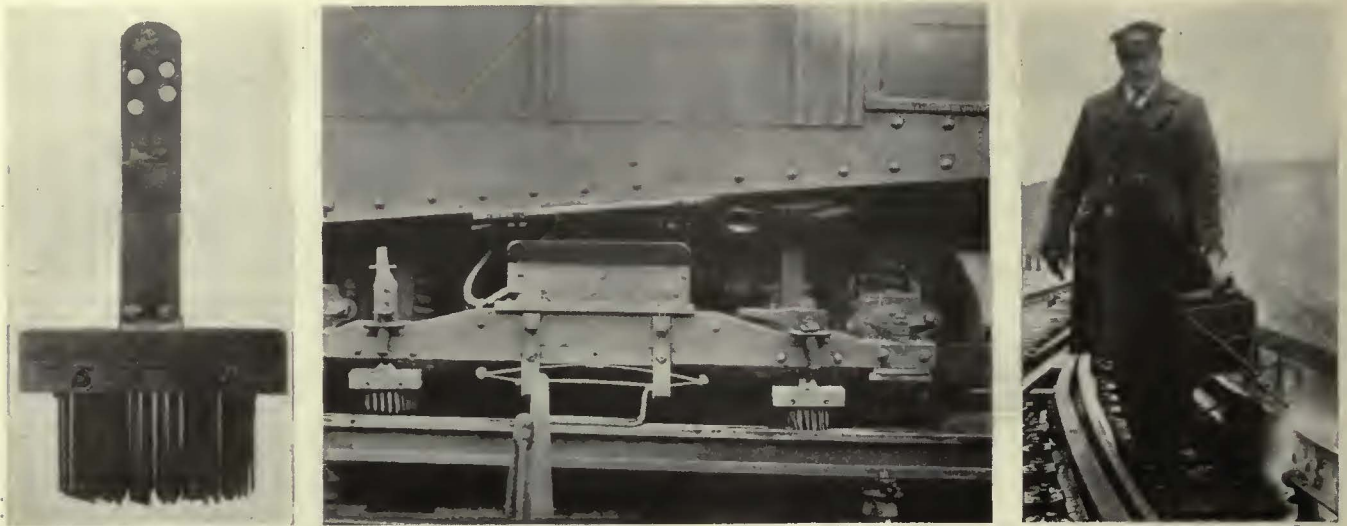
The bristles project $3\frac{5}{8}$ in., and are on a bevel. A spring arrangement provides about 40-lb. pressure on the brushes when they are in position. When not in use the brushes are elevated 1 in. above the third rail. The brush equipment is installed on the cars about Nov. 15 and removed about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

EMPLLOYEES 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

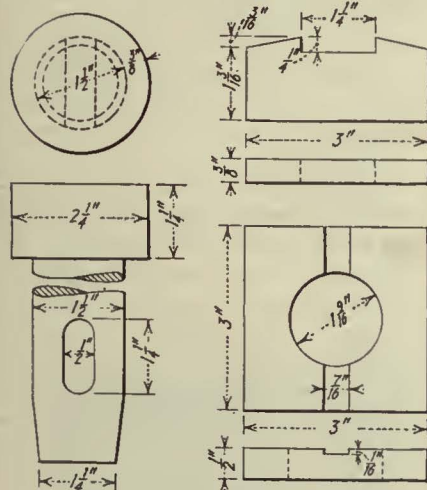
1 in. from the bottom of the tapered end for the reception of a key.

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 ⅞-in. recess cut in the plate and the bottom, being recessed ⅛ in., drops downward in the pin slot, thereby locking it in a fixed position.

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.



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.

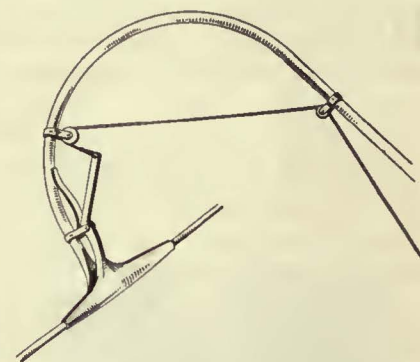
A keyed taper pin was designed and adopted to prevent this trouble. This pin is made of 1½-in. round stock and is tapered on one end to 1¼ in. A ½x1¼-in. slot is cut in this pin about

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

Contact for Track Tools

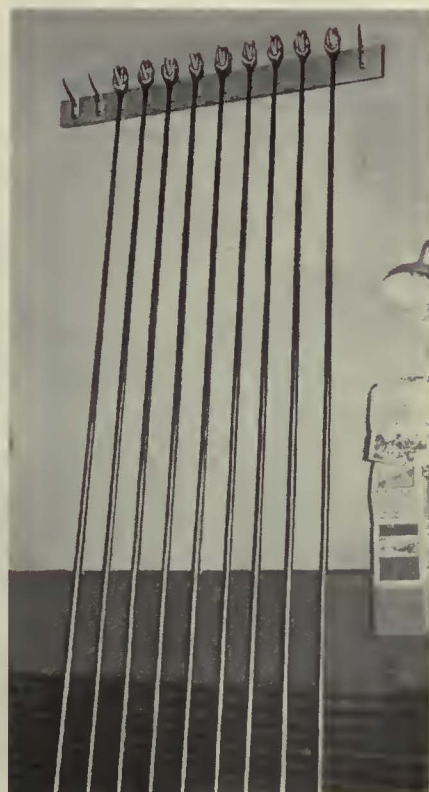
CONNECTION to the trolley wire to supply electrical concrete mixers and other track machinery operated by the trolley current can be made by the ingenious device shown in the accompanying illustration. It was developed by the Paris Surface Lines and is in use on that system. Particulars of it are given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



Convenient trolley pole rack

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.



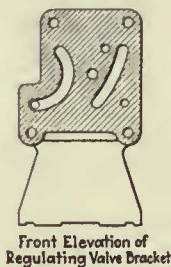
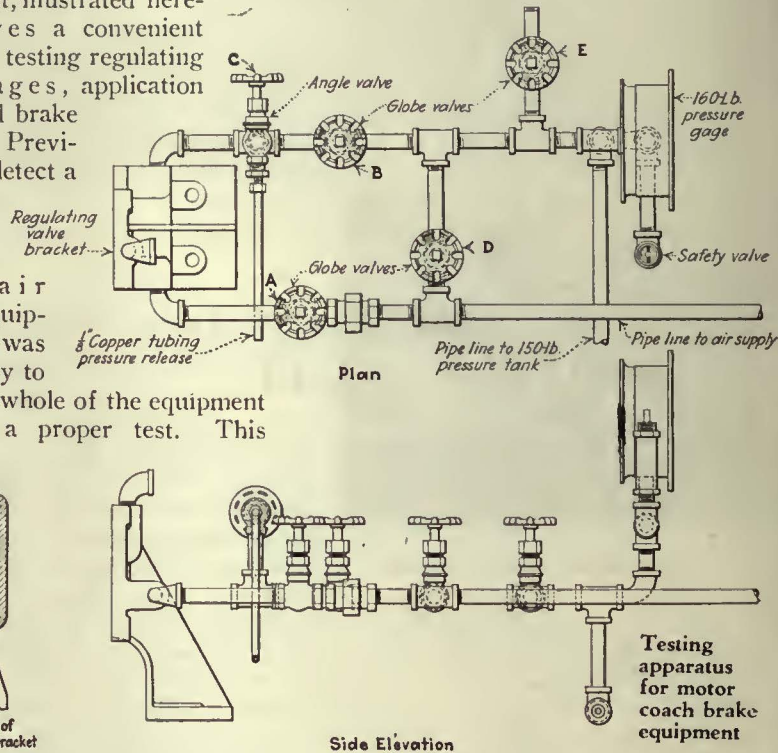
At left, truck with old type tie bar. At right, new tie bar arrangement

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



Front Elevation of Regulating Valve Bracket

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.

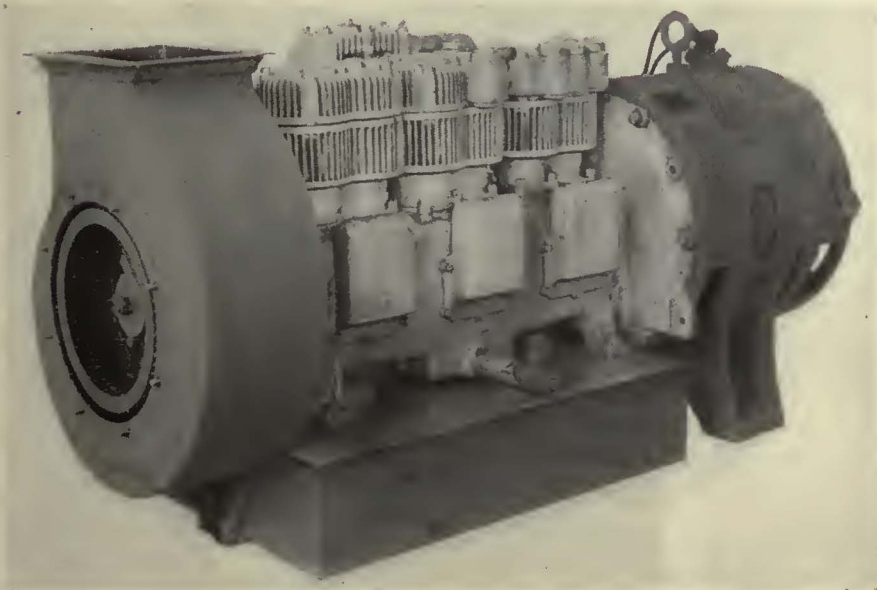
New Equipment Available

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."

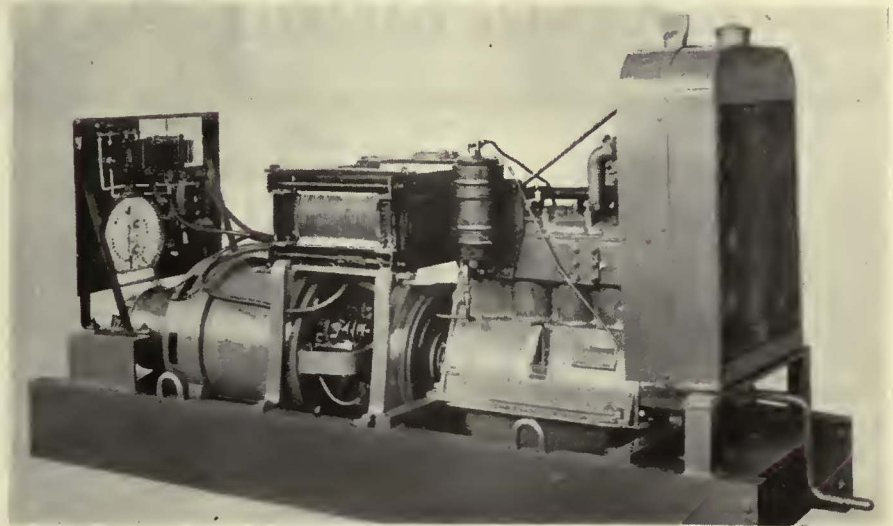
Motor-Driven Air Compressor for Electric Locomotives

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



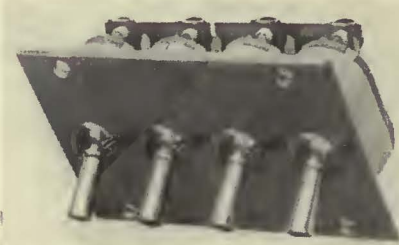
GROWING demand of welding various classes of construction work, where electric power is not readily available, has led the Lincoln Electric Company, Cleveland, Ohio, to bring out a new model of the Stable-Arc welder. The new unit has a rating of 200 amp., with a current range for welding duty, of from 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

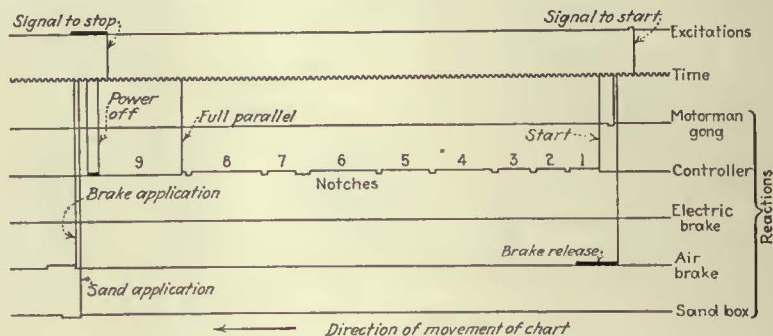
An account of the tests for motormen in use in June, 1924, was given by Mr. Bacqueyrise in a report before the International Street & Interurban Railway & Bus Association.† Mr. Bacqueyrise stated in his association paper that his company was preparing the construction of a model car platform and bus 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.

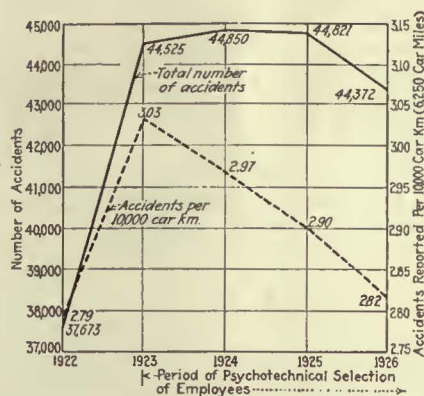
The ability of the candidate for concentrated attention was tested by means of a printed sheet, on which he was asked to cross off within a fixed time all marks having a definite form. The quickness of his reaction to sensory stimuli was tested by a vertical box containing various numbered slots inclined 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			
	Good	Poor	Per Cent of Group	
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 Ferreés 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. Mellraith, 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 7½ 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.

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

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.

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 theater-goers 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 the three-for-a-quarter ticket rate 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	13,633,643,345	(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	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.

TABLE II—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1927	1926	Increase or (D) Decrease		Per Cent Increase or (D) Decrease		
Way and structures.....	\$62,867,189	\$65,180,526 (D)	\$2,313,337	(D) 3.55	4.50	4.61 (D)	2.39
Equipment.....	58,879,020	59,154,421 (D)	275,401	(D) 0.47	4.21	4.18 (D)	0.72
Power.....	59,541,411	61,254,557 (D)	1,713,146	(D) 2.80	4.26	4.33 (D)	1.62
Conducting transportation.....	189,327,879	193,855,596 (D)	4,527,717	(D) 2.34	13.55	13.70 (D)	1.09
Traffic.....	2,192,066	2,364,156 (D)	172,090	(D) 7.28	0.16	0.17 (D)	5.88
General and miscellaneous.....	64,615,962	63,860,737 (D)	755,225	(D) 1.18	4.62	4.52 (D)	2.21
Transportation for investment—Credit.....	-231,153	-477,483 (D)	-246,330	(D) 51.59	-0.02	-0.03 (D)	33.33
Total operating expense.....	(a) \$439,117,138	(b) \$446,989,954 (D)	\$7,872,816	(D) 1.77	(a) 31.41	(b) 31.61 (D)	0.63

(a) Includes \$1,924,764 undistributed expense. (b) Includes \$1,797,444 undistributed expense.

in the number of passenger car-miles operated, compared with a decrease of 2.64 per cent in the number of passengers carried, including both revenue and transfer passengers. The difference in these figures indicates that a relatively greater amount of service in proportion to the traffic was given in 1927 than in 1926. This is borne out by the number of passengers carried per car-mile, which was 7.1 in 1927 and 7.2 in 1926. The number of passenger car-hours was reduced 2.33 per cent, a greater decrease than in the case of the car-miles operated. The average speed of the cars, therefore, was increased from 10.1 miles per hour to 10.2 miles per hour, a very substantial improvement in operating efficiency.

average number of miles operated by each car was increased from 39,226 in 1926 to 39,549 in 1927. At the same time the average number of car-hours operated by each car was reduced from 3,836 in 1926 to 3,673 in 1927. All of these improvements in operating efficiency contributed materially to the reduction in operating expenses which, together with the higher fares, enabled the electric railways to make as

good a showing as they have under the conditions which obtained during the year.

These are conclusions based on the

Part II—City Lines—Combined Reports of 79 Companies
Operating City Lines Exclusively

TABLE V—COMBINED INCOME STATEMENT

	1927	1926	Increase or (D) Decrease	
Railway operating revenue.....	\$423,287,423	\$426,891,791 (D)	\$3,604,368	(D) 0.84
Railway operating expense.....	300,181,253	305,157,248 (D)	4,975,995	(D) 1.63
Net operating revenue.....	\$123,106,170	\$121,734,543	\$1,371,627	1.13
Net revenue: Auxiliary operations	763,911	571,486	192,425	33.67
Taxes.....	27,229,379	27,299,746 (D)	70,367	(D) 0.26
Operating income	\$96,640,702	\$95,006,283	\$1,634,419	1.72
Non-operating income.....	6,741,557	6,115,574	625,983	10.24
Gross income....	\$103,382,259	\$101,121,857	\$2,260,402	2.24
Deductions from gross income....	80,020,008	79,408,654	611,354	0.77
Net income.....	\$23,362,251	\$21,713,203	\$1,649,048	7.59
Dividends.....	(a) \$12,228,788	(b) \$12,234,622 (D)	\$5,834	(D) 0.05
Operating ratio (per cent).....	70.91	71.48 (D)	0.57	(D) 0.80
Ratio: Net income to operating revenue.....	5.52	5.09	0.43	8.45

(a) Reported by 28 companies. (b) Reported by 25 companies.

TABLE III—OPERATING STATISTICS—206 COMPANIES

	1927	1926	Increase or (D) Decrease	
Passenger car-miles...	1,350,121,164	1,366,937,151 (D)	16,815,987	(D) 1.24
Total revenue car-miles	1,397,697,154	1,413,785,326 (D)	16,088,172	(D) 1.14
Revenue passengers (1)	7,710,221,883	7,906,409,142 (D)	196,187,259	(D) 2.49
Transfer passengers (2)	1,606,430,890	1,660,556,010 (D)	54,125,120	(D) 3.26
Total passengers (3)	9,376,506,790	9,630,681,258 (D)	254,174,468	(D) 2.64
Passenger revenue....	\$551,711,496	\$562,579,731 (D)	\$10,868,235	(D) 1.94
Revenue car-hours (4)	119,737,456	122,630,246 (D)	2,892,790	(D) 2.36
Passenger car-hours (5)	118,455,928	121,279,429 (D)	2,823,501	(D) 2.33
Miles of single track....	23,421	23,472 (D)	51	(D) 0.22
Passenger cars operated (6) (a).....	31,628	32,272 (D)	644	(D) 2.00

(a) Average maximum number of passenger cars in service daily.

(1) Reported by 197 companies. (2) Reported by 137 companies. (3) Reported by 183 companies. (4) Reported by 178 companies.

TABLE IV—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES—206 COMPANIES

	1927	1926	Per Cent Increase or (D) Decrease	
Railway operating revenue.....	\$596,557,500	\$606,709,768 (D)	1.67	(D) 1.67
Per mile of single track.....	\$25,471	\$25,848 (D)	1.46	(D) 1.46
Gross income.....	\$133,832,076	\$134,238,324 (D)	0.30	(D) 0.30
Per mile of single track.....	5,714	5,719 (D)	0.09	(D) 0.09
Passenger revenue.....	\$551,711,496	\$562,579,731 (D)	1.93	(D) 1.93
Per revenue passenger.....	(1) 7.0c.	(1) 6.9c.	1.43	(D) 1.43
Per total passenger.....	(1) 5.7c.	(1) 5.7c.	.....	.....
Per mile of single track.....	\$23,556	\$23,968 (D)	1.72	(D) 1.72
Per passenger car-mile.....	40.9c.	41.2c. (D)	0.73	(D) 0.73
Per car operated.....	(2) \$15,472	(2) \$15,448	0.16	(D) 0.16
Per passenger car-hour.....	(2) \$4.14	(2) \$4.14	.....	.....
Revenue passengers.....	(1) 7,710,221,883	(1) 7,906,409,142 (D)	2.48	(D) 2.48
Per mile of single track.....	(1) 344,391	(1) 352,461 (D)	2.29	(D) 2.29
Per passenger car-mile.....	(1) 5.8	(1) 5.9 (D)	1.69	(D) 1.69
Per car operated.....	(1) 216,038	(1) 216,830 (D)	0.37	(D) 0.37
Per passenger car-hour.....	(1) 60	(1) 60	.....	.....
Total passengers.....	(1) 9,376,506,790	(1) 9,630,681,258 (D)	2.64	(D) 2.64
Per mile of single track.....	(1) 418,818	(1) 429,328 (D)	2.45	(D) 2.45
Per passenger car-mile.....	(1) 7.1	(1) 7.2 (D)	1.39	(D) 1.39
Ratio: Transfer passengers to revenue passengers (per cent)	20.8	21.0 (D)	0.95	(D) 0.95
Revenue car-miles.....	1,397,697,154	1,413,785,326 (D)	1.14	(D) 1.14
Per mile of single track.....	59,677	60,233 (D)	0.92	(D) 0.92
Per car operated.....	(3) 39,549	(3) 39,226 (D)	0.82	(D) 0.82
Per car-hour.....	(3) 10.2	(3) 10.1 (D)	0.99	(D) 0.99
Car-hours.....	(3) 119,737,456	(3) 122,630,246 (D)	2.36	(D) 2.36
Per car operated.....	(3) 3,673	(3) 3,836 (D)	4.25	(D) 4.25

(1) Reported by 197 companies. (2) Reported by 183 companies. (3) Reported by 172 companies. (4) Reported by 170 companies.

(5) Reported by 179 companies. (6) Reported by 173 companies. (7) Reported by 155 companies.

TABLE VI—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1927	1926	Increase or (D) Decrease	
Way and structures.....	\$39,546,808	\$41,599,587 (D)	\$2,052,779	(D) 4.94
Equipment.....	40,339,211	40,932,018 (D)	592,807	(D) 1.45
Power.....	39,324,674	40,068,001 (D)	743,327	(D) 1.86
Conducting transportation.....	137,796,327	140,401,944 (D)	2,605,617	(D) 1.86
Traffic.....	747,250	987,719 (D)	240,469	(D) 24.35
General and miscellaneous.....	40,727,585	39,552,665	1,174,920	2.97
Transportation for investment—Cr.	-102,365	-84,521	-17,844	21.11
Total operating expense.....	(a) \$300,181,253	(b) \$305,157,248 (D)	\$4,975,995	(D) 1.64

(a) Includes \$1,801,763 undistributed expense. (b) Includes \$1,699,835 undistributed expense.

TABLE VII—OPERATING STATISTICS

	1927	1926	Increase or (D) Decrease	
Passenger car-miles..	991,363,648	997,369,635 (D)	6,005,987	(D) 0.60
Total revenue car-miles.....	1,000,017,800	1,007,181,217 (D)	7,163,417	(D) 0.72
Revenue passengers (1)	6,202,325,617	6,281,044,386 (D)	78,718,769	(D) 1.26
Transfer passengers (2)	1,403,379,717	1,443,535,434 (D)	40,155,717	(D) 2.79
Total passengers (3)	7,637,754,069	7,758,690,453 (D)	120,936,384	(D) 1.56
Passenger revenue.....	\$408,712,840	\$412,445,636 (D)	\$3,732,796	(D) 0.91
Revenue car-hours (4)	88,298,298	90,063,223 (D)	1,764,925	(D) 1.96
Passenger car-hours (5)	88,148,855	89,912,072 (D)	1,763,217	(D) 1.96
Miles of single track....	9,890	9,896 (D)	6	(D) 0.07
Passenger cars operated (6) (a).....	24,176	24,429 (D)	253	(D) 1.04

(a) Average maximum number of cars in service daily. (1) Reported by 77 companies. (2) Reported by 66 companies. (3) Reported by 73 companies. (4) Reported by 70 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)	34,891,282	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)	37,394,065	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	1,585,246	(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 1927	1926	Per Cent Increase or (D) Decrease	Cents per Car-Mile 1927	1926	Per Cent Increase or (D) Decrease	Cents per Car-Mile 1927	1926	Per Cent Increase or (D) Decrease
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	(D) 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 1927	1926	Per Cent Increase or (D) Decrease	Cents per Car-Mile 1927	1926	Per Cent Increase or (D) Decrease	Cents per Car-Mile 1927	1926	Per Cent Increase or (D) Decrease
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.	—9.01	—0.01	.....	.....	.....	.....	—0.04	—0.11	(D) 63.64
Cr.	.....	.....	.....	.....	.....	.....	.....	.....	.....
*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)	(1)	27.6c. (1)	27.9c. (1)	0.08 (2)	8.4c. (2)	8.2c. (2)	2.44
Per total passenger..... (1)	5.3c. (1)	5.3c. (1)	(1)	26.0c. (1)	26.3c. (1)	1.14 (2)	7.3c. (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	\$12,447	\$12,982	(D) 4.12
Per passenger car-mile.... (1)	41.2c. (1)	41.4c. (1)	0.48 (10)	33.1c. (10)	34.3c. (10)	3.50	40.5c.	41.3c. (1)	1.94
Per car operated..... (1)	\$15,266 (1)	\$15,254 (1)	0.08 (11)	\$15,419 (11)	\$16,656 (11)	7.43 (12)	\$16,194 (12)	\$16,010 (12)	1.15
Per passenger car-hour.... (1)	\$4.21 (1)	\$4.18 (1)	0.72 (1)	\$5.55 (15)	\$5.80 (15)	4.31 (1)	\$3.89 (1)	\$3.96 (1)	1.77
Revenue passengers..... (1)	6,202,325,617 (1)	6,281,044,386 (D)	1.25 (1)	34,801,282 (1)	36,819,171 (D)	5.48 (2)	1,473,094,984 (2)	1,588,545,585 (D)	7.27
Per mile of single track.... (1)	633,796 (1)	641,578 (D)	1.21 (1)	13,108 (1)	13,926 (D)	5.87 (2)	148,094 (2)	158,86 (D)	6.79
Per passenger car-mile.... (1)	6.3 (1)	6.4 (D)	1.56 (1)	1.2 (1)	1.2 (1)	(2)	4.8 (2)	5.0 (D)	4.00
Per car operated..... (1)	230,005 (1)	230,832 (D)	0.36 (13)	56,674 (13)	60,800 (D)	6.79 (13)	177,435 (13)	180,735 (D)	1.83
Per passenger car-hour.... (1)	65 (1)	65 (1)	(14)	24.5 (14)	25.1 (D)	2.39 (1)	47 (1)	49 (D)	4.08
Total passengers..... (1)	7,637,754,069 (1)	7,758,690,453 (D)	1.56 (1)	37,047,065 (1)	39,104,334 (D)	5.26 (2)	1,701,705,656 (2)	1,832,886,471 (D)	7.16
Per mile of single track.... (1)	780,478 (1)	792,512 (D)	1.52 (1)	13,954 (1)	14,790 (D)	5.65 (2)	171,077 (2)	183,325 (D)	6.68
Per passenger car-mile.... (1)	7.8 (1)	7.8 (1)	(1)	1.3 (1)	1.3 (1)	(1)	5.5 (1)	5.8 (D)	5.17
Ratio: Transfer passengers to revenue passengers (per cent).....	22.6%	23.0% (D)	1.74	2.1%	2.1% (D)	0.44	13.7%	13.6% (D)	0.74
Revenue: Car-miles.....	1,000,017,800	1,007,181,217 (D)	0.71	44,285,258	44,480,585 (D)	0.44	353,394,096	362,123,524 (D)	2.41
Per mile of single track....	101,114	101,777 (D)	0.65	15,208	15,328 (D)	0.78	33,279	33,926 (D)	1.91
Per car operated..... (1)	37,783 (1)	37,700 (D)	0.22 (15)	62,233 (15)	62,501 (D)	0.43 (15)	43,958 (15)	42,641 (D)	3.09
Per car-hour..... (1)	10.2 (1)	10.1 (D)	0.99 (1)	11.7 (1)	11.6 (D)	0.86 (1)	9.9 (1)	9.9 (1)	0.00
Car-hours..... (1)	88,298,298 (1)	90,063,223 (D)	1.96 (1)	1,554,344 (1)	1,588,246 (D)	2.13 (1)	29,884,814 (1)	30,978,777 (D)	3.53
Per car operated..... (1)	3,494 (1)	3,699 (D)	5.54 (16)	3,573 (16)	3,715 (D)	3.82 (17)	4,374 (17)	4,331 (D)	0.99

(1) Reported by 77 companies (2) Reported by 74 companies (3) Reported by 73 companies (4) Reported by 71 companies (5) Reported by 46 companies (6) Reported by 39 companies (7) Reported by 70 companies (8) Reported by 72 companies (9) Reported by 71 companies (10) Reported by 64 companies (11) Reported by 50 companies (12) Reported by 40 companies (13) Reported by 62 companies (14) Reported by 38 companies (15) Reported by 36 companies (16) Reported by 41 companies (17) Reported by 33 companies (18) Reported by 58 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	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 service it is today.

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

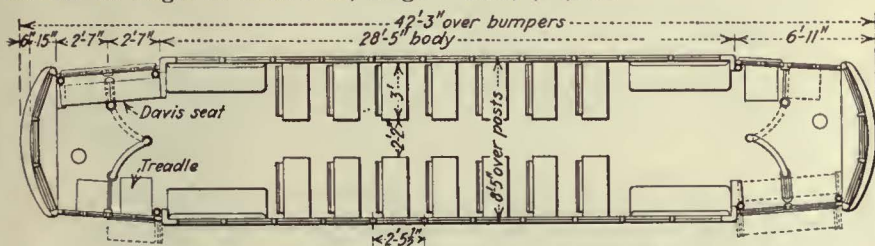
The bodies are of the semi-steel type with Monitor roofs. The exterior finish is cream and blue paint and the interior is cherry and grey enamel. The seats are upholstered in genuine leather. Each car is equipped with four outside-hung motors and air brakes with variable load feature. Complete specifications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

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
Bluminous 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.....	\$0.60

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 gun-iron 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.

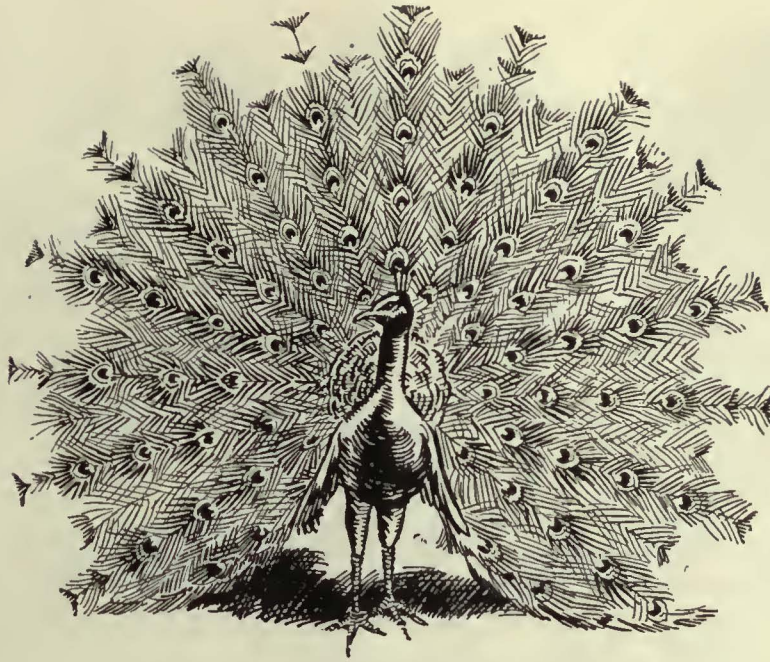
ELECTRIC SERVICE SUPPLIES COMPANY, Philadelphia, Pa., has issued a new folder, No. 253, on Keystone portable lamp guards.

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 1¼, 1½ 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.

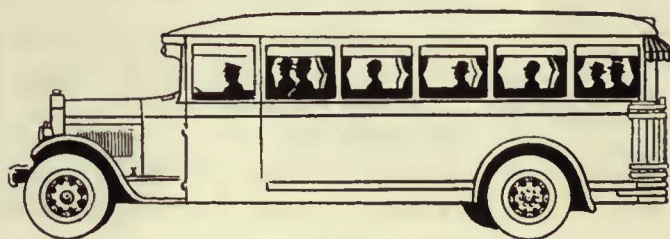
This year, established carriers have the added competition of 3,765,059 private automobiles built in 1927. Busses must share in this basic dilution. To maintain the imperiled volume, and to do it profitably, operators must observe the laws of frequency and of the average load.

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.

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Lansing, Michigan

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12 AND 21 PASSENGER

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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

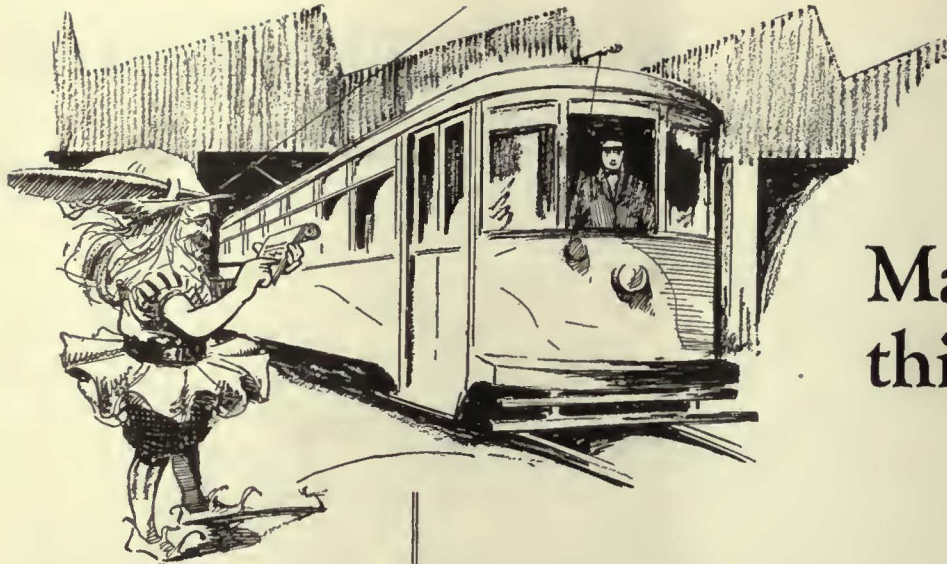
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PITTSBURGH, PENNA.

1918

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STEEL CROSS TIES**



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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!

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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.

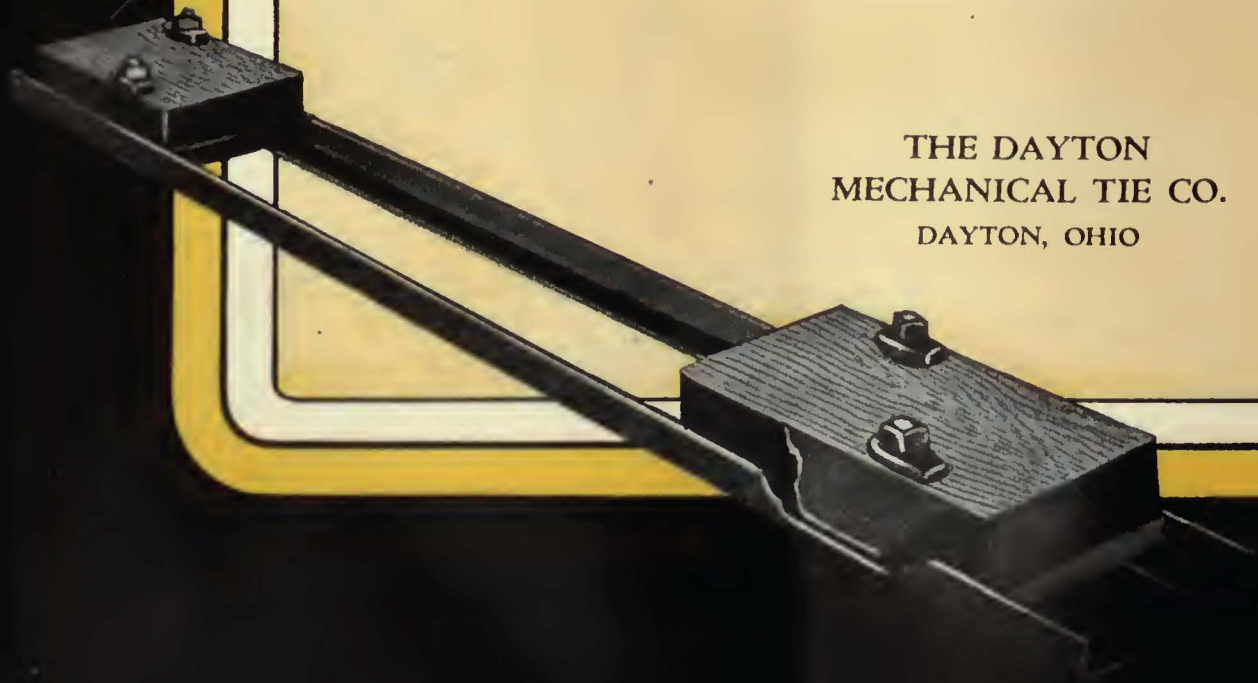
The other is two years old.

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.

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MECHANICAL TIE CO.
DAYTON, OHIO



Passenger — inviting comfort



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Double Rotating Chairs
in C. H. & D. Interurban cars.



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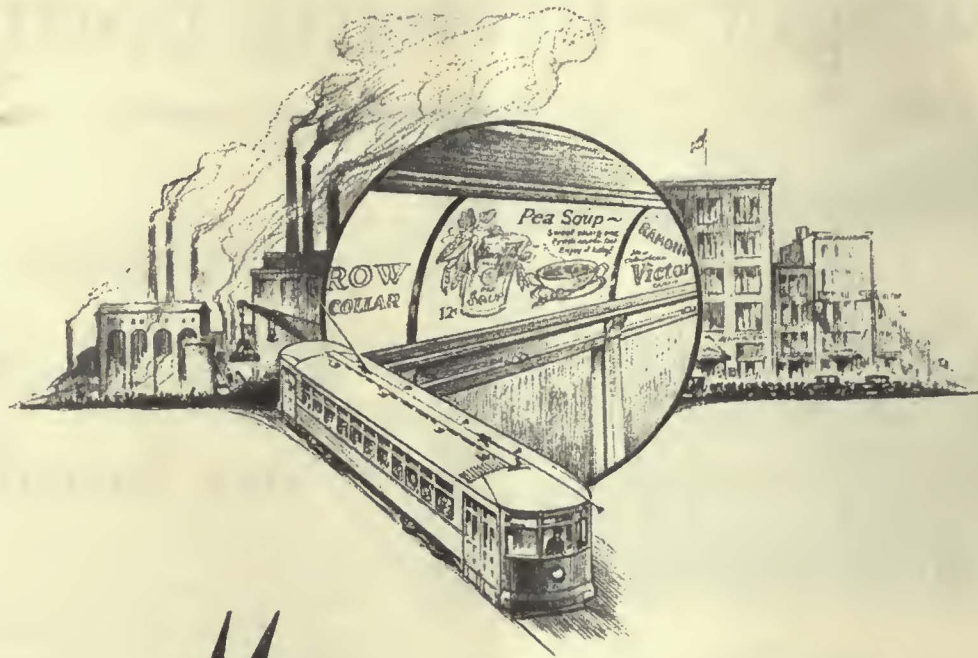
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Mutual Service

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.

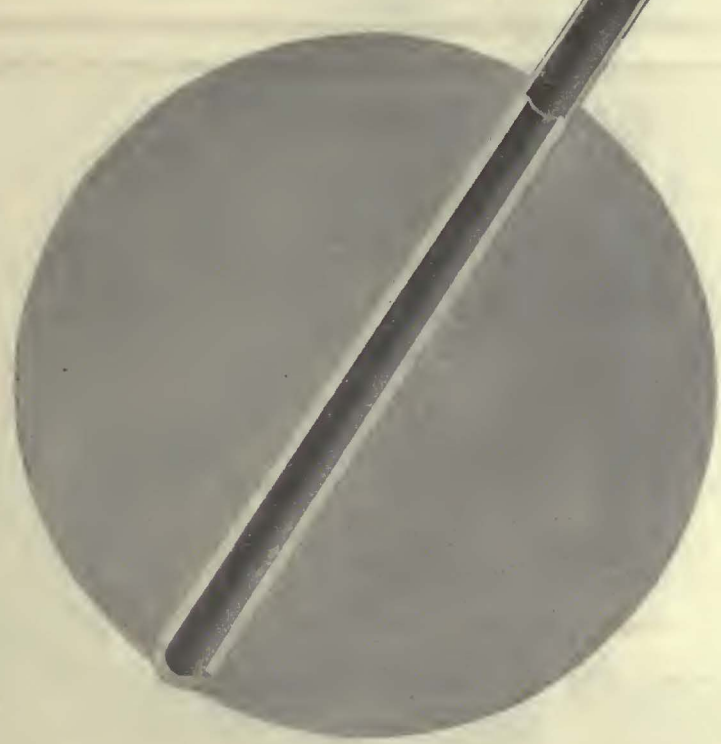
Our business is one of service—service to the street railway industry, service to America's national and local advertisers, service to the millions of people who daily ride on street cars.



CANDLER BUILDING,
NEW YORK, N. Y.

“**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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Have you Bulletin 2D-28?

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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.

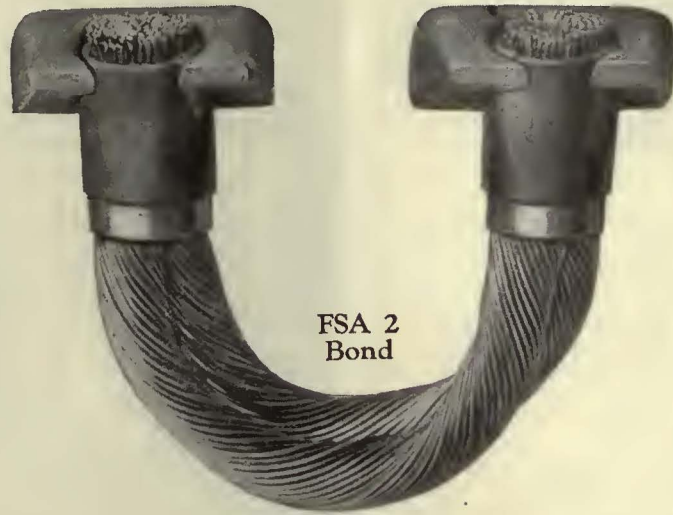


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American Steel and Wire Company



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FSC Bond

Reliable Performance with Simplicity of Application

Here are two of the best all 'round welded bonds on the market. The terminals are designed to fit the rail joints and are easy to apply. The simplicity of application with our alloy flux wire combined with the ease with which the oxy-acetylene flame can be manipulated insures efficient and lasting attachment of these Flameweld Bonds.

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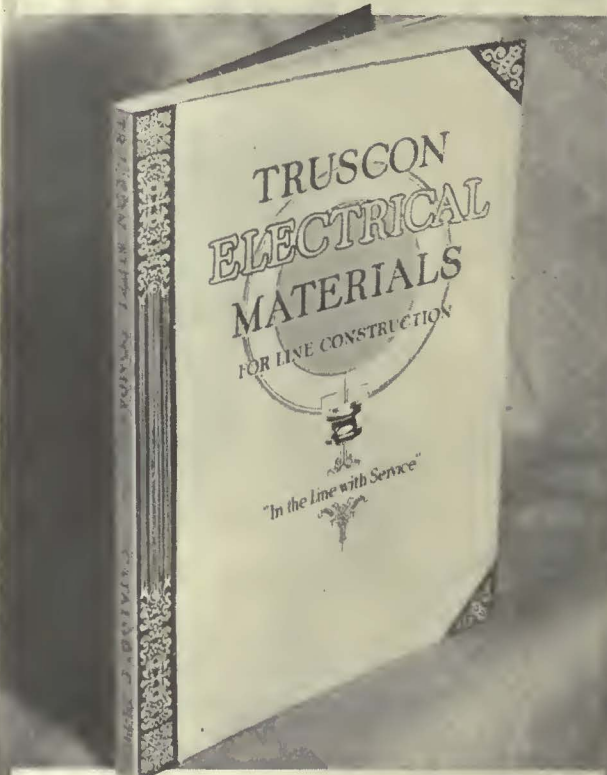
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INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

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"



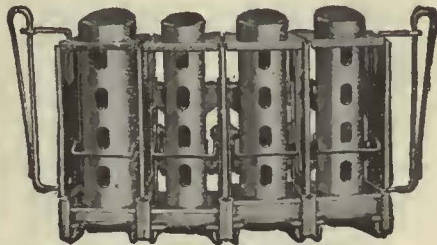
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Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

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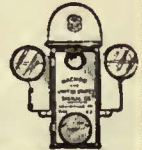
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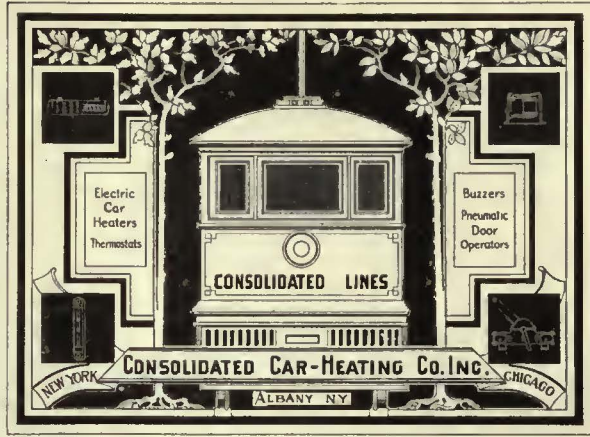
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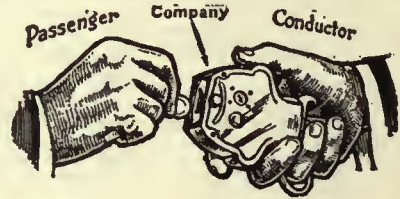
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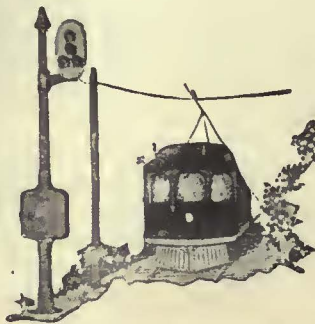
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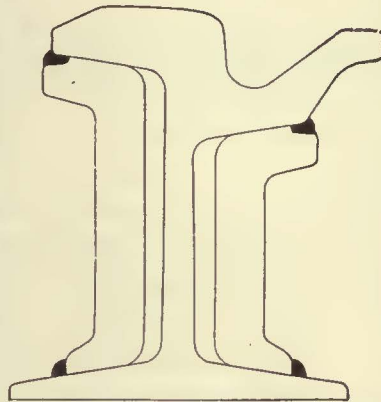


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