McGraw-Hill Company, Inc. February 7, 1925 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Modern Methods

THE Brooklyn City Railroad furnishes an outstanding example of modern transportation methods. Traffic conditions on each individual line are carefully watched and cars are shifted to meet the varying conditions. Particular attention is paid to comments of patrons as to the sufficiency of service in their particular localities. Maintenance of the cars and equipment is well above the average. Every effort is made to give the localities served the best possible transportation system which can be developed under existing conditions.

With this policy in mind, Mr. C. E. Morgan has ordered 335 new moderate-weight, low-floor cars, to supplement the added service supplied by 200 similar cars purchased in 1923.

No. 510-A
Railway Motor

These cars will be equipped with four Westinghouse 510-A motors and double-end K-72 control, making a total of 1740 motors of this type in service in Brooklyn.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

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Vol. 65, No. 6 New York, February 7, 1925 Pages 209-244

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ELECTRIC RAILWAY JOURNAL

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FEBRUARY 7, 1925

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Use—as Well as Read

MOST readers use the JOURNAL just in the ordinary way. They read of what various railways are doing of an engineering nature and the methods used, the news of the industry, reports of conventions and announcements of future meetings, details of new rolling stock and personal items about their friends.

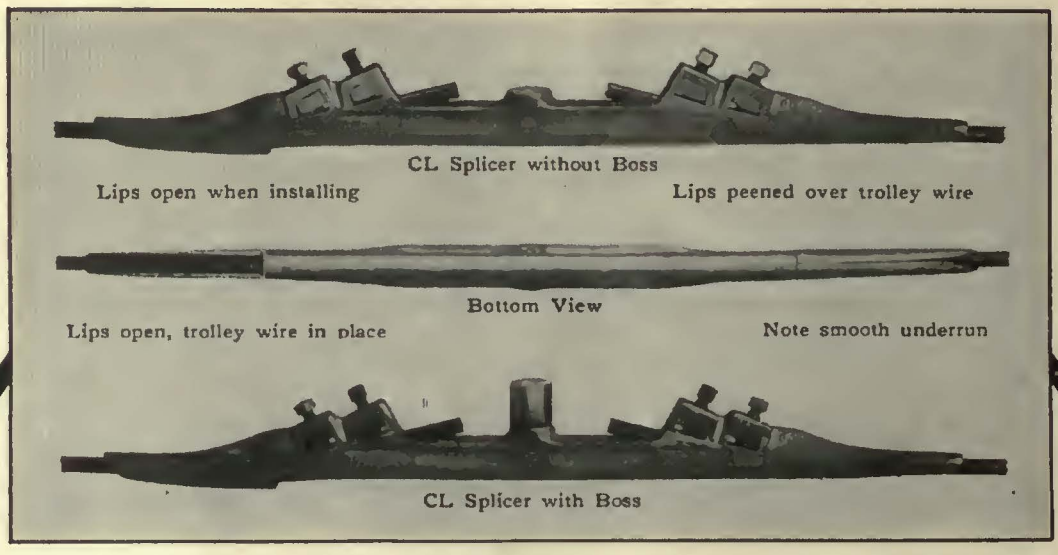
Beyond this use, however, many interesting examples come to our attention showing other uses to which the JOURNAL has been put. One railway makes an editorial from this paper the subject of a poster displayed in its cars. Another company, whose achievements are described, sends reprints of the article to all its stockholders. In a town where the railway is having difficulty to secure the co-operation of the merchants in an anti-parking campaign, material published in the JOURNAL is successfully used to clinch the railway's previous arguments. Several contestants incorporate clippings of articles published by this paper in the briefs submitted in competition for the Coffin prize.

So it goes. There isn't room in this column really to list the number of different uses to which the JOURNAL is put. The explanation of this is that the editors have in mind when writing the paper not only to use material about which the readers will want to know for themselves but also to include some material with which railway men can help their case with certain public groups.

Number of Copies Printed, 6,300 Advertising Index—Alphabetical, 60; Classified, 56, 58, 60; Searchlight Section, 55

A Splicer

That Is Stronger Than The Trolley Wire



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Made with and without boss, for all sizes of round and grooved wire.

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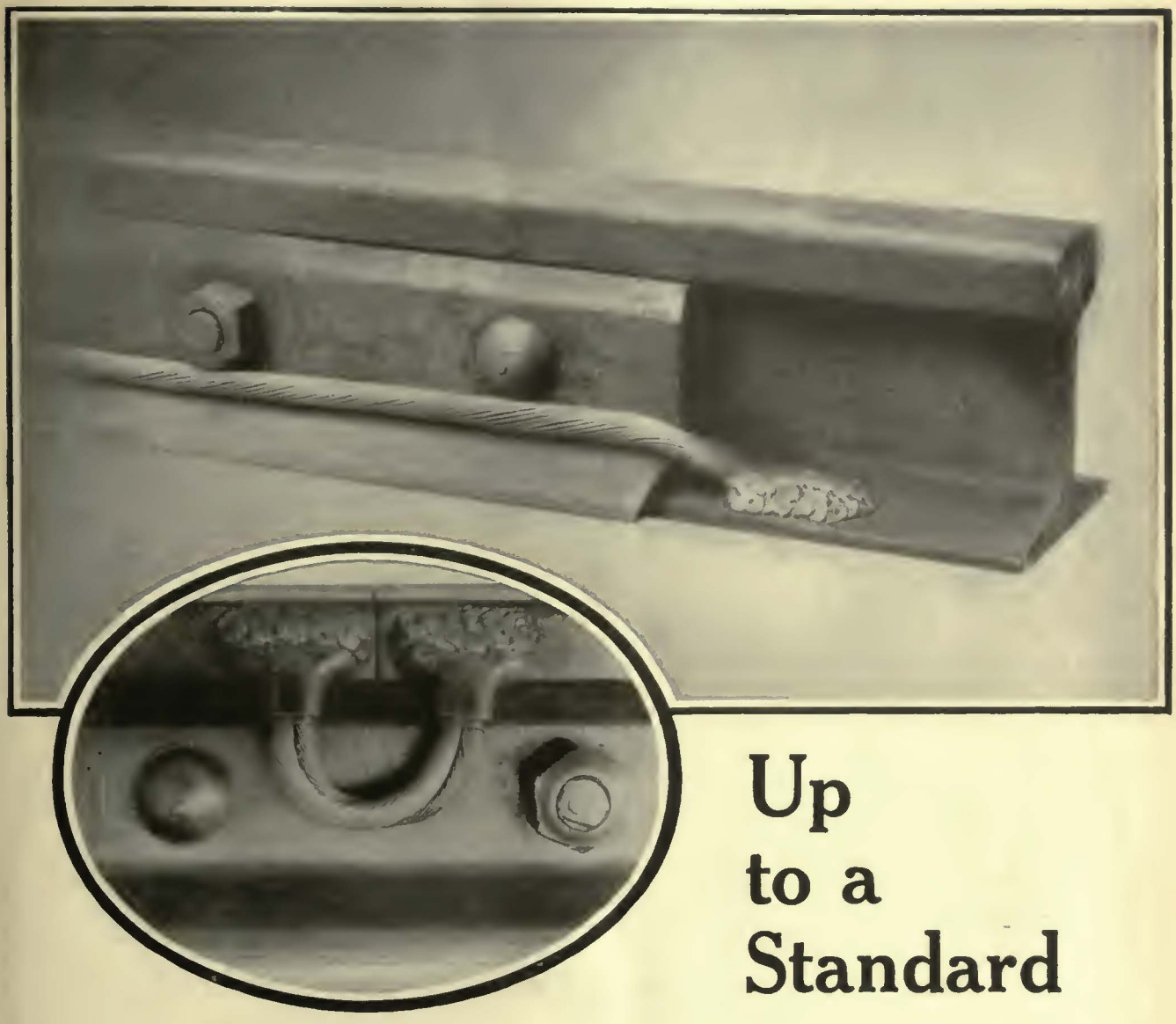

Up to a Standard

O-B Arc Weld Bonds were developed to meet an O-B established high standard, not to take their place with the average.

These Type AW Bonds, one for base of rail and one for ball of rail, have carried their responsibility. They are easy to weld, and therefore insure the highest percentage of good rail joints.

The Ohio Brass Co.
Mansfield, Ohio

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STEEL TWIN TIES

Low Initial Cost—Long Life Joints Renewable Foundation

THE REASONS for the continually growing interest in steel tie construction for paved track work which are stated above are definitely based on experience. The cost records for 1924 (where the work was installed with modern equipment) are apparently less on the index basis than pre-war costs.

The long life of joints (the weakest point in any track) is on record showing up to thirteen years' experience.

The renewal methods are being utilized on upwards of five miles of steel tie construction this Summer. The first renewal has had a two-year test.

All this data, too voluminous, for this space is included in our folder "Steel Tie Track Construction." Ask for it before settling this year's construction plans.

The International Steel Tie Co., Cleveland, Ohio

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

Modern Signal Protection

Electro-Pneumatic Interlocking at Terminal Station of Philadelphia & West Chester Traction Co.

At the new Philadelphia Terminal Station of the Philadelphia & West Chester Traction Co., UNION ELECTRO-PNEUMATIC INTERLOCKING allows car movements to be speeded up and insures against confliction of simultaneous movements.

Let one of our engineers study your operating conditions and co-operate with you in considering what Interlocking and Automatic Block Signals will do for your Railway.

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The burning out of any lamp in a series car lighting system will not affect the burning of the remaining lamps when Keystone Compensating Fixtures are used.

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The growing tendency toward the operation of high candle power incandescent headlights in series with one or more circuits of car lamps and also the increasing use of larger units in car lighting has made a device of this character practically a necessity.

Consider these advantages

Greatly reduced cost of lamp renewals.
Greatly lessened loss of lamps from theft.
Immediate evidence of burned-out lamp.
Vastly improved appearance and lessened glare.
Greatly simplified car wiring.
Better illumination for a given total wattage consumption.

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If you are using Motor Buses to supplement existing street car service—

If you hope to thus secure new patrons to produce additional revenue—

If you want to assure your bus patrons the same degree of protection that modern rail transportation provides—

If you want to realize the maximum utility, as well as safety, in the operation of your buses—

Eighteen prominent Street Railway Companies are now enjoying the benefits derived from the use of Westinghouse Air Brakes on their buses.

Use Westinghouse Automotive Air Brakes

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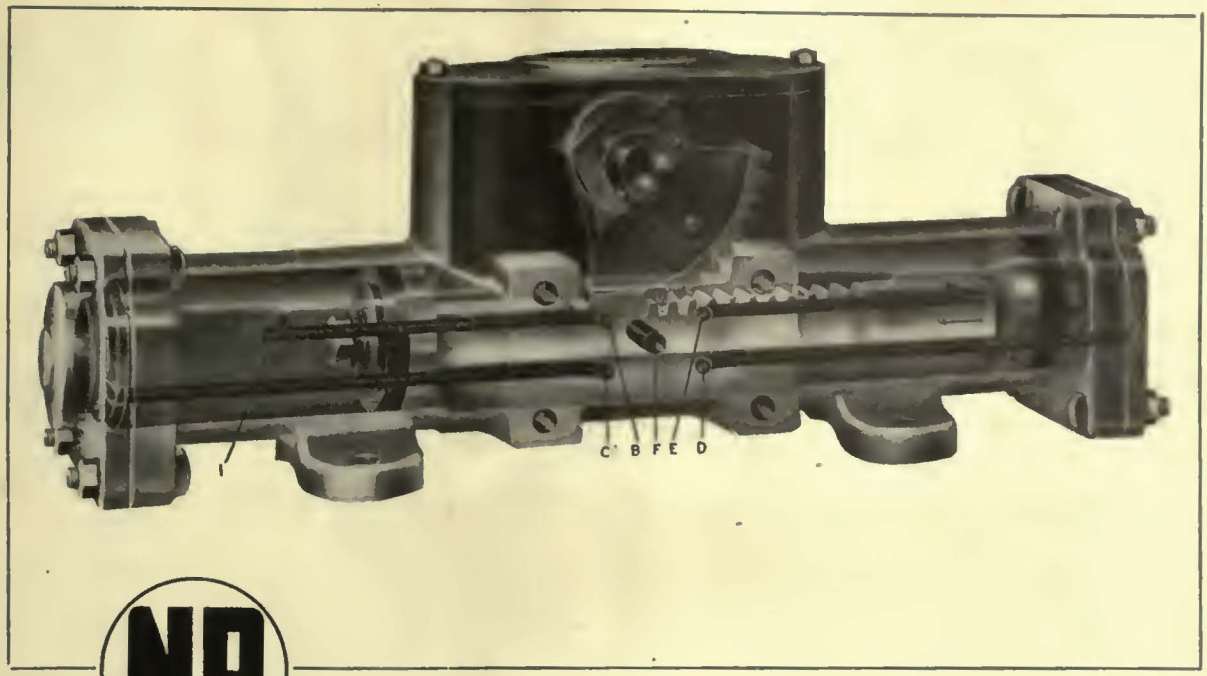
WESTINGHOUSE *Automotive* AIR BRAKES



PNEUMATIC ENGINE WITH VALVE REMOVED

NP

You have seen both old plant and the new plant of the National Pneumatic Company. Here is one of the products that is made in the new plant—the pneumatic engine—ideal tool for operation of car doors and steps. Following advertisements will show you *how* this engine and accompanying mechanisms are constructed.

NATIONAL PNEUMATIC COMPANY

Executive Office: **50 Church Street, New York**
General Works, **Rahway, New Jersey**

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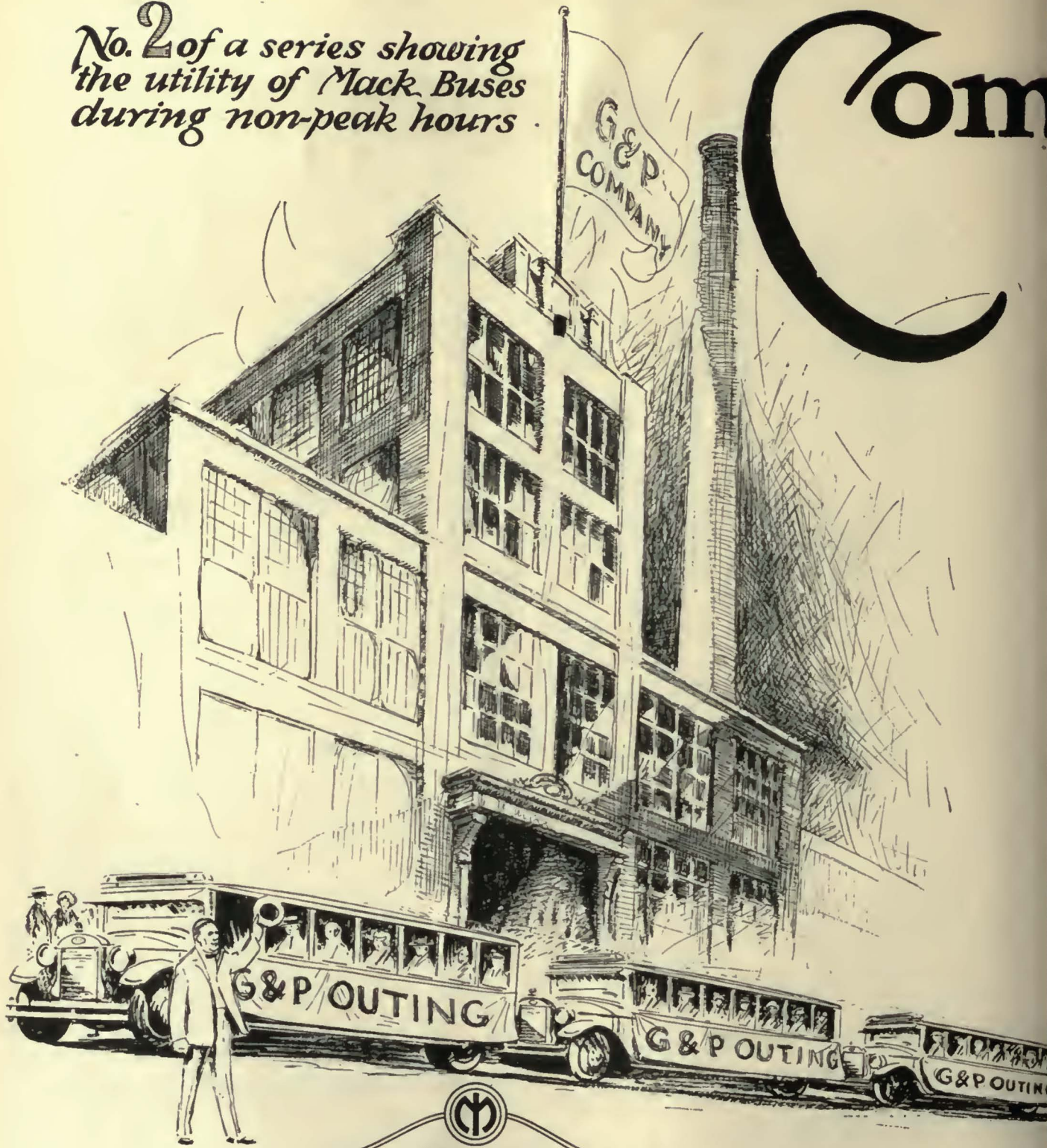
McCormick Building

MANUFACTURER IN
TORONTO, CANADA
Dominion Wheel & Foundries, Ltd.

PHILADELPHIA
Colonial Trust Building

No. 2 of a series showing the utility of Mack Buses during non-peak hours

Com



1900 1925

For a full quarter century Mack interests have been centered on the manufacture of transport vehicles

pany Outings

Most of the large commercial and industrial houses set apart one day each year for a company outing. Employees want to get away from the turmoil of town or city life and play in the open air, so a beauty spot or picnic ground is chosen and the need arises—for buses.

Such bus business is but one of many ways in which the electric railway company operating Macks can make profitable use of equipment during non-peak hours, and at the same time establish a service of incalculable goodwill value among its more influential patrons.

Mack all-bus design, coupled with quality construction in every detail from bumper to tail light, helps foster such goodwill, while affording utmost operating economy and low depreciation.

The remarkable feature of the improved Mack Bus Engine is that great additional power has been gained without increasing the diameter of the cylinders. This in turn has made it possible to maintain the established low operating and maintenance record of all Mack Engines.

Mack dual reduction rear axle is strictly a bus axle designed to give utmost road and underbody clearance with straight line transmission.

The Mack Bus Chassis is built long and low, with a specially wide front axle for safety, and to contribute toward easy handling. The Chassis, including engine and transmission, floats on eight cushions of live resilient rubber, in which the long flexible spring ends are imbedded.

These are just a few of the famous Mack features. Let Mack Bus engineers explain the rest and help you plan railway-bus co-operation.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 BROADWAY NEW YORK CITY
Eighty-eight direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

The Mack Bus

25 Passenger, City Type

Performance counts!

One of a number of Safety Cars now being operated in Pittsburgh, Penn. to help improve a difficult traffic situation.

Living up to a Slogan

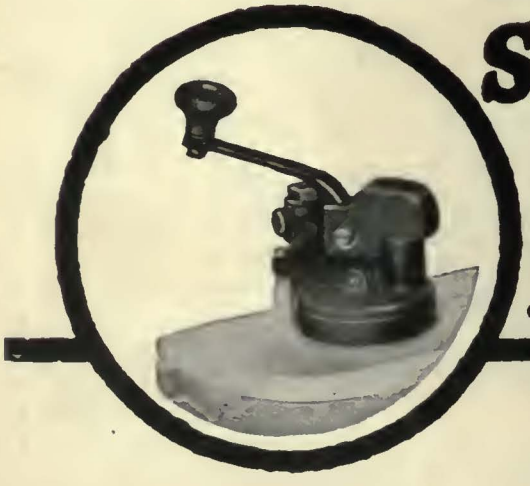
"Pittsburgh Promotes Progress" is a slogan adopted by the City of Pittsburgh to state a fact and stimulate action.

Forward movements are encouraged, and readily adopted for the city's betterment when they have proven merits.

One of the latest progressive ideas to be espoused is the Safety Car.

65 one-man, two-man cars, having Safety Car Control Equipment, were recently put into service by the Pittsburgh Railways Company.

One more traction property will realize the economic advantages, one more city will enjoy the service benefits, which result from using Safety Cars.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

General view of new, complete terminal of The Detroit Motorbus Co., Dexter Blvd., and Penna. R. R. Architectural design, construction and equipment by The Austin Company. This Terminal is comprised of Administration Building, Body Shop and Garage.

Modern Terminals for Detroit Motorbus and D. U. R.

THE Detroit Motorbus Company, an outstanding example of a successful modern metropolitan transportation system, has again called upon Austin for building service.

The first contract, in 1921, was for the design and construction of the East Side Garage at Terminal and Edlie Streets, with a capacity of 80 double-deck buses of the Fifth Avenue type.

This was followed by a repeat contract for the complete Motorbus Terminal at Dexter Boulevard and Pennsylvania Railroad. This includes a large, modern administration building with offices, school for operators, etc., and a body shop and repair building with paint shop, forge shop, electrical department, completely equipped to make running repairs and periodical overhauling.

The garage at this terminal with a 100-ft. center aisle has a capacity of 100 buses. It is well daylighted with abundant ventilation which provides a complete change of air at frequent intervals. Underground storage tanks contain large stocks of gasoline, motor and fuel oils.

The efficiency of Austin design, as demonstrated in service of Detroit Motorbus, led to its adoption by the Detroit United Railways for their Gratiot Ave. terminal in Detroit, and the D. U. R. terminal at Flint, Mich. These buildings are now under construction by The Austin Company.

Interior of the well daylighted and ventilated garage at the Detroit Motorbus Terminal at Dexter Blvd., and Penna. R. R. Capacity, 100 double-deck buses. The building also contains an aisle for running repairs. Underground fuel storage has a 35 tank car capacity.

Austin Success in the Transportation Field

AUSTIN has grown up with the whole Transportation field. With a background of fifty years of industrial building, The Austin Company has had years of successful experience in designing and building for the largest railroads of this country—engine terminals, locomotive erecting shops, roundhouses, machine shops, car shops, etc.

In the automotive field Austin has built scores of garages, sales and service, and repair stations, automobile and truck plants, complete body plants, warehouses and foundries, in every type of building, multi-story and single story.

The design evolved for Bus Transportation Terminals has been approved as highly efficient by well-known operating officials, notably by Mr. W. F. Evans, President of the Detroit Motorbus Company.

Austin will design, build and equip for Bus Transportation Companies anywhere. Thirteen established Austin offices in principal industrial centers provide local control for your project wherever located.

Every detail of your project will be handled under the Austin Unit Responsibility Plan with one contract which provides—

1—A guaranteed lump-sum price covering the complete job;

2—A guarantee that the complete plant will be ready by a specified date, with bonus and penalty clause, if preferred;

3—A guarantee as to quality of material and workmanship throughout.

Wire, phone or mail the coupon for a copy of the Austin booklet, "The A No. 1 Plan."

and Builders - - - - CLEVELAND

The Austin Company of California: Los Angeles, San Francisco

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CONSTRUCTION EQUIPMENT

The Austin Company, Cleveland

You may send me a copy of your booklet, "The A No. 1 Plan."

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There is no true substitute for G-E Armature Coils for G-E Motors. And now supplied in cartons, G-E Coils are sure to be preserved undamaged until ready for use. Besides, the cartons are a great convenience, each containing a set of coils for one armature.

To get the same efficiency as from your original coils, to secure maximum armature life, and to insure satisfactory service from your G-E Motors you must rewind with G-E Armature Coils. Each is an exact duplicate of the other.

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Schenectady, N. Y.
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GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 65 New York, Saturday, February 7, 1925 *Number* 6

Assuring Success of the Midyear Meeting

PREPARATIONS for the Midyear Meeting of the American Electric Railway Association, which is to be held in Washington on February 17, have been carried on so quietly and efficiently that the date is almost here without its approach having been realized. Present indications are that it will be one of the most successful midyear meetings in the history of the association.

The program will take the form of a "town meeting" at which the main topics will be "What Are the Facts About Electric Railway Service" and "Motorbuses—When, Where and How They Should Be Used by Electric Railways." The outstanding character of men who will lead the discussion insures full and free consideration of both topics, which are of such vital importance to the industry that every electric railway executive who can possibly do so should attend.

In addition to the main sessions, Monday will be taken up with some 17 committees of the American and affiliated associations. Since the membership of the committees includes many leaders of the industry, a nucleus is assured for a most successful and inspiring meeting.

Interurban Activity Attracts Attention

NEWS developments this week indicate that at least one extremely successful utility executive is engaged in a program of acquiring interurban roads. That man is Samuel Insull of Chicago. He has just taken over the Chicago & Joliet Electric Railway and is about to take over the Chicago, Lake Shore & South Bend Railway.

Undoubtedly these apparently independent steps are part of a much larger plan. That is important. More significant at this time, however, is that this shrewd judge of utility values is buying interurban roads and that the roads are of a type that were considered by some not to have a very promising future.

Mr. Insull has always been a bull on the utility business. The growth of the properties under his management speaks for itself. Now he apparently is a bull on the interurban situation. Not so many years ago he acquired what is now the Chicago, North Shore & Milwaukee Railroad, a bankrupt interurban in apparently a hopeless condition. In 1923 that road was not only healthy financially but won the first Coffin medal. In the opinion of some, the North Shore line was in a situation unlike that of most interurban properties because it had the advantage of two large cities as terminals. The same has been said of another Insull road, the Interstate Public Service Company, operating between Indianapolis and Louisville. This condition does not apply in the case of the roads just purchased.

There are many interurbans elsewhere in the country similarly situated that lend themselves to such treatment as he apparently has in mind for his recent acquisitions. Whether or not such roads must be welded together to accomplish the best results depends upon the particular situation. But in any event the desired result can be achieved only by the intensive application of modern operating and merchandising methods. There is no other open sesame to success.

Atlanta Makes a Good Start

ATLANTA has at last fallen into line. That city is going to tighten the regulation of its jitneys. Atlanta has been slow to profit by the experiences of Toledo, Saginaw, Des Moines, Akron and the cities in New Jersey where railway service has been suspended in the past, but Atlanta's lesson appears to be a salutary one. Atlanta has been told and told and told the consequences of its mistaken policy with respect to jitneys, but it has refused to heed the warnings. It had evidence close at hand at Augusta of the effect of unfair jitney competition, but not until the dire consequences of what the suspension of service meant in the case of the Atlanta Northern Railway at Marietta did the realization sink in that the cry of distress was sincere that had been made by the Georgia Railway & Power Company.

Stated very briefly, Atlanta's idea now is to eliminate motor vehicles carrying fewer than 20 passengers, require an indemnity bond of $5,000 for each vehicle, issue no motor vehicle permits for routes on which railways operate, prohibit a bus line from running within two blocks of a railway line for a distance of more than five blocks on its round trip and, most important of all, rule out jitneys and buses entirely from the so-called congested limits of the city as defined by the fire department.

In adopting this sane course with respect to the jitney Atlanta is following the recent engineering advice given by the Beeler Organization, the details of which have been covered in articles appearing in this paper for Jan. 10, Jan. 24 and Jan. 31. The expert findings, intended to guide the future course of the city, said that the jitney has no place in any real transportation plan and that it is useless in mass transportation and worse where congestion is acute. The Marietta experience, under the very eyes of Atlanta, added the force of facts to these findings.

Eventually far-reaching effects may reasonably be expected to follow the negotiations that are sure to come as a corollary to the presentation of the recent engineering report. There is no gainsaying the fact, however, that the Marietta suspension, as indicated before, hastened action against the jitney—action that has been unreasonably delayed at a cost to the city that is incalculable. No matter what the eventual outcome, Atlanta is paying dearly for the mistaken policy which it has pursued. Having a report and acting on it are two dif-

ferent things. The start has been made with respect to the jitney. It is to be hoped that this action is the forerunner of further favorable developments.

Publish Convention Dates Early

DURING the year, the total of all railway conventions and sectional association meetings amounts to a surprisingly large number of events. In many cases several meetings follow each other in rapid succession. Such conventions are much to be desired. The opportunity given railway men for comparing experiences helps to keep each man in touch with what his neighbors are doing, and adds stimulus and interest to the everyday tasks.

In many of these meetings the representatives of manufacturers take a prominent and important part. They frequently have places on the programs, and thus give to the operating men the benefit of their experience and observations as specialists.

Early publication of meeting dates will help these men to make up itineraries that avoid lost time and expense through taking long special trips. Not only will this saving be made, but early information of a coming meeting will enable men to attend who otherwise could not do so.

Transit Facilities in a City with 20,000,000 Inhabitants

THE present efforts in our largest cities to plan for future transportation facilities are especially welcome in view of the troubles which have come from past neglect. All of our large cities are adding rapidly to their populations. In the case of New York, it is estimated that by 1930 the territory within 40 miles of the City Hall will contain more than 10,500,000 inhabitants, and that in 20 years more the population within this area will be 17,000,000, of whom 7,000,000 will live outside the present limits of the city. This means a tremendous increase in demand for transportation in the metropolitan district which must be met, if congestion on all lines of travel in exaggerated form is to be avoided.

Two recent reports on suggested improvements in transit facilities between New York and its environs are abstracted in this issue. One relates to entrance to New York from Westchester County on the north, the other to better communication across the Hudson River. The former was prepared for the Board of Supervisors of Westchester County, while the latter was conducted by a state commission in New Jersey. Though prepared by different engineers, they have strikingly similar recommendations, which may be considered to be in line with present thought on the subject. In both cases, most of the traffic from the districts is by steam or electrified railroad to existing terminals. Each report proposes to transfer this traffic to a distributed terminal in the form of a subway in Manhattan Borough. The distributed terminal, in contradistinction to the concentrated terminal of the average trunk line railroad, is primarily a rapid transit idea. But the railroad terminals in our large cities are now so congested and their expansion with existing realty values would be so expensive that their owners would be glad to devote them to through traffic and be relieved of commuter travel. Their capacity would then be adequate for years to come.

Another point of similarity in the two plans is the idea of through train service. In the New Jersey plan, this would be accomplished by a loop which, in Manhattan, would extend from near the southern end of the island to about 57th Street and in New Jersey would join the trunk line railroads coming in from the west. In the Westchester project, through traffic is suggested by an extension of the Manhattan subway to New Jersey, connecting possibly with a North Jersey rapid transit system.

Rapid transit extensions of the kind described are bound to be an important development of electric railways during the next few decades. In many cases, of course, electrification of the connecting steam suburban lines must follow to give through running and obtain the best results.

Publisher Responsibility— Reader Opportunity

NO ONE can project himself very far into the future and read ahead with any great degree of accuracy. The times move too fast for that. Men can, however, keep themselves well informed. In fact, the tendency is growing to weigh cause and effect much more carefully than in the past. In addition the standard of business ethics is much higher than it was. The injection of engineering elements more and more in business has had the effect of making business more exact. It is not repression, but an added feeling of responsibility that is abroad, and nowhere does this feeling of responsibility manifest itself to a greater degree than in the business press of the country. This sense of responsibility is constantly being borne in upon the editors of the McGraw-Hill papers, of which ELECTRIC RAILWAY JOURNAL is one.

Working out in the field the editor must preserve his individuality. His responsibility is first to his readers and then to his industry, but beyond that his great responsibility is to the general public. These considerations and others were emphasized at the recent annual convention of the business and editorial staffs of the McGraw-Hill publications held in New York. At that meeting Herbert Hoover, through the medium of F. M. Feiker of the Society for Electrical Development, said that the business press is probably the greatest force in making industrial opinion. Men do get together in the physical sense at conventions and meetings to exchange ideas and they do so with good results to themselves and to their industry, but it is through the medium of the business press that the real avenue is opened to them for the discussion of problems in which they are interested.

After all, as Mr. Hoover has so aptly put it, the industrial press has been in large part responsible for the change from rule-of-thumb and *laissez-faire* methods to scientific determination of facts and programs of action based on facts. Every issue of ELECTRIC RAILWAY JOURNAL and every page of every issue is edited with that end in mind. Facts do not always lend themselves to statistical presentation, but facts remain facts even though the romantic method of presentation be applied to them, as is often done in the industrial press. No two men will probably ever interpret facts exactly alike. That would be expecting too much. Business cannot, however, form a right judgment unless it knows the facts. It is the province of the business press to supply the facts.

New Illinois Central Cars Similar to These Will Operate on the 1,500-Volt D.C. Circuit in Chicago Suburban Service. A Motor Car and a Trail Car Are Semi-Permanently Connected to Form a Unit. A Train Is Made Up of from One to Five Units

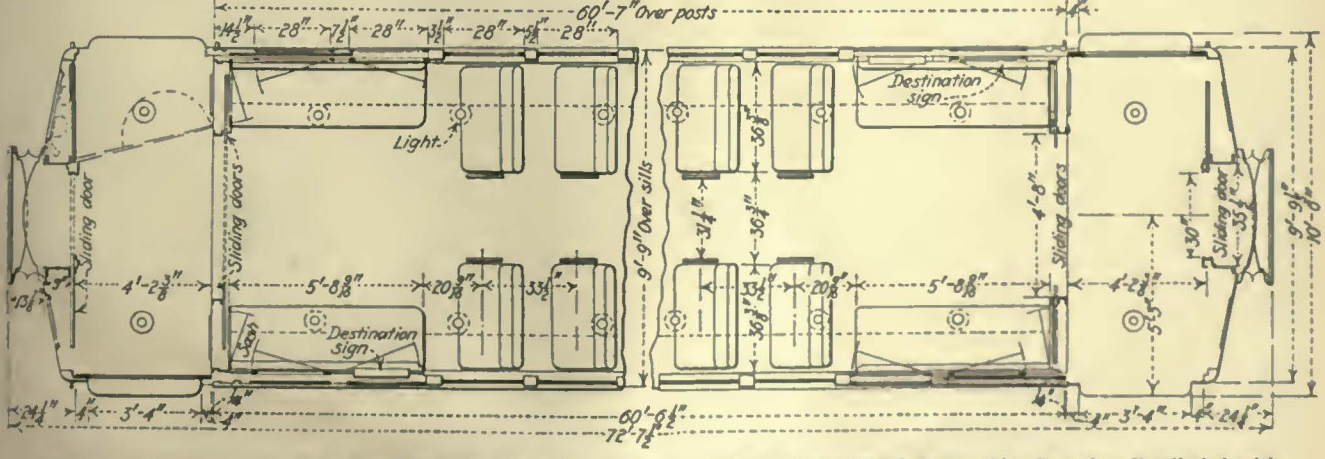
I. C. R.R. Cars for Chicago Electrification Designed for Heavy Service

Steam Railroad Practice Followed in Design of M-U Suburban Cars — One Motor and One Trail Car Semi-Permanently Connected—Lighting on 32-Volt Battery Circuit—Cars to Be Operated from 1,500-Volt D.C. Catenary Trolley

SAFETY, speed and passenger comfort were given first consideration in the design of the 215 new suburban cars recently ordered by the Illinois Central Railroad for use on the lines now being electrified in Chicago and vicinity. These cars will be operated over the Chicago Terminal Division, which extends into the suburbs on the south side of the city. They will be similar in construction to 45 trail cars now in the same service but at present being pulled by steam locomotives. Of the 215 new cars, 130 will be motor cars built by the Pullman Car & Manufacturing Corporation. The other 85 new cars will be trailers built by the Standard Steel Car Company. These, together with the 45 cars now in steam service, will give the company 130 suburban trailers. One motor car and a trail car will be semi-permanently connected. These two cars thus connected will be called a unit and trains will be made up of units as traffic demands. The number of cars on hand and on order provides for 130 such units. The maximum length of train will be five units or 10 cars.

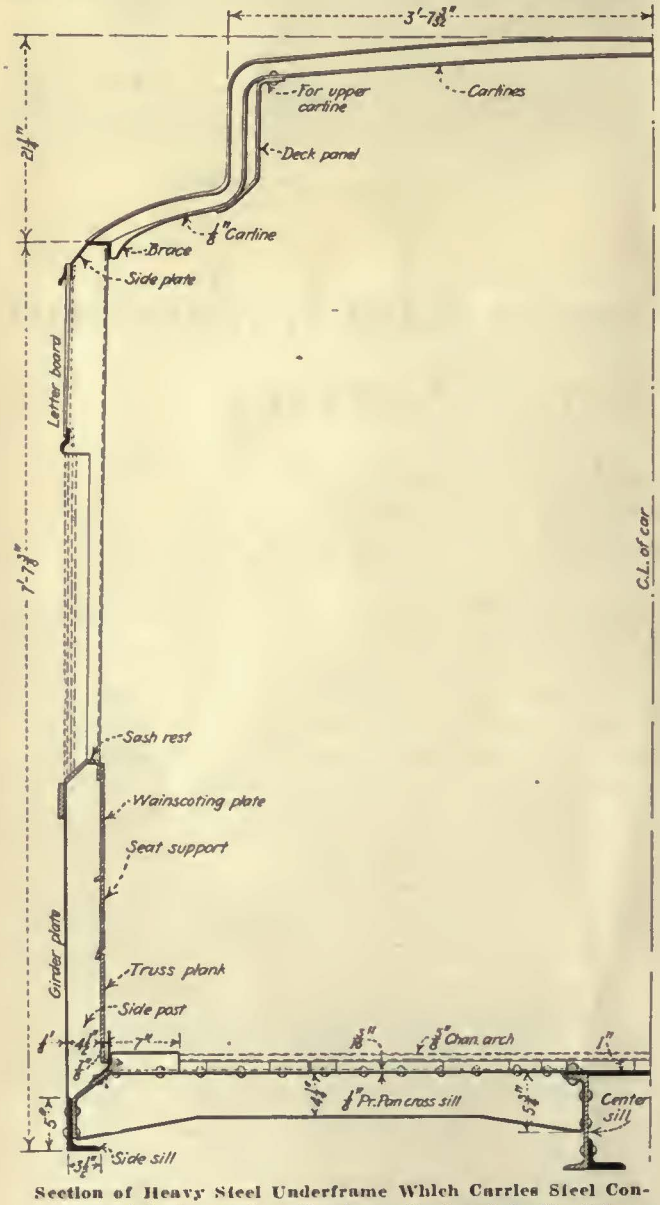
Steam railroad practice is followed closely in the design and construction of the cars. They are 72 ft. 7½ in. over buffers and 9 ft. 9¼ in. over side sheets. The construction is of steel and aluminum alloy throughout. The motor cars will weigh 125,000 lb. and the trailers 84,000 lb. As each car seats 84 passengers, the weight per passenger for the motor cars is 1,490 lb. and for the trailers 1,000 lb.

Like the present steel suburban cars, the new cars will have monitor type roofs, inclosed vestibules and single-sash windows. As flush platforms are installed at all stations, steps will be provided at one end of the trail cars only, for emergency use. The cars will be painted on the outside with standard Illinois Central Railroad green and will have mahogany finished aluminum interior trim with white Agasote ceilings and maroon mastic floors.



Seats for 84 Passengers Have Been Provided on 34 Cross Seats and Four Longitudinal Seats. The Cars Are Vestibuled with Diaphragms Between Cars. Sliding Doors Permit Easy Entrance and Exit

Steel structural shapes, pressings and castings are used in the underframe construction. The center sill consists of a box girder built up of two 9-in., 15-lb. channels with top plate. The side sills are 5-in. x 3½-in. x ⅜-in. angles. On the motor cars all sills extend from one buffer casting to the other. On the trail cars the side sills extend from the buffer casting at the control end to the body end sill at the opposite end, to allow for step wells at that end of the car. The car flooring is



Section of Heavy Steel Underframe Which Carries Steel Constructed Body Having Aluminum Roof and Inside Trim

carried on six steel stringers and three wood stringers, which are supported by pressed steel pan cross sills spaced on 33½-in. centers. The floor supports at the side sills are 2½-in. x 1½-in. x ⅜-in. angles riveted to the side posts. Intermediate floor stringers of the same size are located between the center and side sills. The center supports consist of two Z-shaped pressed members riveted to the center sill. The wood supports are placed between the steel stringers.

The body bolsters are built up of two pressed steel pans of ⅜-in. steel, placed back to back 10 in. apart and reinforced by ⅞-in. top and bottom cover plates. Two cross-bearers near the center of the car are built up of ¼-in. pressed steel pans with top and bottom cover plates and act as auxiliary bolsters serving to stiffen the frame. The platform floor is one piece of ⅜-in. diamond pattern sheet steel. This acts as an anti-telescoping plate on the motor cars and at the control ends of the trail cars.

In the body of the car the sub-flooring consists of No. 20 gage galvanized copper-bearing sheet steel, covered with one layer of three-ply Salamander felt. A ½-in. air space separates this from the top flooring, which is No. 22 gage Chanarch corrugated steel with a section depth of ⅝ in. This is placed crosswise of the car, and the floor wearing surface, of Johns-Manville mastic, is laid ⅜ in. deep over the top.

Two pressed steel channels with cover plates approximately 6 in. wide form side posts of box construction. These are spaced on 2-ft. 9½-in. centers and extend from the side sill angles to the side plates at the eaves. The side girder plates are ⅛-in. steel, riveted to side sill angles, posts and flange of the sash rest. Above the single sash windows is a ⅛-in. steel letterboard 15 in. wide.

The monitor type roof is carried on continuous pressed U-shaped steel supports, which extend from side plate to side plate. They are spaced on 2-ft. 9½-in. centers, the same as the side posts. On the motor cars the carlines over each bolster are designed to carry a 1,000-lb. pantograph. Deck frames, eave moldings, upper and lower decks of the roof are covered with ⅛-in. sheet aluminum alloy.

Insulation against cold consists of two layers of three-ply Salamander on the insides of all outer side sheets, body end sheets and the undersides of both upper and lower deck roof sheets. The sliding vestibule door pockets are insulated in a similar manner.

Of the 21 windows on each side of the car, the two located at each door pocket have a stationary outside sash and an inside sash arranged to swing open to give access to the door track and mechanism. The other side windows are single sashed, arranged to raise, and are provided with Pantasote curtains. The glass is set in a mahogany frame, which has rubber weather strips at top and bottom.

Electrically Operated Door

The electrically operated outside sliding doors on the sides are operated by electric motors controlled by push buttons located in the vestibules. These and the hand-operated double doors in the bulkhead between vestibule and car body are of aluminum. All doors on a side may be opened from either end of both cars of the unit, or each door may be controlled individually. This arrangement allows one guard or trainman to operate the doors of two units or four cars. A door-control switch in the motorman's cab permits separate control of the adjacent door. Each door has a safety contact shoe in the edge, with a rubber sheath over a phosphor bronze spring. The electric door engine will stop its movement if a passenger is struck by the door in closing. After the obstruction is removed the door will continue its motion. A signal light notifies the motorman in the front cab when all the doors in the train are closed. By connecting this circuit through the reverser lever, a green lamp is lighted when the train is being operated forward and a yellow lamp is lighted when the train is reversed. The door operation and signal system are on the 32-volt battery circuit. This equipment is to be furnished by the Consolidated Car Heating Company.

Pantograph safety gates are attached to each corner of the car. Those on the control end have face plates and are held in the open position by springs, to press together the face plates of two adjacent units. The safety gates between the motor and the trail cars have no face plates, but may be easily uncoupled from either car.

Two pantographs mounted on the roof of each motor car collect the 1,500-volt direct current from the catenary trolley wire. One of these will be used in regular service, the other in emergency.

A headlight mounted above the vestibule door at the control compartment end contains a 100-watt, 32-volt, concentrated filament lamp, backed by a "Golden Glow" reflector in which the bulb is adjustable for focus. Without dimming resistance, the headlight throws a beam of approximately 130,000 cp. Electric tail lights are mounted on brackets at the rear of the train.

The motor cars are mounted on 50-ton capacity trucks with 6-in. x 11-in. journals and the trail cars on 40-ton capacity trucks. These trucks are four-wheel Commonwealth Steel Company's cast-steel design, with "Simplex" clasp brakes. Each motor truck carries two 750-volt motors of 250-hp. nominal rating, permanently connected in series. Westinghouse A-2971 motors are used on 65 of the motor cars, while the other 65 will have General Electric No. Z-1231 motors. The motors are inside hung. The motor trucks have 38-in. rolled steel wheels and the trailer trucks 33-in. rolled-steel wheels. The trucks, particularly in the spring suspension, are designed to give easy riding qualities, insuring safety at high speeds.

INTERIOR FITTINGS

Thirty-four reversible cross seats and four longitudinal seats are used. On 190 cars the seats are to be supplied by Hale & Kilburn, while on the other 25 cars Heywood-Wakefield seats will be used. These are covered with natural color rattan and have high backs and 36-in. cushions, 18½ in. above the floor. No arms are provided, allowing a 36-in. aisle between seat backs. The seats are spaced on 33½-in. centers, a seat being opposite each window. Each longitudinal seat accommodates four passengers alongside of two windows at the end of the car.

Rattan High Back Seats, Mahogany Finish Aluminum Trim, White Agasote Headlining and Maroon Painted Mastic Floor Feature the Interior

Flush Station Platforms Render Car Steps Unnecessary Except for Emergency Purposes

Electric heat with thermostatic control is furnished by 34 cross seat heaters dissipating 750 watts each, eight longitudinal seat heaters of the same rating and a cab heater of 1,000-watt capacity. These operate with 17 coils in series on the 1,500-volt circuit. A piece of sheet aluminum covers the bottom of the seat, while a narrow guard plate mounted directly in front of the heater prevents passangers coming in contact with it. Electro-pneumatic 1,500-volt heater switches are controlled by two thermostats, one of which cuts off the heat at 50 deg. and the other at 70 deg. The former is for use when the car is in the yards and the latter when the car is in service. A selector switch allows either one to be used. The thermostat actuates a relay through a 32-volt circuit.

Interior illumination is by means of 28 bracket fixtures with 25-watt, 32-volt lamps. These are mounted on the lower deck of the ceiling at the lower deck sill. Two enameled reflectors and sockets are flush in each vestibule hood. These and the body lights are in five lighting circuits.

A 1,500-volt to 32-volt motor-generator set on each motor car gives low voltage current for operating auxiliaries and charges a 32-volt, 300-amp.-hr. Edison storage battery for reserve purposes mounted under the trail car. The charging is controlled by a reversible watt-hour meter. By using 32 volts for the motor control, door operation, signal system and car lighting it has been possible to confine all 1,500-volt wiring except for the heaters to conduit below the floor. Even the watt-hour meter has been mounted under the car and a distant dial actuated by the 32-volt circuit has been placed in the motorman's cab.

Electro-pneumatic multiple-unit control of the General Electric Company PC 103-A type is used. Control cabs located in opposite ends of each unit contain master controllers of the horizontal type, reverser levers, air brake valves, remote-control switches and other operating accessories. The apparatus is inclosed between the front bulkhead and a swinging door, which when opened engages a small swinging panel mounted on the body end panel and thus forms a cab. Six points are provided on the control quadrant, namely, off, switching, series running, full field notching, parallel running, normal field. The control is designed for

automatic acceleration at 1.5 m.p.h.p.s. on level tangent track. Provision has been made for varying this acceleration rate through by-passing the current limit relay. This allows the speed of the control sequence to be controlled independently by successive movements of the master controller handle between notching and running positions. Each movement by-passes the current limit relay one step only.

The master controller has the usual safety handle. Its release opens the main circuit breaker and makes an emergency application of the air brakes. A line relay opens when the line voltage falls below 500.

GENERAL DIMENSIONS OF NEW ILLINOIS CENTRAL CARS

Length over buffers	72 ft. 7½ in.
Length between pulling face of couplers	72 ft. 2 in.
Length over body corner posts	60 ft. 7 in.
Length over end sills	60 ft. 6½ in.
Length between truck centers	47 ft. 9 in.
Width over all at eaves	9 ft. 11½ in.
Width over belt rail rivets	9 ft. 10½ in.
Width over side sheets	9 ft. 9½ in.
Width over platform at vestibule side door	10 ft. 6 in.
Height, rail to center line of coupler	2 ft. 10½ in.
Height, rail to bottom of side sill	3 ft. 7½ in.
Height, rail to bottom of center sill (at truck)	3 ft. 5½ in.
Height, rail to top of carline	13 ft. ¼ -n.
Height, rail to top of platform	4 ft. 3½ in.
Clear opening, body and door	4 ft. 0 in.
Clear opening, vestibule side door	4 ft. 0 in.
Clear opening, vestibule end door	2 ft. 2 in.
Seat spacing, center to center	2 ft. 9½ in.
Aisle spacing, at seat ends	2 ft. 7½ in.
Aisle spacing, at seat backs	3 ft. 0½ in.
Number of cross seats on each side	17
Total seating capacity of car	84

Tomlinson automatic radial couplers on opposite ends of the unit contain facilities for connecting the 19 wires of the train control and signal circuits and the brake and reservoir air lines. A push-button control allows the motorman to couple and uncouple any desired combination of two-car units without assistance. An interlock with the control circuit prevents operation of the motors in the event the couplers fail to lock. Another feature incorporated in the couplers is the automatic completion of the door signal circuit when the coupler is uncoupled. Adapters are provided for emergency use in coupling the automatic tight-locking couplers with a standard A.R.A. coupler.

Air Brakes Are of the Electro-Pneumatic Type

Electrically controlled air brakes of the New York Air Brake Company's PS type give the trains of 10 cars or less a smooth retardation at a normal rate of 1.75 m.p.h.p.s. This equipment is capable of braking at a rate of 3 m.p.h.p.s. or more with an emergency application. It is designed for the following performance: Electric application of the brakes on all cars simultaneously in any desired degree from light service to emergency when the motorman's valve is placed in the desired position; a pneumatic service application, release and emergency application in the event of failure of the electric control. The service brake cylinder pressure is 60 lb. per square inch and the emergency cylinder pressure is 110 lb. per square inch.

Each motor car is provided with a 35-cu.ft. air compressor driven by a 1,500-volt motor. The governor maintains a pressure of 110 lb. per square inch in the main reservoir, and all governors on a train are electrically connected so that any governor cuts in all of the air compressors. The motors are capable of driving the compressor against a 115-lb. reservoir pressure when the line voltage is 1,350. They are capable of operating 100 per cent of the time, but normally will operate only 50 per cent of the time to furnish air for the brake equipment, motor control apparatus and the air whistle on one unit.

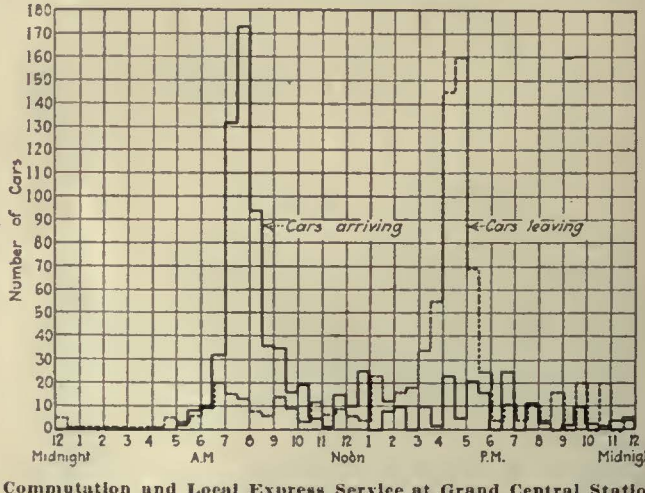
In the design and construction of the car and its apparatus, including motors, trucks, control and couplers, the local suburban schedule to South Chicago was shown to be that service producing the highest root mean square current to which the equipment will be subjected. For the purpose of computing motor heating, this schedule is figured without coasting between stops. The difference between the actual schedule time and the no-coast time represents speed margin. As much coasting as possible will be introduced into the schedules. Stopping times at the various stations are taken as 18 seconds, with the exception of the first stop at Van Buren Street, which is figured at 25 seconds.

Plans for Westchester Traffic

Report by H. M. Brinckerhoff Shows the Need for Present Planning—It Recommends that Suburban Trains Use a Subway in New York City

THE solution of the transportation problem of Westchester County, New York, just north of New York City, lies in operating suburban trains downtown in a subway instead of to the Grand Central Station, according to a report recently prepared for the Westchester County Transit Commission by Henry M. Brinckerhoff, of Parsons, Klapp, Brinckerhoff & Douglas of New York. It is an interim report and considers the needs and the physical aspects of the proposed plan. A further report, devoted in part to the legal and financial problems involved, will be submitted about March 1.

The need for better traffic facilities is shown by the fact that the passengers carried from the territory concerned on the New York Central and New York, Westchester & Boston lines and the total figures of the New Haven suburban service amounted in 1924 to about 40,000,000. For the last 10 years the growth on the New York Central lines has been about 8 per cent per annum, and if the new line is built it is estimated that this traffic would more than double within a few years after completion of the line. The accompanying chart shows the number of cars arriving and leaving Grand

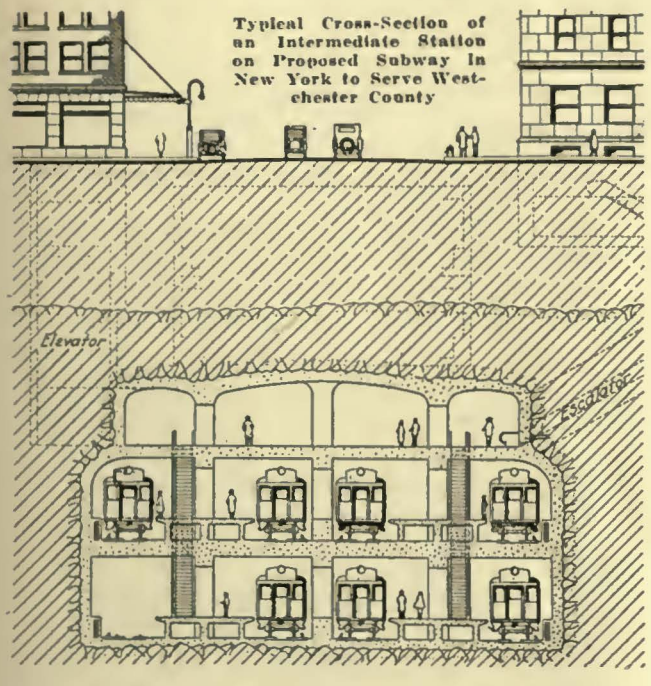


Commutation and Local Express Service at Grand Central Station

This chart shows the number of cars per hour arriving at and leaving Grand Central Station in commutation and local express service on a typical day in September, 1924. The cars are plotted on Eastern Standard time and New York City at this period was on daylight-saving time.

Central Station on all suburban lines on a typical day during September, 1924. The chart is plotted on Eastern Standard time, but New York City during that period was on daylight-saving time. The rush-hour peaks are very pronounced, and it will be noticed that the morning peak is higher and somewhat sharper than the evening peak.

The report recommends that the suburban trains of the existing New York Central lines—Hudson River division, Putnam division and Harlem division—together with the New Haven and Westchester & Boston



Typical Cross-Section of an Intermediate Station on Proposed Subway in New York to Serve Westchester County

suburban service, be brought together at a point in Bronx Borough, then passed by subway to a downtown terminal near the City Hall. The junction point recommended in Bronx Borough is at 149th Street, and the subway from that point would pass down Madison Avenue to Madison Square and thence down Fifth Avenue and West Broadway to the lower terminus. It would preferably be four-track on two levels, though cost estimates are also given for a three-track and a two-track subway. The tubes would be carried at a low level to leave sufficient space above for the construction of two levels of city subways of standard type, and the subway would pass largely through rock. The plan contemplates two intermediate stations between the northern and southern ends of the subway. At these stations each track would branch so as to pass on either side of a central platform and allow the trains on that track to berth alternately on opposite sides of the platform. This would increase the time allowable for stops. The station would be reached from the street level by stairways and elevators or escalators, and there would be escalators and stairways between the three platform levels. A typical intermediate cross-section, as proposed, is illustrated.

The suggestion is made that it may be found desirable to carry two of the four tracks from the proposed terminal station near the City Hall west under the Hudson River to reach New Jersey. Certain operating economies would be gained by this extension, but it would involve higher fixed charges.

The estimated cost of the proposed subway ending near New York City Hall and including a station at that point and two intermediate ones, but exclusive of rolling stock, would be: For a two-track subway, $95,000,000; for a three-track subway, $115,000,000; for a four-track subway, $150,000,000.

Tests Show Two-Motor Trackless Trolley Better

Comparison of One-Motor and Two-Motor Vehicles Made by Detroit Department of Street Railways Under Actual Road Conditions for Wide Range of Speeds and Voltages

THE possibility of trackless trolley operation in outlying areas at an early date led the Department of Street Railways, City of Detroit, to conduct a series of power demand and acceleration tests on two types of trolley buses last summer. These tests were conducted as a preliminary to a traffic investigation which was made in the College Park and Grand River districts, two newly developed tracts in the northwestern section of the city which required transportation. One of these investigations was described in ELECTRIC RAILWAY JOURNAL for Jan. 24, page 129.

The results obtained from these tests, made under the direction of L. R. Wagner, acting electrical engineer, proved of sufficient consequence materially to influence the management in the choice of buses which may be purchased when a trackless trolley line is put into operation.

Heretofore tests made on trackless trolley buses have consisted largely of power consumption, which while of utmost importance do not give all the essential facts required of the bus performance. It is essential to know the starting demand in order to provide adequate power and overhead facilities. As the trackless trolley is used in service having a large number of stops per mile, it is necessary to know the acceleration of the different types of buses, as this has a definite bearing on the schedule speed which the buses can maintain.

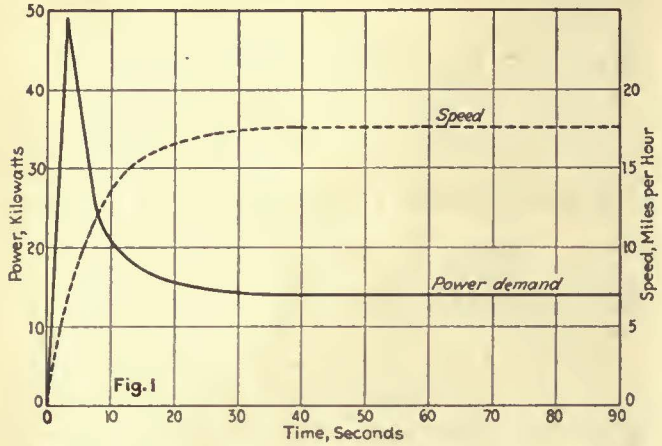
The one-motor bus was a Brill trackless trolley equipped with Goodrich semi-pneumatic tires, weighing 12,000 lb. light and seating 29 passengers. It was propelled by one GE-265 motor (35 hp.) geared 7.85 to 1. The two-motor bus, which seated 28 passengers, was

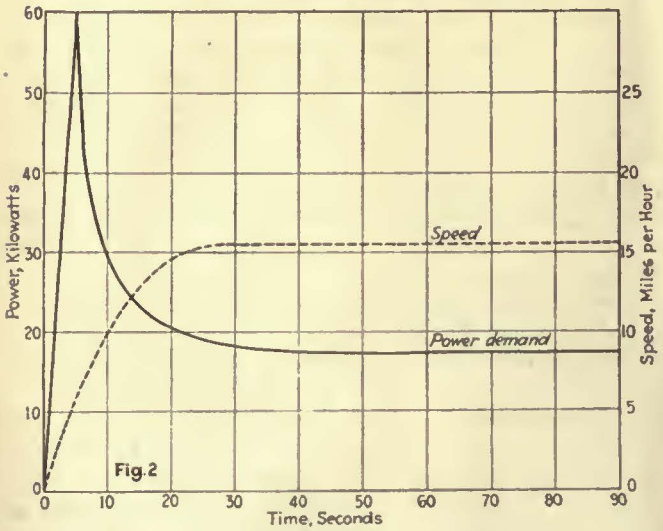
OPERATING CONDITIONS OF THE FOUR DETROIT TRACKLESS TROLLEY TESTS

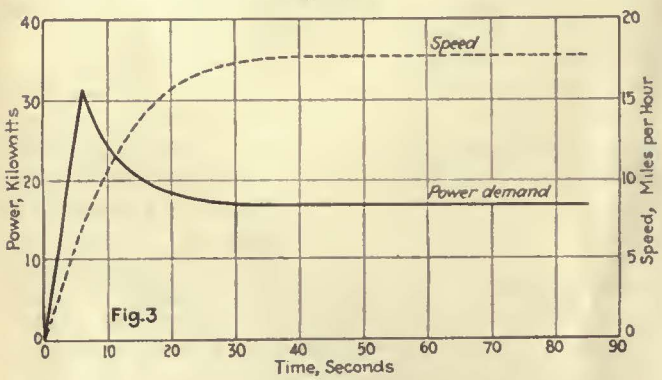
	One-Motor Bus		Two-Motor Bus	
Seating capacity	29		28	
Tires	Semi-pneumatic		Front solid Rear cushion	
Motors	One 35 hp.		Two 25 hp.	
Total rated horsepower	35		50	
Gear ratio	7.85		5.8	
Weight of bus, empty, lb.	12,000		13,000	
Test number	1	2	3	4
Weight of load, lb.	1,000	9,500	1,200	1,200
Total weight loaded, lb.	13,000	21,500	14,200	14,200
Average volts during tests	492	495	398	481 434 373
Average temperature, deg. F.	70	72	75	75
Type of paving	Asphalt	Asphalt	Asphalt	Concrete

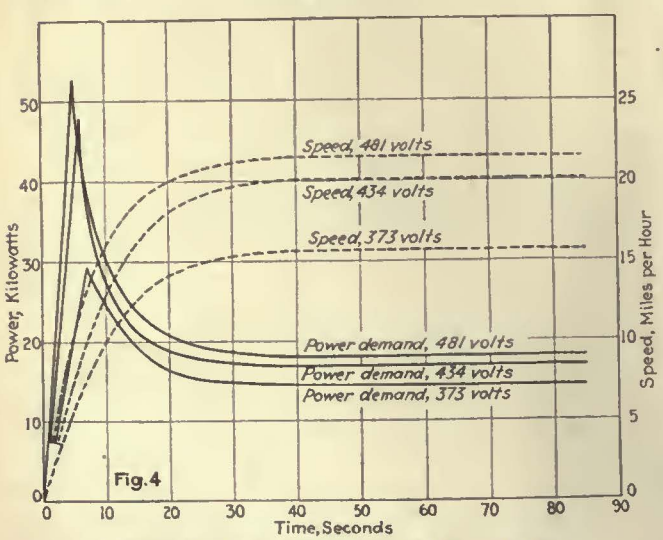
built by the St. Louis Car Company and was equipped with Sewell wheels having cushion tires on the rear and solid tires on the front wheels. This bus weighed 13,000 lb. light, and it was equipped with two 25-hp. Westinghouse motors, geared 5.8 to 1.

Five test runs were made on the one-motor bus carrying a load of 1,000 lb. in test crew and passen-









Results of Tests on Detroit Trackless Trolleys

Figs. 1 and 2, equipped with one motor; Figs. 3 and 4, equipped with two motors.

gers. The vehicle was run over asphalt pavement in good condition, being clean and dry during the test. The results are shown in the table and Fig. 1. It will be seen that the maximum power demand was 49.2 kw., while the demand at a free running speed of 17.6 m.p.h. was 14 kw.

A second set of five tests was carried out on the same bus under similar conditions when carrying a weight of 9,500 lb., consisting of the test crew (500 lb.) and 9,000 lb. of cement. In this test, shown in the table and in Fig. 2, the power peak was 60 kw. and the demand at the free running speed of 15.5 m.p.h. was 17.4 kw.

Four tests were made on the two-motor trolley bus on asphalt pavement in excellent condition. The power peak when starting a load of 1,200 lb., consisting of testers and passengers, was 31.4 kw., while the demand at the full speed of 17.7 m.p.h. was 16.8 kw. The results are shown in Fig. 3.

A final series of tests was made on the same bus on a concrete road in good condition, with a load of 1,200 lb. as before. In these tests the trolley potential was reduced, being 481 volts, 434 volts and 373 volts. The peaks for these three voltages were respectively 52.5 kw., 48 kw. and 29.4 kw. The speeds reached for the three conditions of voltage were 21.5 m.p.h., 20 m.p.h. and 15.6 m.p.h., the power demands corresponding being 18 kw., 16.8 kw. and 14.4 kw., as shown in Fig. 4.

The foregoing results show that the two-motor bus was able to reach a speed of 20 m.p.h. at 434 volts, with a maximum starting demand of 48 kw. While the one-motor bus reached a speed of only 17.6 m.p.h. at 492 volts, with a maximum starting demand of 49.2 kw., showing conclusively that with similar voltage the two-motor bus will run at a higher speed, it will have a much more rapid acceleration, and the maximum starting demand will be lower than in the case of the one-motor bus.

Subway for Street Car Passengers

THE lines of the Market Street Railway, San Francisco, Cal., operating out Sloat Boulevard terminate directly in front of the new municipal swimming pool. Automobile traffic makes crossing the boulevard at that point quite hazardous, so the tracks were lowered and a concrete subway built. This permits

Subway at Market Street Railway Terminal Provides Safe Crossing of Boulevard to Swimming Pool

passengers to reach the swimming pool without the necessity of crossing the boulevard. The incline leading to the subway is surrounded on three sides by heavy railing and concrete walks on either side of the tracks make an attractive as well as convenient terminal.

Accounting for Stores

An Outline of the Principles for Keeping Track of Stock and Issuing It for Use in Repair Work from the Main Storeroom, from Several Storerooms and Under All Conditions

By R. A. Weston, C. P. A.

Special Accountant the Connecticut Company
Formerly General Storekeeper New York, New Haven & Hartford Railroad and Its Electric Subsidiaries

THE principal requisites for good storekeeping on an electric railway are: System, organization, personnel and facilities. By facilities are meant sufficient space, suitably arranged and located, in which to store and care for the stock of materials that must be maintained to provide for the operating requirements of the system. These stocks are just as truly a part of the company's assets as is its cash, and should therefore be well safeguarded against loss, deterioration, improper use, or use without proper authority and accounting.

The duty of caring for these stocks and of properly accounting for them should not be committed to those who have to do with the use of the material. This principle is now well recognized, and the official designated as storekeeper or general storekeeper should be independent of officials in departments that apply or put the materials into use.

Unfortunately, the importance of the storekeeper's position is generally underrated, and the work is delegated to a man of medium or ordinary ability, with a salary to correspond. This is a serious mistake and one of the reasons why store departments do not function as they should. For this position a man of good caliber should be chosen, one who has had extended experience in this work and can rank in ability alongside of such officials as master mechanics and roadmasters, and his rate of pay should compare favorably with theirs. If the system is a large one, there should be a general storekeeper, in authority over the other storekeepers, and he should rank with other heads of departments. A storekeeper of such caliber will not only see to it that the materials are properly conserved and intelligently ordered, but he will realize the importance of correct accounting and see that it is done. Such a man will also find many more ways to save the company money than a man of medium ability, and the resulting savings would amount to many times the difference in the salary paid.

Material Used for Maintenance of Equipment

A rule of prime importance which the system must be arranged to carry out is that material must not be charged to expense accounts until used or about to be used, in order to keep the operating costs and the asset accounts correctly stated. This is somewhat difficult, and in some cases it may not be practicable to comply literally with this rule, but if the facilities previously mentioned are provided, a practical compliance with the rule can be arranged. Theoretically, also, all material should be kept under the physical control of the storekeeper, and issued from the storeroom to the workman, on approved requisition, when and as he requires it to use or apply. It will be interesting now to consider how the conditions vary with respect to issuing and accounting for the materials required by the different departments. They will be considered in this order: For repairs to equipment, material for power stations and material for the line and track.

The main repair shop of the company is usually the largest customer of the store, and generally the storeroom is located adjacent to it. If the storeroom and the shop are very close to each other there need be no difficulty in requiring that all materials shall be drawn from the storeroom only when and as actually needed. If the storeroom is some distance away, too much time will be lost if special trips have to be made for the smaller and more inexpensive kinds of material. In such a case, a small working stock of such items may be placed in the shop near the work. The list of such items should be carefully made up by the storekeeper and master mechanic, and it should be quite restricted. This stock should be kept labeled and in order by the storekeeper, otherwise the workmen will soon have it badly mixed up.

This stock should not be charged to expense account when placed in the bin but should remain a part of general stores, entirely subject to the control of the storekeeper. After some of the stock has been used and it becomes necessary to replace it, a requisition should be issued for the replacement, and the charge made. It will be noted that this charge is for material that has actually been used and that the working stock in the shops is at all times a part of general stores and entirely under the control of the storekeeper.

There are some materials for equipment repairs that cannot well be handled physically in the storeroom. Among the most important of these are car wheels and axles, both mounted and unmounted. Some difficulty is experienced in properly accounting for them. Almost invariably the shop foreman will care for this kind of stock, and will press wheels on and off of axles and apply them to cars with little reference or information to the storekeeper. It is not uncommon to find the foreman giving the storekeeper a requisition for charging out purposes whenever he takes a new wheel from stock to press onto an axle. However, to make a charge to expense accounts at this time is incorrect, because the pressing of a wheel onto an axle is not a use of the wheel in repair work, but only getting it into a form in which it can be used. The use does not occur until the axle and pair of mounted wheels are placed under a car.

The character of such stock is continually changing. A pair of new wheels mounted on a new axle may be applied to a car, and of those removed one wheel and the axle may be good and the other wheel scrap. The scrap wheel will be pressed off the axle, and a good second-hand wheel may be pressed on and the mounted pair held as a spare in place of the new ones used. In this manner, after a short period has gone

by the character of the stock has very largely changed. Also to be dealt with are steel wheels, cast-iron wheels and steel-tired wheels, and the application and removal of wheels both at the main repair shop and at the outlying operating carhouses.

To do this accounting work correctly there must be a system of charge requisitions and of credit requisitions. In the illustration just given, when the pair of new wheels and the axle were applied a charge requisition would be made out, together with a credit requisition for the pair of wheels and axle removed. In both requisitions, the character, kind, condition and size of both wheels and axles should be given. These requisitions would go to the storekeeper and enable him to make a correct charge and credit. If the credit requisitions are not made, the operating expenses are not credited until the time comes to take an inventory, or to sell the scrap, wheels and axles. This results in a distortion both of the stock account and the expense account, and is the cause of a considerable amount of the inventory discrepancies that have to be periodically adjusted. Some companies keep a wheel record to determine the mileage obtained, and reports are made by shop foremen of wheels and axles changed, applied, removed, scrapped, etc. Another way of handling the accounting would be to have the requisitions for charge and credit purposes made out from such reports in the office where the wheel record is kept.

Other items need special attention with respect to their accounting, such as motor armatures that are being continually removed, rewound and used again; field coils that are impregnated, varnished or painted and reused, and various other parts of equipment that are repaired and again put into use. Again, when cars become obsolete and are scrapped, parts of their equipment, such as air motors, etc., are saved and used in repair work. Often such parts are not turned into the storeroom but accumulate around the repair shops. Usually, the records and the accounting for such parts are poor, and they are not under good control as regards their availability for use at different points.

Closely related to the issue of material for use at the shop will be the issue of material needed for lighter repairs at the outside operating carhouses. All such material should be strictly in the stores account and under the reasonable control and jurisdiction of the storekeeper. This can be treated in a manner similar to the working stock described previously in the case of the main shop, except that the carhouse foreman will need to be relied upon to make the requisition for replenishing the stock instead of the storekeeper. To insure good results, a simple stock book system should be used by the foreman. It need require no bookkeeping but simply show that his stock is kept in good order and that a count is made and entered in the book once a month. This, coupled with a monthly visit from the storekeeper or his assistant, will result in this stock being kept at minimum and its accounting well handled.

Materials Used at Power Stations

The accounting for power station material is often very poor. Usually the station is not located near the shop storehouse, where its materials can have the immediate supervision of the storekeeper. The care and accounting for these materials must be left to the power station engineer, who usually does not maintain any stock or price records and who will not always describe the material on a requisition in the same way. It is remarkable, too, how frequently in the construction of, and additions to, power plants that proper provision is not made for the storage of supplies and of spare parts. In consequence, the materials are scattered all around the plant in a manner that discourages intelligent ordering and correct accounting.

The remedy would seem to be to provide a suitable storage place, assemble the stock together in order, place it under lock and key, restrict unlimited access to it and place it in the general stores account. Then, if the employment of a storekeeper at the power station is not felt to be justified, the stock can be placed under the jurisdiction of the storekeeper at the shops, who should have help enough so that he can have one of his assistants spend part time at the power station to keep the stock in order and accounted for. Perhaps the care of the power station tools and the stock could be combined, and the employment of a man thus justified.

A system of placing on the larger items in stock the description and cost price of the article, either by affixing suitable tags or by the use of paint, would go a long way to insure the correct pricing and accounting for this material when it is used or when an annual inventory has to be taken.

Materials Used for Overhead Line Repairs

Here we will have such materials as poles, crossarms, wire, insulators, ears, trolley frogs, and similar materials for telephone and signal repairs. This work will usually be in charge of a line foreman with one or more crews or gangs and assistant foremen working under him. There will be work cars equipped with working stocks of materials and tools, and the linemen must have headquarters of some sort at which to assemble and start out on their work. A small workshop may also be provided. From this place they must take the materials needed in the day's work, and at the close of the day bring back material not used, also second-hand material and scrap removed from the line.

Often some outlying carhouse, not fully utilized by the transportation department, or some unused power station, will be available for a lineman's headquarters, shop and material storage plant. When such a course is followed, it removes the materials from the care and control of the storekeeper and places them under the lineman. This is open to serious objections from the standpoint of accounting, orderliness and safeguarding of the stock. The storekeeper is out of touch and can control neither the upkeep of the stock nor the accounting. Rather than follow such a practice, sacrifices should be made if necessary, to the end that if it is possible and not prohibitive as to expense, the lineman's headquarters can be adjacent to or near the main shops and the main store and the storekeeper retain full control of the working stock required and the second-hand material and scrap returned. The working stock would then be limited to the work or line cars, which would be replenished direct from the storeroom on starting out in the morning.

A similar plan to that suggested for the outlying carhouse can be followed to control the working stock. It will be necessary, however, for the foreman to maintain a daily record of the material used and turn in a requisition for charging out purposes to the storekeeper

daily. If line poles are received and handled by linemen at points other than the storeyard at the storeroom, a careful receiving record must be returned to the storekeeper daily, and the storekeeper should arrange a monthly inventory of poles to keep this rather large item correctly.

If it is not possible to bring about the desired arrangemen whereby the line foreman's headquarters are situated near the main store, and an independent and separate storage place has to be maintained, the best alternative would seem to be to place the storekeeper in charge of the stockroom, and the keeping of the stock replenished and in order. He should then have enough help so that an assistant can be on duty mornings when the workmen replenish their car and at night when they return, to learn what their plans are for the following day and what material will be required. This assistant can also take charge of surplus second-hand material and scrap. When he is not at the stockroom, it should be kept locked and inaccessible to the workmen.

Materials Used for Repairs to Track

Material required for use on the track is different, in that it is large, heavy to handle, and only to a small extent capable of being stored in the storehouse. Track bolts and track spikes may be kept in the storehouse, but usually will be issued by the keg in unbroken packages. Rail braces, tie plates, track bonds and bonding cable, and a limited number of other items can be kept by the storekeeper with his regular stock, but as a rule the rail, the ties and the special work will have to be handled physically by the roadmaster's forces and stored according to his ideas.

The most satisfactory accounting would seem to be in the form of a daily requisition to the storekeeper made by the track foreman or the roadmaster for the materials used each day, and it will be necessary to have frequent check-up inventories taken if correctness is to be obtained. Special work should have each piece painted (and this painting renewed before it becomes obliterated) with a designated "lot" number, and the description should be a matter of record in the store, so that when such material is used or inventoried the lot number will positively identify the material and the cost price.

Facilities are needed for considerable quantities of bulky materials at certain times or seasons, such as sand for stocking cars for sanding track, and track salt, which is used by the carload lot for salting switches by some roads during snowstorms and in winter. Some care needs to be given to the arrangement of this material for accounting and inventory purposes, so that an inspection of it would at any time determine the quantity on hand without handling it.

Care and Accounting for Scrap

It is most important to give the best attention to scrap and salvaged materials, both from the point of view of possible further use and of recovering in cash for scrap sold as much as possible of the original cost. In the case of a trolley road, the large amount of scrap brass, copper and composition, which has in its pound value a very large per cent of its first cost, makes this especially important. Such metals enter into the composition of armature and field coils, trolley wheels, armature and journal bearings, motors, controllers, compressors, car trimmings, trolley wire and feeders and transmission wire, track bonds and bonding cable, pipe and fittings, and power station electrical machinery, and the value in the aggregate in the course of a year runs up into a large sum of money.

This scrap material should be safeguarded almost as carefully as cash on account of its easy convertibility into cash. A misappropriation is not easily detected, and every practicable means should be taken to safeguard it and to account for it. So far as practicable, a rule should be enforced requiring an old article to be returned to the storekeeper when a new one is drawn from stores. When this is not practicable a good practice is to establish standard scrap boxes around the shops, carhouses, etc., which are always kept locked and in the top of which there is an opening large enough to drop pieces not too large in size, which when once dropped into the box cannot be removed except by the storekeeper. This keeps the smaller scrap out of sight and lessens the temptation to misappropriation.

The storeroom space should also include a scrap room or inclosure in which this class of scrap can be put as it accumulates and where it can be placed in shape for the best market. As fast as it is put into marketable condition by being made clean and free from other material and of suitable size, it is well to barrel it and paint the gross, tare and net weights upon the barrel and report it for sale in this condition. This tends to lessen any opportunity for frauds or connivance between employees and junk men. A copy of these reports of scrap for sale should be sent to the auditor, and his men should check up the material at the storehouses from time to time after it is reported and before it is sold, verifying the weights. From time to time a complete audit of the sales orders issued for the sale of scrap and the shipments of it should be made.

A check should be made from time to time by the accounting department of the weights of scrap of different kinds, as compared with the weight of new material of the same kind purchased, as there should not be too great a disproportion between the two. To illustrate, if a company is going to renew a few miles of trolley wire, it is self-evident that the same number of miles is to be taken down, the larger part of which will be scrapped. The approximate weight of this is determinable in advance, and a system should be arranged whereby the storekeeper will know what he should receive for this scrap. He should then report if it is not received, and the accounting department should also have a system of checking this up.

The scrap accounts are generally based upon estimates, and it is very difficult to estimate such weights closely and correctly. If the more valuable scrap is handled carefully as suggested, it can be weighed as it accumulates and estimates be eliminated. The accounting will then be more nearly correct. If the practice is formed of making out credit requisitions for scrap material when it is removed from equipment, line and track, and scrap accounts are based on these requisitions, accounts will be more correctly maintained than if not.

Importance of Correct Naming and Identification of Material

One of the easiest ways in which wrong accounting for materials may occur is in applying an incorrect price to the article on the requisition slip when the

material is charged out and also on the inventory when it is taken out of store. It is quite feasible to maintain a card or loose-leaf stock record for each different item of material carried in stock. This record should show the prices and quantities received and the quantities issued, thus maintaining a running inventory. Many roads do this, and careful scrutiny of these cards permits of the application of the correct price or of following a system of average prices. These cards are of great assistance in keeping track of stock and guarding against errors in accounting for it, but with the vast amount of detail work in a storekeeper's office and with the class of help usually employed, it is impracticable to check the work on these cards to any very considerable extent and many errors creep in. On account of this, it is not a safe practice to rely wholly upon these cards as a source of information from which to make orders for replenishment of stock, and if this is done, serious and costly errors will result.

Another very good plan is to give each item of material a designating number, which is posted at the bin and placed upon the requisition when the stock is issued. This helps to keep the pricing right in the office, and many roads follow such a practice. The writer would advocate going a step further than this, and follow the department store idea of putting the price on the material itself, so that the requisition may be priced when the material is issued. This would save a large amount of clerical work in the office in the daily accounting work, would much facilitate the taking of inventories and, it is believed, would tend to reduce errors in pricing and accounting. While the writer is not aware of any railways that follow this practice, he is by no means convinced that such a plan is impracticable. Most absurd mistakes are often made in pricing by the clerks in the office who are unfamiliar with the material itself, mistakes which the storeroom man himself who knows the material would not make if it devolved upon him to price the requisition.

Accounting at Local or General Offices

Where is it the most advantageous to carry on the detailed store accounting work, in the office of the local storekeeper, or in the general accounting offices of the company? Something can be said for each side of this question. By assembling the work at some central point and having it done by accountants, making use of modern office appliances, it seems reasonable to believe that more clerks can be eliminated at the local storekeeper's office than would need to be added at the central office, and the work would have better accounting supervision than would be given at the local store and therefore not so many errors would be made. As against this probable saving in payroll needs to be considered the additional office space for workers and for files at the central point and what the same would cost. The storekeeper, being relieved of this accounting work, can give more time and better service in the care and upkeep of stock and in serving the various departments, and probably could better the work done by those departments, though this improvement would not be visible and could not be stated in dollars and cents.

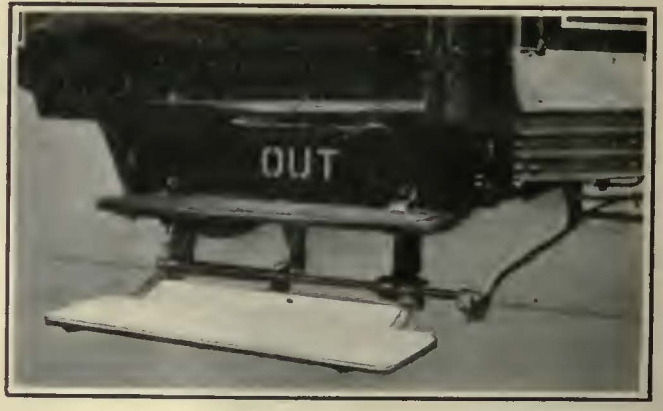
On the other hand, there are difficulties in identifying and pricing the materials when the work is done at points distant from those where the material is located, and questions cannot conveniently be asked of the men who handle and use the material. These objections might be overcome by having the storekeeper price the requisitions. Another objection that might be stated is that when accounting is done at the store and statements prepared there, the storekeeper can keep in better touch with the value of the material carried and consumed in the various classes, and this is quite important in efficiently conducting a store.

Statements made in the general office are not likely to be available for the storekeeper's information as soon after the period is over as if made in his own office. Adjustments will be made without the storekeeper's knowledge, and statements when received are sometimes not understood and often felt by him to be incorrect and unreliable. The storekeeper will not be in a position to answer many questions likely to be asked by local officials of the other departments, who will be uninformed about costs of work done or material used on certain jobs. It might be, however, that these objections could be overcome by sending back all detailed working papers and requisitions for the files of the local store after the accounts for the month had been stated.

Of course, when the accounting is done locally it would have to be under good supervision, and frequent test checks should be made by the traveling members of the auditor's staff. Just as the traveling auditors are sent out at intervals to check up the cashier who handles the company's cash receipts, so too they should visit the storekeepers and check up their accounting for the materials intrusted to their care.

White Steps Reduce Accident Hazard

FOR the convenience of boarding and alighting passengers, the Altoona & Logan Valley Electric Railway, Altoona, Pa., undertook some time ago to install double folding steps on its high interurban cars in place of the single steps formerly used. This was



The Lower Step Is Painted White to Attract the Attention of the Passenger to the Double Step

described in ELECTRIC RAILWAY JOURNAL for Oct. 18. After this had been done, however, it was found that some confusion resulted, since some cars in this district had double steps and other cars had single steps. These cars are of steel and there was, therefore, no convenient method of installing a step light. In order, therefore, to attract the attention of the passenger to the two steps on the interurban car, the railway has painted the lower steps white. A Kass tread of pressed steel is used. This raises the foot of the boarding or alighting passenger off of the white paint, which retains its color longer than would be the case if the passengers stepped on the painted surface.

Refrigerator Car Is Electrically Operated

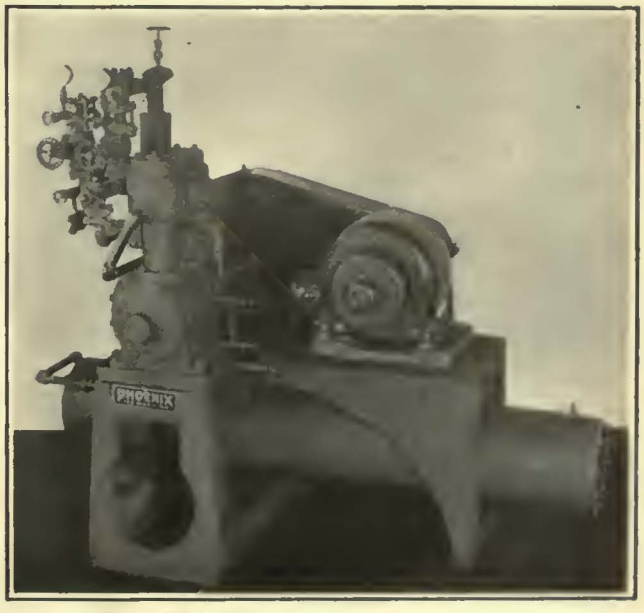
The Northern Ohio Traction & Light Company Has Developed a Car with Automatic Electric Refrigeration for Carrying Perishable Products Over Its Interurban Lines

A REFRIGERATOR car equipped with its own electrically operated plant has been developed and placed in service by the Northern Ohio Traction & Light Company, Akron, Ohio. The work of constructing the car began early last fall at the request of the Cleveland Provision Company, with the co-operation of the engineers of the latter company. The car was designed to carry perishable freight over the interurban lines of the traction company. Through the Phœnix Ice Machine Company a new idea was developed quite different from that used in the old kind of refrigerator cars.

The new car is built on the frame of a regular system box car, thoroughly insulated with cork, hair felt, cellotex boards and insulating paper, properly joined with tar and asphalt. The car is equipped with a Phœnix 2-K unit-type ice machine, a patented cooling tower, endless pipe coils, motors and a thermostatic control. The machinery occupies a space of about 5 ft. in one end of the car. It is separated from the space provided for perishable freight by a solid insulated partition and is reached by an outside end door. The car proper is equipped with regular refrigerator doors and baffle boards are placed inside to insure proper circulation of air.

The thermostat, located in the center of the car, automatically shuts off the motor when the temperature reaches 35 deg. F. and starts it again at 40 deg. By the use of an attachment to the trolley wire the car is at all times under refrigeration, the machines running when required whether the car is moving or standing still. This provides an even temperature at all times, something impossible in the ordinary type of refrigerator car operated by steam roads, as it is necessary to use ice and salt to pre-cool the car and then to replenish the melted ice, along with a proper amount of salt, usually running about 12 per cent of the weight

Interior of the Refrigerator Car. It Is Thoroughly Insulated Against Heat. A Thermostat Near the Center Is Set to Regulate the Temperature



The Ice Machine, Which Is Driven from the Trolley, Maintains the Temperature Between 35 Deg. and 40 Deg. F.

An Electrically Cooled Refrigerator Car that Has Been Placed in Service on the Northern Ohio Traction & Light Company's Interurban Lines

of ice. Re-icing must be done at intervals of from 24 to 72 hours, depending upon the outside temperature and the contents of the car. Between icings the temperature is bound to fluctuate.

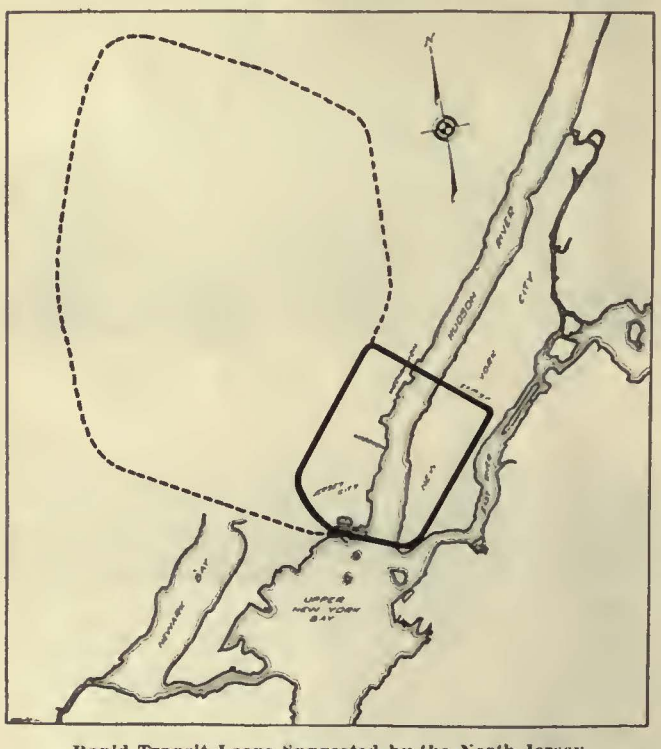
The car will save a considerable amount in the expense of icing. It is estimated by the company that to pre-cool and ice a car preparatory to loading requires about 14,000 lb. of ice and about 170 lb. of salt. The regular railroad charge for ice is $4 per ton and for salt is 75 cents per 100 lb., making the total cost $29.26. Cars containing fresh meats must be re-iced each 24 hours with from 1 to 4 tons of ice and a proportionate amount of salt.

The new car will furnish regular Northern Ohio Traction service for perishable products between Cleveland and stations on its lines. Deliveries with the car will be made over night to all cities and towns served by the company.

Interstate Loop Urged

Preliminary Report Presented by the North Jersey Transit Commission Makes Recommendations on Commuter Traffic

THE needs for better transit facilities to New York from the nine northern counties of New Jersey are set forth in a report presented on Feb. 2 by the North Jersey Transit Commission to the Senate and General Assembly of New Jersey. The report is a preliminary one only, as the data from an extensive



Rapid Transit Loops Suggested by the North Jersey Transit Commission

traffic count conducted Sept. 24, 1924, for 24 hours of all passengers on the steam railroad, the Hudson & Manhattan Railroad and the ferries from New Jersey to New York City have not yet been fully analyzed and tabulated. Enough has been done, however, to disclose the very rapidly increasing traffic on all of these lines, amounting in the last 12 years to 70 per cent in commuters and 65 per cent in all rail passengers.

The report says that the railroads concerned cannot solve the entire problem unaided and that they should not be asked to do so because the proper solution requires a comprehensive transit system, which will so unite them that passengers on any of the railroads can use a common facility for reaching their destination in New York. The report adds that the present railroad terminals on the New Jersey shore of the Hudson River are wholly inadequate for the growing traffic, as well as too costly for commuter travel, because the area they occupy is needed in the development of commerce.

The report refers to a number of plans for the solution of this problem and recommends, subject to further study, a double loop as shown in the accompanying map. The loop shown by the solid line would connect all of the railroads of northern New Jersey at points some distance back from the river. The New York section would be a subway, passing through the business sections of the city, and preferably of such size as to permit the operation of standard railroad rolling stock. When the railroads connecting with this loop are electrified, through trains can be run on them and around the loop. The report also suggests that the subaqueous tunnels be so constructed as to serve as combined vehicular and rapid transit tunnels, like that proposed under the Mersey River at Liverpool.

The dotted line on the map is a supplemental loop designed to serve the most densely populated district in northern New Jersey.

Encouraging Travel to Reservations

TO FACILITATE the use of its service by visitors to the famous Blue Hills state reservation, the Eastern Massachusetts Street Railway has mounted a timetable and map of the reservation on a bulletin board at an important highway crossing with its Brockton-Mattapan line, as shown in the accompanying illustration. Foot passengers through the reservation entering from another side find this electric line convenient after a walk of several miles through woodland country, and the presence of the timetable with its specific information as to the arrival and departure of cars contributes to increase the patronage of the railway.

Reservation Map Combined with Trolley Timetable Increases Traffic

Safety Slogan Prominently Displayed

THE familiar safety slogan "Watch Your Step" is displayed on the cars of the Harrisburg Railways in such positions that boarding and alighting passengers can hardly fail to see it. This phrase is painted in yellow letters on the riser between the folding step and the platform floor. When the step is folded up the legend cannot be seen, but when the step is down for passengers to board the car, the yellow lettering is very prominent. To caution the alighting passenger, the warning has been painted on the sand boxes on the two platforms.

P-O Builds New Freight Terminal

Double-Track Yard with Freight House, Loading Platform and Team Area Is Located in Business District of Youngstown—Facilities Are Provided to Handle Double the Present Business—Connections with Electric Railways in Michigan and Ohio Increase Scope of Pennsylvania-Ohio Service

By R. M. Graham
Manager of Railways Pennsylvania-Ohio Electric Company

Modern, Fireproof Freight Terminal Is Located in Heart of Youngstown, Serving Conveniently the Retail and Wholesale Business Districts

MODERN freight-handling facilities have been provided at Youngstown, Ohio, by the Pennsylvania-Ohio Electric Company, in a new freight terminal house and yard. On Nov. 3, 1924, the freight department of the interurban line was moved into its new quarters, which for some time previous had been under construction. The outstanding feature of this new development is the central location of the terminal. It is less than three short blocks from the central public square of Youngstown. Furthermore, it is situated in the heart of the retail and wholesale business section of the city. Notwithstanding this central location it is easily accessible to both trucks and cars.

The terminal property extends entirely through the block from Boardman Street to Front Street and has a width of approximately 100 ft. Since these streets are important arteries of the city, the terminal is readily accessible from all directions. From the standpoint of the railway operation it is most convenient. A spur track from Boardman Street enters directly into the yard. The company's main storeroom is readily accessible, as is also the office building, located on adjacent property.

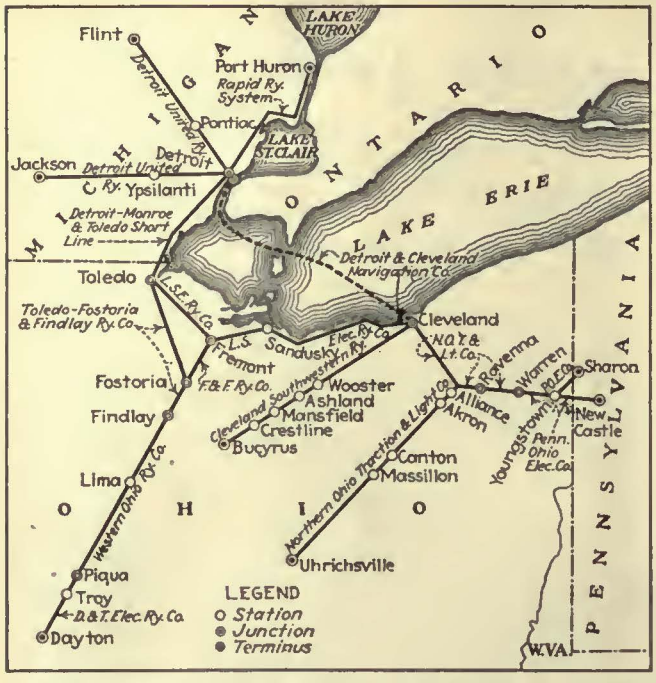
In this desirable location the company has built a double-track freight yard with a reinforced-concrete platform and fireproof warehouse along one side and a wide teaming area along the other side. This area is used by trucks delivering and calling for shipments. To facilitate further the handling of freight, all traffic into and out of the terminal is on a one-way basis. The entrance is from Boardman Street and the exit into Front Street. This prevents congestion and confusion and reduces the time the trucks and teams are at the terminal, which is an important consideration for shippers and receivers.

Reinforced concrete is used in the construction of the platform. It is of the proper height for unloading freight cars and for handling shipments to and from trucks. To the rear of the platform, which has a depth of approximately 10 ft., is the freight warehouse. This is a single-story shed, extending from the rear of a four-story building on Boardman Street to the freight office on Front Street. It is of fireproof construction, having sheet-steel walls and roof, the product of the Truscon Steel Company at Youngstown. The offices of the freight agent are at the Front Street end of the terminal, in a brick and stone extension of the warehouse. This location is convenient for the handling of bills of lading as the trucks are ready to leave.

Extensive Freight Connections

The main freight business consists of through shipments over connecting lines from and to Cleveland, Toledo, Akron, Canton, Detroit, Findlay, Lima and other Ohio and Michigan points. Practically all this freight is sent through at night on trail cars. Three or four-car trains are brought into the terminal at night and their contents distributed throughout the day. During the day, trailers are loaded preparatory to being removed the following night. Over-night service is given to Akron, Canton and Cleveland and intermediate points. Forty-eight hour service is given to all other points reached by a connecting line.

In 1918 connections were made with the Cleveland,



Many Important Freight Centers Are Reached by P-O System

Freight service offered by the Pennsylvania-Ohio System and connecting lines, includes principle cities in Ohio, Michigan and Pennsylvania. Copies of this map were used to advertise the service.

Alliance & Mahoney Valley Railway at Warren, Ohio, but the area served was small and the business handled did not show much increase. Following this, however, connection was made with the Northern Ohio Traction & Light Company, whose lines reached Akron, Cleveland, Urichsville, Canton and other important towns. The business received at first was small, but the fast over-night service to and from these points was soon appreciated by shippers and receivers of freight in Youngstown. This resulted in large freight trains being handled daily by this joint operation.

Still striving to increase business, other connections were sought and arrangements made for the handling of interline freight to and from the Detroit & Cleveland Navigation Company in order to reach Detroit. This was highly desirable in view of the fact that Youngstown produces many articles used in the automobile industry. Connections were then made with the Lake Shore Electric Railway, with lines extending from Cleveland to Sandusky, Fremont and Toledo. More recently, connections have been made with the Western Ohio Railway and the Dayton & Troy Electric Railway, which connects with the Western Ohio and operates into Dayton. Arrangements are now being made to connect with electric lines serving Detroit, Flint and Jackson, Michigan and points southwest of Cleveland. The accompanying map illustrates the scope of the freight service given through the connecting lines.

Dependability is the watchword of the Pennsylvania-Ohio system in handling freight shipments. The completion of the new terminal has overcome the handicap of lack of facilities under which the company previously labored. It is thought that the new facilities will permit the volume of freight to be doubled. This fast service has been recognized as a real asset to the merchants and industrial plants of Youngstown, as it permits of their carrying small stock, knowing that they can depend upon fast electric freight to handle their consignments without delay. The effort is being made not only to reduce complaints to a minimum, but to make the carrying and delivery of such freight as is intrusted to the company so completely satisfactory that it will more than fulfill whatever expectations may have existed in the minds of the customers.

A noteworthy feature of the new freight terminal is the extraordinary illuminating effect which the company has worked out in connection with it. Large painted signs on the east side of the Boardman Street building are illuminated with a battery of five lights installed on the roof of the office building across the areaway from it. The signs on the south side of the building are illuminated by four projectors installed on the roof of the freight shed. Similar signs on the west side of the building are illuminated by four Western Electric "X"-ray projectors installed on poles. The prominence of the building and its situation is such that it can very readily be seen from a large portion of the city. This extraordinary illumination of the building and its signs renders it a conspicuous feature of the landscape. In addition to these signs, the company also makes general use of billboards in advertising this convenient and attractive service.

The Loading Platform Extends the Length of the Fireproof Sheet-Metal Warehouse and Is Served by a Double-Team Track

Electric Derail Protects Bridge Crossing

Derail Controlled by Approach of Car Replaces Hand-Operated Type on Chicago Surface Lines—Operation Interlocked with Movement of Bridge—Experimental Installation to Be Forerunner of Others

AN ELECTRICALLY operated track derail, controlled by the approach of a car and interlocked with the movement of the bridge, has been installed recently by the Chicago Surface Lines on the southbound track at the Wells Street bridge approach. This experimental installation replaces a hand-operated derail formerly in use at this point. If the new type of derail stands up under the severe service, the company plans to replace five other hand-operated derails with the electric type.

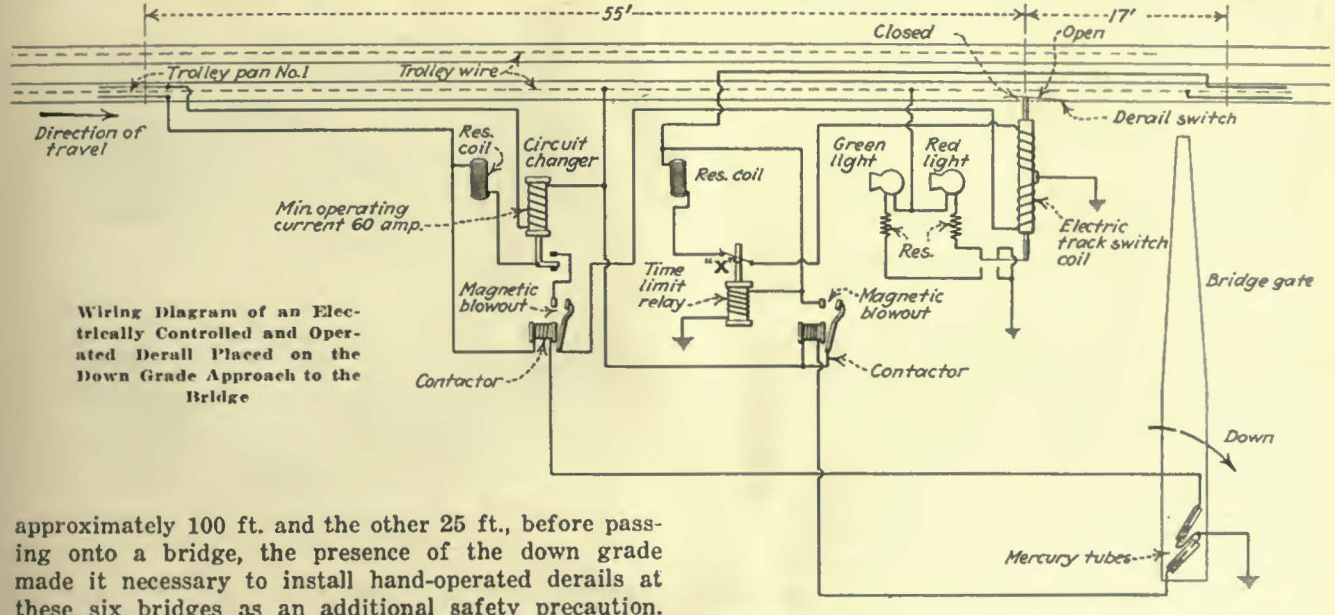
Of the many bridge approaches on the Surface Lines, only six are on a down grade. Although a city ordinance requires all cars to make two stops, one approximately 100 ft. and the other 25 ft., before passing onto a bridge, the presence of the down grade made it necessary to install hand-operated derails at these six bridges as an additional safety precaution. The derail is located between the two points where stops are required. It was necessary to have a switchman on the job 16 hours of the day to throw the hand derail in front of each car. This required the services of two men for each derail. During the remaining 8 hours of the night, the conductor on each passing car threw the derail. The electric derail dispenses with the services of the two flagmen and also eliminates the hazard of having the conductor cross the street at night through the vehicular traffic.

As the company was unable to obtain the desired type of derail complete, it was necessary to utilize available electric track switch equipment. A solenoid operated switchpoint is used with control similar to that employed in track switches. One two-plate contactor is located 55 ft. in front of the derail. A second trolley pan is located 17 ft. beyond the derail. The first is electrically connected to the solenoid of the derail so that the motorman must pass with power on, in order to throw the derail to the straight track position. When the car passes the second pan, whether with power on or off, the derail is thrown to open position.

Two signal lamps the mounted on the elevated structure overhead near the derail. Each signal consists of a lamp box with shaded lens, one green and the other red. When the derail is open the signal shows red, this being the normal position of the apparatus before the car passes the first pan. When the switch is thrown to straight track position, the green signal is lighted.

By interlocking the action of the derail with the movement of the crossing gate protecting the entrance to the bridge, it is possible to prevent a car from going on the bridge when it is open or about to open. This is accomplished by connecting the switch control circuit through two mercury contact tubes mounted on the gate.

As will be seen from the accompanying wiring diagram, one of these tubes is so mounted that when the gate is raised, contact is made through this mercury tube, allowing the derail to be operated by means of the two trolley pans. However, when the gate is lowered the other mercury tube closes the contact, which throws the derail into the open position if it is not already in that position. At the same time the contact in the first mercury tube is opened, preventing the operation of the derail by the first trolley pan. As it is necessary for the bridge tender to lower the crossing gate before he can raise the bridge, the derail is thrown into the open position some little time before the bridge is raised. This requires an approaching car to stop before the bridge actually begins to raise and avoids any possibility of accident.



Wiring Diagram of an Electrically Controlled and Operated Derail Placed on the Down Grade Approach to the Bridge

The locations of the pans, signals and derail are such that the operation of the derail fits in with the transportation department's operating rules. The motorman stops his car approximately 125 ft. before the bridge at the top of the down grade. Just beyond this point is located the first trolley pan which must be passed with the power on. The motorman notes the change in position of the derail by watching the switchpoint or the signal light. After passing the derail and the second pan, it is necessary for the motorman to bring his car to a full stop before going onto the bridge. Thus the whole operation makes the motorman watchful and careful in approaching the bridge.

A few changes were made in the standard switch equipment in order to adapt it for this special installa-

tion. Two magnetic blowout contactors are used to take the heavy arc in the control switchbox which is located on an adjacent trolley pole. A new type of solenoid track switch made by the Cheatham Electric Switching Device Company is used. The ordinary operation is reversed, as this switch is set for straight track by applying power. A time-limit relay protects the electrical apparatus should a car stop with the trolley wheel on the pan. This relay is set for 5 seconds and is brought into play if a car is blocked by the bridge. However, the relay is reset automatically when the car clears the pan.

This initial installation of bridge protection has been in operation since Sept. 21. For the month of October, the derail was thrown approximately 30,000 times without a failure.

Railway Makes Concrete Poles in St. Louis

Reinforcement Has Been Arranged to Provide Adequate Strength Where the Strain Is Greatest and Eliminate Excess Metal in Other Places—Steel Hoops Hold Reinforcement in Place

BY C. L. HAWKINS
Engineer of Way and Structures
United Railways of St. Louis

THE United Railways of St. Louis for the last four years has been using reinforced concrete poles to replace defective wooden poles. At present approximately 100 concrete poles are placed per year, although a total of more than 1,000 have been installed on the system.

The success of the concrete pole depends, to a great extent, upon the position of the reinforcing bars and the care taken in placing them. An accompanying illustration shows the arrangement adopted by this company. Steel reinforcement consisted of deformed bars which are rerolled by the Laclede Company from rail steel. Corner bars are of ⅝-in. square section, while the intermediate bars are ½ in. square. As the greatest bending moment occurs between 4 ft. and 14 ft. from the bottom of the pole, three intermediate reinforcing bars have been placed on each side of the pole in this area. The reinforcing rods are held in place by ¼-in. round steel hoops. In the section where the greatest strain comes these are spaced 6 in. apart, but elsewhere they are 12 in. apart.

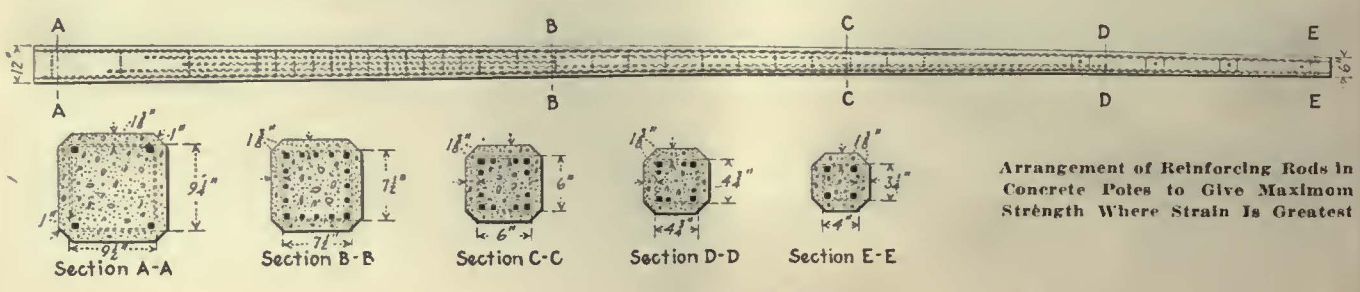
The standard pole is 35 ft. long with a base 12 in. square and a top 6 in. square. The corners are beveled, but sufficient concrete has been left to insure a thickness of 1 in. between the outside edge and the nearest of the reinforcing rods. Elsewhere the rods are approximately 1⅜ in. from the outside.

The concrete mixture used is 1:1½:3. Gravel graded down from ½ in. size is used in the aggregate. It is thought that a coarse concrete would be bad for this purpose, as it would permit the reinforcing rods to rust. Concrete is poured into the mold fairly dry, in order to obtain the maximum possible strength in compression. The care taken in the manufacture and handling has almost eliminated defective poles.

Concrete Poles of This Type Are Being Installed at the Rate of Approximately 100 per Year

Method of Storing Concrete Poles in the Yard of the United Railways of St. Louis

Driving one of the buses is considered the best job in London for the unskilled workman. A 6-day week minimum is guaranteed and the earnings are about £5 a week for a driver and £4 for a conductor, with an average of about £1 a week extra for overtime.



Arrangement of Reinforcing Rods in Concrete Poles to Give Maximum Strength Where Strain Is Greatest

Automatic Doors Relieve Jim Crow Problem

Several Months Experience in Dallas with 20 Cars Equipped with Rear-End Automatic-Exit Doors Has Led to Extension of Their Use

BY RICHARD MERIWETHER
Vice-President and General Manager Dallas Railway

DURING the late spring of 1924 the Dallas Railway started to equip 20 double-truck cars for one-man operation by installing safety devices, pneumatic door engines and a treadle-operated rear-exit door. Six of these cars were placed in service in September, on the Munger-Highland Park line, and by Oct. 1 the line was completely equipped with 20 of these cars. This route is 8 miles in length and has a 5-minute headway during the peak hours and a 10-minute headway during the remainder of the day.

The distinctive feature of the cars is the rear-exit door, which is controlled by a treadle set into the platform floor in front of the door. When a passenger steps on the treadle the door opens. It then closes automatically as soon as the step is clear, unless in the meantime another passenger has stepped upon the treadle. The mechanism is interlocked in such a way that the door will not open until the brakes are fully applied, and the car cannot start until all doors are closed.

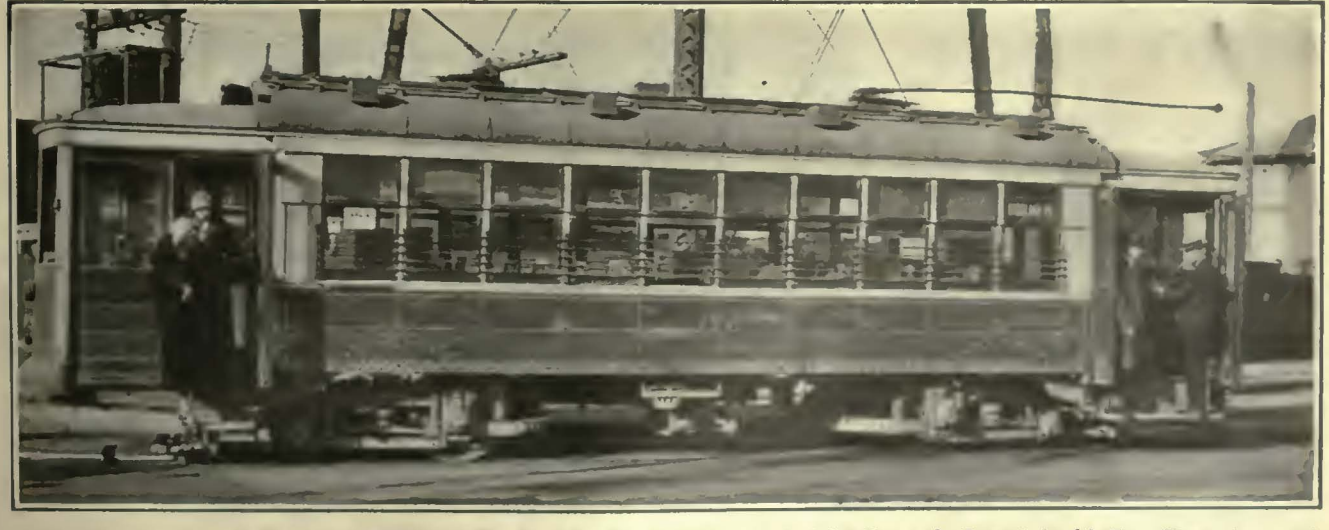
This automatic rear-exit door was installed because passengers objected to one-man operation on account of having to crowd through the aisles to the front exit. Dallas being a Southern city, this condition was particularly objectionable. The "Jim Crow" law is in effect here, and requires the negroes (who constitute some 20 per cent of the population) to be seated in the rear of the car. White passengers objected strenuously to the negroes crowding through the aisle to leave the car at the front, and the rear-exit door offered the means of completely eliminating the cause of complaint. Furthermore, it is a great convenience to white passengers, who may also leave by the rear door when the front end of the car is crowded.

Service has been materially speeded up by the automatic rear-exit one-man car; in fact, the cars being used in Dallas have demonstrated that they can handle the traffic quite as rapidly as two-man cars. The schedule on the line now being operated with these cars is the same as when two-man cars were in use. Another feature which enhances the value of this automatic door arrangement is a key valve, so located that the rear door may be opened with a key by street fare collectors stationed at the most important downtown corners.

When the Last Alighting Passenger Clears the Step the Rear Exit Door Automatically Closes

ANSWERS ONE-MAN CAR CRITICISM

The Dallas Railway is a pioneer in the development of the rear-door treadle exit for one-man car operation. The arrangement has proved so satisfactory that the company is proceeding to change over 20 additional double-truck cars in the same manner as the first lot, and hopes to have, within a reasonable period, not less than 100 cars equipped with the rear-door treadle exit. The arrangement has completely answered all the adverse criticisms from patrons of the Dallas Railway on one-man car operation, and the management is elated at the reception they received from the public.



Double-Truck Cars Converted for One-Man Operation Are Run on the Same Schedules Formerly Operated with Two Men. Automatic Rear-Exit Door Is Interlocked So Car Cannot Be Started Until Doors Are Closed

Association News & Discussions

The Business Paper of the Future*

What It Needs of Its Industry—What It Can Do for Its Industry—Assistance Which It Can Give in Reducing Production Waste and Distribution Waste

BY JAMES H. McGRAW
President McGraw-Hill Company, Inc.

BEFORE launching into consideration of the future, it would be well if we agree upon the fundamental characteristics of the business paper.

It is, first, a merchant of ideas. Like unto the great merchants, like Marshall Field and Wanamaker and Tiffany, it delves into the far corners of this country and of the world for the best merchandise—the merchandise, in this case, of ideas—assembles it in one place and displays it attractively for its customers. While delving into the corners of its field it shares in the counsels of the mighty, and in the noon-time exchanges of experience of artisans, mechanics, salesmen and saleswomen. It becomes close brother of all who work in industry and trade.

At the same time its obligation is to the whole group rather than to individuals. It sits, therefore, as a judge. Business passes in review before it. It is of the industry but not immersed in its details. It is judge, counselor, sympathetic critic. Its duty is to advise, to warn, to encourage, to applaud.

Sitting on the side lines as judge and counselor, it becomes co-ordinator as well. With responsibility to the whole group, it brings into unity of action those working at cross-purposes. Its function is to make all forces in a branch of business bear in the same direction—and that direction the right one. The business paper, therefore, is information bureau, teacher, friend, philosopher and guide, of industry and trade.

The question before us now is this: What can the business paper accomplish in the future? What demands will come upon it and how will it meet them?

To speak with absolute certainty about the future is given to no man. We can only estimate the probable continuation of trends that are discernible today. To tell what the business paper of the future will be, we must seek the trends in business that are so fundamental that they are likely to persist. Are there such trends? And if there are, whither do they lead?

In the first place, business will continue to enjoy, for one if not for more generations, the marvelous growth of the last 50 years. There are no signs of loss of virility in American industry and trade; rather there is increase in capacity, initiative, courage and energy. There is not such serious diminution of natural resources as to cause an early slowing up. In consequence, business will become more complex, its problems larger and more difficult.

In the second place, the American people, having tasted of high standards of living, will demand still higher standards, requiring the constant increase in the purchasing power of the wage dollar. This will require greater efficiency in industry and trade—which means the elimination of waste, and will, in the race for public favor, make the competition of the future more severe than that of the past.

What influence have these trends upon the business paper?

WEIGHTIER PROBLEMS

It should be apparent that a business of greater volume and greater complexity, carried on in larger units and by larger organizations, will confront business men with problems weightier and more difficult than in the past. They will need for their solution more knowledge, wider experience, keener analysis, more reliable conclusions, more courageous plans, more decisive and effective execution. If the business paper is to play worthily its part it will have to deepen the wisdom, broaden the experience and strengthen the courage of its staff that it may bring to these business men knowledge and counsel and warning measuring up to the weightiness of the new problems.

In numbers our larger papers are now well staffed. The need will be not for more men, but for better men; men who can gain the confidence of the big business men of the future, and having gathered the best of the experience of leaders and made it their own, can command the respect and following of the field for whatever of counsel and warning they may give as a result of their judgments.

The second of these trends demands that we shall continue to increase efficiency in business—which means to eliminate waste. Much has been done in this direction, particularly in production. So far have we gone, in fact, that, save for new technical discoveries, further progress in individual effort will be slow. But vast areas of waste elimination remain that can be reclaimed by collective effort, particularly in the field of distribution of goods and commodities.

In this collective effort in waste elimination we have made valiant beginnings. The great technical societies, by their standardization, test and specification work, and the trade associations have eliminated much wasteful practice. The admirable methods and efforts successfully applied in engineering and production need to be extended to every phase of business. It is one of the many contributions that Mr. Hoover has made to our material progress to point out these new areas for collective effort and to do it so dramatically that American business is putting a new emphasis on their study.

In this work, the business paper of the future can play a large part. It has always been a great co-ordinator. No agency has been responsible for the formation of more trade associations and technical societies than business papers, and no agency has done so much to spread a knowledge of their work and to secure acceptance thereof. Efforts of this kind will assume a greater importance in the future.

WASTE IN DISTRIBUTION

Of this area of waste elimination one part—that in distribution—looms up as the largest problem before American business today. The spread between production cost and the price paid by the consumer is far too large. Collective attack, as Mr. Hoover has insisted, alone holds possibility of large results. Wastes in transportation, in inefficient hauling and loading; wastes in deterioration of commodities; wastes in disorderly marketing, with attendant gluts and famines; wastes in too many links in the distribution chain; wastes in bad credits; wastes through the "competition of ignorance," by those who do not know their costs and the fundamentals of the business in which they are engaged; wastes in not knowing the markets in which one can sell economically; wastes in not knowing the buying habits of private and of industrial consumers; wastes in using wrong channels of approach to prospective buyers; wastes in advertising and selling by using appeals that have no power to influence the prospect.

What part can the business paper of the future play in this study of distribution?

Just as large, I answer, as the capacity of its publishers and editors and advertising men. It is in a strategic position. It is the confidant of industrial and trade leaders. Eagerly they will give of their views and experiences, eagerly will they accept help, so long as it be intelligent, stimulating and sound.

I do not mean that the business paper can by itself study the whole problem. It can, however, stimulate and co-ordinate, point out the new fields for investigation and hammer home the discoveries made until they are gen-

*Abstract of address at the annual meeting of the New York Business Publishers' Association, New York, N. Y., Jan. 27, 1925.

erally accepted and put into effect. It can, too, it must in fact, be itself an authority on selling methods, so far as they touch its own field. How else can it dispose of its own goods—advertising—in the spirit of modern selling, that spirit which is to "service," rather than "sell," the product to the consumer? We must be experts not only in advertising, but in the channels of distribution and sales methods that will be effective for our clients.

Superior Service Demanded

I referred previously to the increase in severity of competition as another of the results of the effort to raise the standards of living. This tightening of competition will create a new hungriness for facts, for data leading to economies, for searching inquiry into the best practice.

I have frequently heard publishers and editors say that they could not hold this or that type of influential subscriber, that the renewal rate in desirable branches of the field was inordinately low. There seemed to be an implication in their tones that the prospective reader was at fault. But the fault lies in ourselves. Why should the reader buy our wares if they are unsound, stale or commonplace? He needs help, but the help must be real. If we will but get to the bottom of the problems of our fields and have the ability to take the leadership in their solution, we shall have no cause to complain of failure to get and hold influential subscribers.

Circulation Work

The same sort of research that I described for the editorial and advertising departments is needed in circulation work, as well. Our inquiry must start with a thorough knowledge of our field. It must proceed to a picking of those who can profitably use our paper, and then to a concentration of selling effort to put these names on our subscription lists. Finally, it must include a thorough survey of the influence of these subscribers, their buying habits, their buying or specifying power, the channels for approaching them and the appeals that are valid.

In other words, hit or miss in circulation will not avail, nor will even the building up of sound circulation. There is needed, aa well, thorough knowledge of what that circulation can do for the advertiser.

Our Responsibility to Society

I want, in closing, to leave a thought regarding our broader responsibility. We as business publishers owe our primary responsibility to the business, to the industries and commerce, of America. But eventually our accountability, as well as that of business itself, is to the whole American people. Viewed in this light, the business paper is a great social force. It has ever stood for economic and governmental sanity, but its counsel will be more needed in the future than in the past. Many agencies of information—newspapers, magazines, associations, even some of the colleges—are veering with each erring wind of public fancy. It is all the more important that the business press fight without tiring for economic and governmental soundness. It should stand for enlightened business policy—for fairness to the owners of business, to the employees and to the public. It should urge that business men think rather of their responsibllities than of their rights.

It should above all, stand for the principle of individualism in American life, making the sole reservatlon that that individualism shall not transgress the rights of othera. It is upon this individualism that our social structure rests. If today our people enjoy the highest standards of living of any people on the globe, if they are better fed, better clothed, better housed and have more of the comforts and luxuries of life, it is because of the stimulus afforded by the individual initiative and risk on which our business is founded. A nation committed to individualism will conserve the foundation of liberty on which our government rests.

To stand for principles such as these, to champion them in the interest of the whole people and the integrity of our system of government, is the inestimable privilege and the solemn obligation of the business publisher.

American Association News

Mr. Brush to Address Midyear Meeting

M. C. BRUSH, president of the American International Corporation, has just accepted an invitation to be one of the speakers at the banquet of the Midyear Meeting of the American Electric Railway Association. Acceptance of the invitation by Mr. Brush was gratifying to the association executives because not only is he an old-time electric railway man, but he speaks his mind plainly, as it is hoped all of the Midyear Meeting speakers will do.

Other speakers who have accepted for the meeting include Gen. Guy E. Tripp, J. G. Barry, George E. Hamilton, Peter Witt, S. B. Way and Commissioner John Esch.

President Shannahan has extended invitations to the chairmen and members of public utility commissions, as well as other governmental officials, to attend the meeting, which will be held in Washington Feb. 17. The present indications are that this will be one of the most successful Midyear Meetings in the association's history.

Reservations for hotel rooms and the dinner are coming in fast, association headquarters reports.

The transportation committee, under the direction of E. C. Faber, chairman, has divided the country into sections and every member of the association has received a personal letter from a member of the committee setting forth the attractive features of the Midyear session. Barney Frauenthal and H. J. Kenfield have sent out special folders in the St. Louis and Chicago territories, respectively, boosting the meeting.

Meetings of the manufacturers' committee on co-operation and the directors of state committees on public utility information have been called for Monday, Feb. 16.

New Publicity Material

THE manufacturers' special committee on co-operation of the American Association, of which E. F. Wickwire, vice-president Ohio Brass Company, is chairman, has just opened up a new publicity channel for telling the electric railway story. A special label, or dodger, of the size used in the theatrical business for "sniping" has been prepared and distributed for sticking on freight and express shipments. The idea is based on a conviction of the committee that there isn't half enough reading matter around railway stations and that any label which shows its face around a depot is certain to be read. Therefore this sticker is headed "I'm a Railway Man."

The complete text is as follows:

"I'm a Railway Man. I make electric railway supplies. More than 300,000 of my buddies throughout the United States do the same thing. This package contains some of the supplies I made. A square deal for electric railways means a square deal for us."

The label carries the picture of Bill Ernst, whose face has been on other electric railway publicity material. He is a worker in a manufacturing plant, is good natured, looks genial, and likes his work.

Special Reports Available

THE following special reports have been prepared by the bureau of information and service of the American Electric Railway Association and are available to member companies in good standing upon request:

Bulletin No. 6—Public Utilities Securities Issued in 1924.—A list of the new securities issued in 1924 divided between electric railways and other public utilities showing the type of security, amount issued, maturity date, interest rate and offering price. The list is preceded by a cumulative table comparing the amounts of securities issued in 1924, 1923 and 1922.

Bulletin No. 7—Trend of Trainmen's Wages.—Shows for a large group of companies maximum wage rate; the number of years of service necessary to reach it and the number of trainmen employed for the years 1914 to 1924 inclusive, and the same information as of Feb. 1, 1925.

Bulletin No. 8—Trend of Electric Railway Fares, 1917 to 1924.—This shows the fares in effect in each of the 288 cities having a population of 25,000 or more each year from 1917 to 1924. In addition it shows the average cash rate of fares in these cities in these same years, and the number of cities in which each rate of fare was in effect in each of these years.

Bulletin No. 9—Toll Bridge Rates.—Gives summary of the information obtained in the replies to a circular letter of inquiry addressed to members on the subject of toll bridge charges, and covers charges paid by electric railways for the use of bridges and the schedules of charges for other users of the bridge levied by electric railways owning and operating toll bridges with a statement of the operator's views as to the proper basis of fixing charges on toll bridges.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies (Bulletin No. 10) have been prepared bringing them down to date.

Maintenance of Equipment

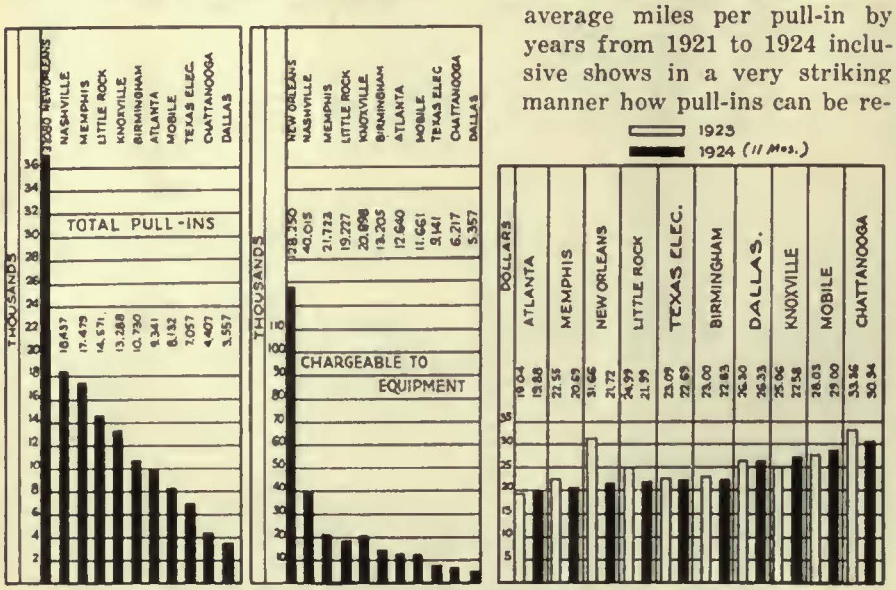
Pull-Ins Reduced on Southern Properties

THE number of cars pulled in during the year 1924 has been reduced materially for the properties comprising the Electric Railway Asciation of Equipment Men, Southern Properties. A record of pull-ins showing the average car-miles for the year up to and including September was published in the ELECTRIC RAILWAY JOURNAL for Oct. 25, 1924. The complete record for the year, now published, shows the average car-miles per pull-in which is chargeable to the carhouse as varying from 5,357 miles in Dallas to 128,250 miles in New Orleans. This is greater than for any previous year. The accompanying illustrations give comparisons of pull-ins and maintenance cost for each property represented in the association.

The statement giving the detailed troubles which have resulted in car pull-ins shows that armatures have been the chief cause of breakdowns. Other equipment parts which have caused high numbers of pull-ins are fields, brushes and holders, motor leads, gears and pinions, controllers, air brakes and brake rigging.

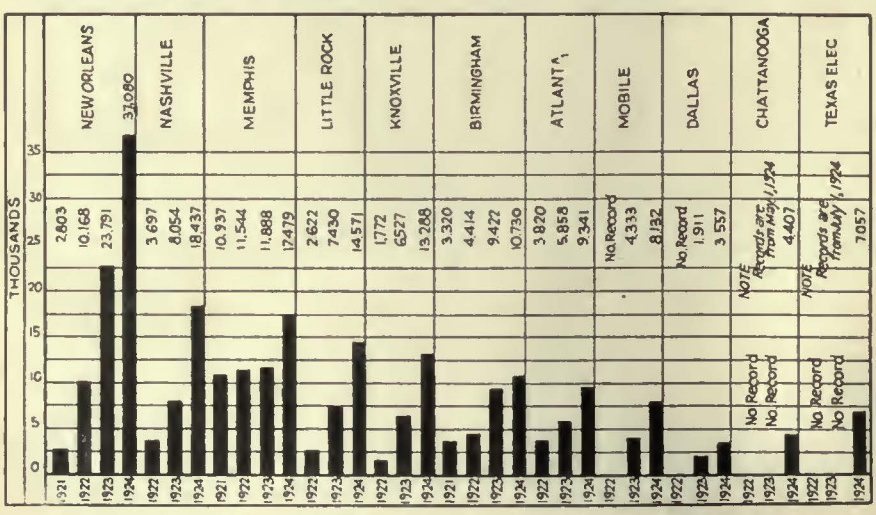
The chart giving comparisons of average miles per pull-in by years from 1921 to 1924 inclusive shows in a very striking manner how pull-ins can be reduced by giving particular attention to the causes. The record of each individual property has been bettered each succeeding year. New Orleans has shown the greatest improvement with an increase from 2,803 miles per pull-in for 1921 to 37,080 miles per pull-in during 1924.

The chart of comparative equipment maintenance cost on a car-mile basis shows that the low figure of 2 cents per car-mile has been obtained in Atlanta, with other properties showing very low costs also. The highest is that of Chattanooga with 3.1 cents per car-mile.



Average Miles per Pull-in and Cost of Equipment Repairs, Southern Properties

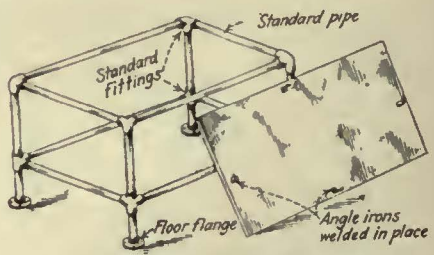
At left, average miles per total pull-in for year 1924; in center, average miles per pull-in chargeable to equipment; at right, comparative maintenance cost of equipment per 1,000 car-miles for year 1923 and 11 months of 1924.



Average Miles per Total Pull-in by Years, 1921 to 1924 Inclusive

Welding Table for Light Work

MUCH of the welding carried on by electric railways in maintenance work is on small parts which may be picked up and carried about by hand. For this class of work a light welding table, which may also be moved about, is particularly convenient. Several railways have made tables by using a framework of steel



This Table, Constructed of Standard Pipe and Pipe Fittings, Facilitates Welding of Light Parts

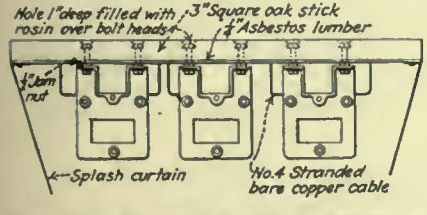
or of pipe with a solid steel or cast-iron top. The size of such a table, of course, varies with the work to be handled and the space available on different properties. A convenient size is 3x5 ft. An accompanying illustration shows such a table constructed of 1¼-in. pipe with standard pipe fittings. On some railways many of the fittings are done away with by welding the pipes together where they join.

For light welding the work may be set on the bench, which is grounded, and the contact will be sufficient to cary the necessary welding current. A vise added to the table

top has been found convenient for holding the piece in proper position during the welding operations and also to form the contact for the welding current. Where it is found inadvisable to have the framework carry the current, a bar with one end connected to ground can be laid across the piece being welded. This will provide sufficient current carrying capacity, provided all scale and rust which might prevent proper contact are removed.

Installing Standard Resistors

STANDARD resistors are being installed in a uniform manner on all cars of the Syracuse division of the New York State Railways when they are taken into the Wolf Street shop for overhauling. The company's standard arrangement consists of three frames of resistors placed in a row on one side of the



Method of Mounting Resistors Adopted as Standard in Syracuse

car, depending on the equipment and style of car. The resistance frames are supported by two 3x3-in. oak blocks running lengthwise of the car. The blocks in turn are fastened by two ½x2-in. iron brackets. Asbestos lumber of ¼ in. thickness is placed over the resistors.

Standard bolts with lock washers are used for fastening the resistance frames to the blocks. The bolt heads are countersunk 1 in. and after the bolts are in place the holes are filled with rosin. Sheet steel splash guards are placed at the ends of the row of resistors to prevent water and slush from striking the grids. The resistance wires as they come from the main cable are covered with ½-in. duraduct, which runs to the asbestos lumber shield. From this shield to the terminals of the grids the wires are bare, so as to prevent any insulation from becoming charred due to overheating of the resistors. The bare wires are thoroughly tinned. An accompanying illustration shows the method of mounting and the splash shields used at either end of the resistor frames.

Bead of Solder Indicates Pole Clearance

By F. C. LYNCH
Shop Supervisor Kansas City Railways

IN THE Kansas City shop it is the practice, when soldering the band wire on the armatures, to leave several small beads of solder spaced at intervals around the armature so that when it is put into the motor housing these small beads of solder rub down by contact with the pole pieces.

Their thickness indicates exactly the clearance that remains before the armature will touch the pole pieces. In this way an examination of these beads at any time, even when the armature is in the motor, will indicate quickly whether the bearings are in a condition that is likely to cause the armature to rub in the near future.

New Equipment Available

Improved Switchboard Instruments

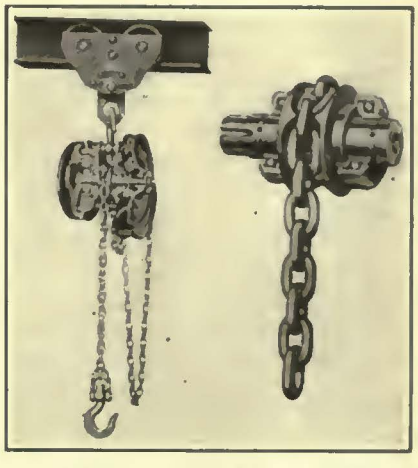
THE horizontal edgewise switchboard indicating instruments manufactured by the General Electric Company, Schenectady, N. Y., and known as its H-2 type, have been redesigned, the new line being designated as type H-5. The line includes ammeters, voltmeters, wattmeters, power-factor meters and frequency meters, for use where the measurement of electrical energy is necessary.

Among the changes are improved armature coil and pointer construction; increased insulation of current winding; non-corrosive finish on frame, magnets, screws, etc., and new strip-wound magnetic shield. The jewels and pivots in these instruments have been reversed, the jewels being mounted on the armature shaft while the pivots are mounted in the frame, thus permitting their ready removal.

Ball-Bearing Chain Block

A DEVELOPMENT in hoisting equipment, consisting of a ball-bearing spur-geared chain block, has just been placed on the market by the Yale & Towne Manufacturing Company, Stamford, Conn. Two chrome alloy ball bearings which support the load-sheave shaft are arranged to take the entire weight of the load and to withstand the shock of all thrust and overload surges. The bearings are inclosed in small chambers and provision is made by means of steel and felt washers to prevent dust and grit from entering the bearings.

Continuous lubrication of the bearings, driving pinion, shaft and driving gears is a feature. The top



Sectional View of Chain Block, and the Arrangement of the Ball Bearings Which Support the Load Sheave

hook, crosshead, suspension plate, load sheave, load chain, detachable shackle, bottom crosshead and hook are all of steel. An increase in mechanical efficiency of more than 6 per cent has been obtained through the introduction and use of ball bearings, where they carry the full load. The new ball-bearing blocks are furnished in capacities of from ½ to 20 tons.

Unit Bus Heater

AN IMPROVED type of unit bus heater for installation under seats is being placed on the market by N. A. Petry Company, Inc., Philadelphia, Pa. The unit consists of cast ends with straight pipes connecting. It is made in two sizes of tubing, 1¾ in. and 2 in., and in both vertical and horizontal types standard lengths are 5 ft. to 9 ft. The tubing is welded in the malleable-iron manifold castings, which are provided with removable plugs to facilitate cleaning of the tubes. The horizontal type is made especially for

Unit Type of Bus Heater for Installation Under the Seats

de luxe coaches having full-width cross-seats. Connections between adjacent heaters are made under the floor of the bus.

Anchorage for Track Bumpers

A BUMPING post for stub-end tracks has recently been placed on the market by the Hayes Track Appliance Company, Richmond, Ind. In appearance it resembles existing types with rigid construction but presents a distinctive form of anchorage to the track. Tension legs with U-shaped ends pass completely under the rail and up on the outside where the end is held in position by a pin passed through it. The bearing of each of these legs is carried by a shoe which is bolted to the rail and spiked to the supporting tie. A flange on the underside of each of these shoes bears against the side of the adjacent tie. Tie anchor bars connect with a lug on the upper face of each shoe and are spiked to the four ties ahead of the bumping posts to complete the system of anchoring the tension members to the ties.

The anchorage of the back legs is accomplished by using steel posts which seat against shoes bolted to the rail. These shoes are provided with flanges which fit against the face of the adjacent tie and with tie anchor bars which extend over the three ties ahead. The anchorage thus brings eight ties into play and is based on the theory that for the best results bumping posts should be connected with the ties rather than with the track rails.

The compression members fit the compression shoe and the seat in the head in such a way that while bolted at each end the bolts do not carry the compression. The tension members are rectangular bars, which are not only curved at the lower ends but also at the upper end in order completely to go through the head. A large pin below the bumping head holds the tension members in place. As an additional precaution, the two compression joints are connected together by a tie rod at the lower end to keep them from spreading under the shock of an oncoming car.

Mechanical Helper for Blacksmith Shop

A NEW type of power hammer intended for use with standard anvils is being introduced on the market by the Blacker Engineering Company, Inc., New York, N. Y. This is essentially a mechanical helper developed so that blacksmiths can use their own hand tools and anvil now available and replace the human strikers and hand-swung sledges.

The maximum blow of the machine is about four times as heavy as a human striker averages, and the machine attains the rate of 140 blows per minute on both light and heavy work. Lateral motion is provided so that the hammer can travel the entire face of the anvil and strike any part desired. The lateral transverse motion is controlled by a winged foot lever conveniently located to the right of the anvil. The head can thus be centered exactly over any point where it is desirable to strike a blow and can be located over the two hardie holes for swaging, punching and similar work.

The striking head is located at the end of two pairs of arms. These can be adjusted so that the work is always struck a flat, straight blow. The movement of the head is exactly similar to that of a hand-swung sledge. It rises to strike the blow and then rebounds quickly from the metal. The usual distance between the head and the anvil is 8½ in. The stroke can be adjusted to suit any particular work in hand.

The hammer can be driven from a line shaft or can be provided with an individual motor drive where desirable. When driven from a line shaft, tight and loose pulleys of 15-in. diameter by 2¾ in. face are recommended and the belt should have at least a 7 ft. drive. The individual motor-driven unit is most compact and offers several advantages. The motor is mounted on a small stand in the base and geared through a large driving gear on the main shaft. A 1-hp. motor is employed and any standard make can be supplied.

Mechanical Helper in Use at the Morris Park Shops of the Long Island Railroad

Several electric railways are using this type of hammer with success, among which are the Cleveland Railway and the Long Island Railroad. The accompanying illustration shows the hammer in operation at the Morris Park shops of the Long Island Railroad.

The News of the Industry

Commission Controls Rates

Decision in Richmond Case Affecting Virginia Railway & Power Places Jurisdiction with State Body

The Supreme Court of Appeals of Virginia has decided that notwithstanding provisions of the Constitution of Virginia, acts of the General Assembly, ordinances of the city of Richmond, and contracts between the city and the Virginia Railway & Power Company and its predecessors, the State Corporation Commission is clothed with the final authority to establish rates for the transportation service supplied by the company. In its opinion the Supreme Court upholds the ruling of the State Corporation Commission in the appeal of the city of Richmond against the company.

It was control over rates on trackage operated under various franchises granted prior to the adoption of the Constitution of 1902, before the establishment of the State Corporation Commission, that constituted the issue in the case just decided. That issue has been decided against the contention that the right to regulate rates of public service corporations chartered prior to 1902 is reposed in the cities and towns in which such corporations are operated. The court holds, with the State Corporation Commission, that the state's reserved police power, to be exercised in behalf of the public weal and for the general well-being of the state, is paramount—in the absence of specific constitutional provisions limiting this police power—even over contracts which were valid when made and which are inviolable as between the parties to such contracts. It further holds that the constitutional provisions cited by the city and referred to in the opinion do not suffice to limit the state's police power to the extent of depriving the state of the right, through the agency established by the instrumentality of the Corporation Commission, to fix such rates.

As the Richmond *Times-Dispatch* says. the court, in the case of the Town of Victoria vs. Victoria Ice, etc., had already held that the Corporation Commission had jurisdiction over rates in franchises granted after 1902, when the present Constitution became effective. In fact, the court discussed the Victoria case. In so doing it quoted the conclusions announced in that opinion, part of which reads:

> That the state having reserved the right to prescribe rates, the General Assembly has . . . designated the tribunal and prescribed the procedure for the investigation of such rates thus specified by municipal ordinance adopted since the present Constitution became effective; that the State Corporation Commission is thereby expressly vested with jurisdiction, after hearing and investigation, to prescribe different rates adjudged to be reasonable, anything in such ordinance to the contrary notwithstanding; excepting therefrom, however, such contracts, if any there be, as may have been authorized by the state before the present Constitution became effective.

Almost at the end of its opinion in the present case, the court says:

> Whether the conclusion herein reached follows as a result of "evolution" or "revolution," we feel that, in the promotion of the common weal, it is the best solution of a most difficult situation. Any other settlement of the matter would depend upon legislative action, and we do not think that the issues involved should be cast as driftwood into the uncertain current of politics.

In commenting on the decision the *Times-Dispatch* said:

> It is assumed there is little likelihood of an appeal to the Supreme Court of the United States, for the reason that the decision does not precisely involve impairment of a contract; it holds that the contracts in question are valid enough until the state exercises its inherent and retained right to regulate certain matters connected with and growing out of those contracts. Unpleasant as it may be for municipalities to contemplate, it is hardly open to question that the State Corporation Commission is better qualified to evaluate properties and fix rates than the average council of the average city or town.

Bus Fare Cut Suggested at Detroit

Mayor Opposes Fare Discrimination—Street Railway Commission Claims Bus Rate Corresponding to Railway Fare Would Mean Loss

IN response to a recommendation from Mayor John W. Smith that the fare on buses operated by the Detroit Department of Street Railways be reduced to 6 cents to correspond with the fare on the municipal railway, the statement is made by the Street Railway Commission that such action would cause a deficit of $250,000 a year. Mayor Smith's recommendation was studied thoroughly in connection with the showing the buses have made in the few weeks they have been operated.

A 10-cent fare is now charged on all buses. This entitles the passenger to a transfer to the nearest railway line. By paying an additional cent the rider can transfer to the second car line. The payment of an 11-cent fare thus enables the rider to go down town from outlying districts which previously had no reliable transportation service.

Mayor's Case Stated

In making his recommendation, the Mayor pointed out that the city would demand not more than a 6-cent fare if the service into the outlying districts were afforded by means of trolley cars. While it was realized that much of the bus service must be given under conditions that would mean a loss at a 6-cent fare, the Mayor holds to the belief that D.S.R. operation must stand as a single endeavor and that there can be no discrimination in fare between residents of one part of the city and residents of another.

In reply Ross Schram, general manager of the D.S.R., says the commission would not have built railway lines on some of the routes at present because of the prohibitive costs.

The commission's study indicated that the present fare of 10 cents charged on the buses will result in a deficit of approximately $100,000 a year. At the present time the same taxes for buses are required from the street railway department as from the Detroit Motorbus Company. This yearly tax paid by the D.S.R. and the private company is reported as approximately $400 per bus. A reduction in the city's rate of bus fare should be accompanied by a lowering of taxes, and the lowering of the fare, the commission believes, would also curtail the extension of bus service.

In summing up, the commission agrees that the coach fare should be reduced if the policy is to be followed that was established before the advent of the automobile and before the extraordinary annexations to the city.

The communication to the Mayor, signed by G. Ogden Ellis, president of the commission, said in part that:

> For the purpose of serving the greatest possible number of people, this department installed the first of its coach lines on New Year's Day, and since that time has laid 30 miles of coach routes, running through the outlying sections. Within the next two or three weeks all of this 30 miles of routing will be in operation. There is more than 23 miles in operation at present. These routes are operated by 50 light-type coaches and in one year they will run 2,187,000 coach miles.
>
> At the present rate of fare this operation is failing to meet expenses by 7 cents per mile. As the riding developed, this deficit may be absorbed to some extent, but we are confident that even the present rate of fare will not prevent a deficit of more than $100,000 for the first year. Furthermore, we will be required to expend at least $50,000 for service arrangements within the next few months. If we make the coach fare the same as the street car fare our books indicate that we will have an operating deficit for coach service of at least $250,000 for the first year.
>
> The traffic upon the majority of these routes which have been installed indicates that in not more than one or two cases would we, from the standpoint of good railway practice, be justified in extending our tracks. We point out these cases to show that we have gone ahead to install this coach service in a great many places where we would not have considered installing car service, feeling quite certain that we would be permitted to charge an extra fare. If we are to reduce the coach fare, the extent of our coach system must be greatly curtailed from that which we have in mind.
>
> To indicate the scope of our plans, we will, in 30 days more, operate one-third as much mileage as the Detroit Motorbus Company. With this coach installation of 30 miles we outrank every street railway in the manner of pioneering in outlying districts, and this regardless of the rate of fare paid on our trolley cars.
>
> Another point for your consideration lies in the fact that we are paying the same pavement tax for our vehicles as is paid by the Detroit Motorbus Company with heavier equipment. If our fare is to be reduced, should there not be an adjustment of our paving charge?

Atlanta Regulates Jitney

Motor Vehicles Ruled Off Railway Streets and Out of the "Congested Area"

The City Council of Atlanta on Feb. 2 eliminated jitneys from the streets of the city by a vote of 22 to 8 when an ordinance introduced by the special traction committee was adopted.

The ordinance really supplants a measure adopted originally in April, 1919. It has been the subject of a bitter fight ever since it was drawn up by the special committee. Stated briefly, the new law provides that all jitneys be prohibited from operating on any streets where car lines are in operation, on streets within two blocks of and parallel to streets occupied by car lines, and on streets in the downtown district of the city in what is known as the "congested area."

The ordinance, however, contains provisions by which buses with a seating capacity of 17 persons or over may operate in sections not served by the railway, thus permitting the bus lines now operating between Morningside and Sylvan Hills to maintain schedules.

Under an amendment to the original ordinance, operators of buses will be forced to carry $10,000 of indemnity insurance against single accidents, with a maximum of $50,000, instead of posting a $5,000 indemnity bond for each person who might ride in the bus, as provided in the original measure.

The ordinance provides a fine of $200 or 30 days at work on the public works of the city, or both, for each violation of the ordinance. Every day on which the bus is operated in violation of the ordinance is to be considered a separate offense.

The final clause of the ordinance gives the City Council the power to license buses to operate at any place or at any time, as well as to deny bus owners the right to operate on the public streets of the city. Under this last provision there will repose with the Council the right to permit the operation of buses at any time in competition with the street cars if it felt that the service being rendered by the railway is inadequate.

The ordinance becomes effective 30 days after it has been signed by the Mayor. The regulations now about to be put into effect have long been desired by the Georgia Railway & Power Company and are along lines suggested by John A. Beeler in his expert report to the city.

Two-Track Subway Suggested for Pittsburgh

Daniel L. Turner has formulated his plan for transit relief for Pittsburgh. A two-track subway extending from Chatham Street along the line of Fifth Avenue and Sixth Street to Duquesne Way is the substance of the report of the traffic commission. It was presented to the Council on Jan. 29.

No promise of immediate relief from downtown congestion is held in the conclusions reached by the traffic commission, as the solution presented contemplates a future rapid transit system of which the Fifth Avenue Federal Street is the initial section and can be built for $6,000,000 or the amount voted in the 1919 bond issue for a subway in the First and Second Wards.

Before a start can be made on this, the report states a year would be spent in making an intricate survey of underground conditions, including the underground systems of the public utilities, foundations and strata formations.

Briefly, the plan provides an east and west rapid transit between the East End and Northside, the general lines of Ellsworth and Frankstown Avenue to the East and Federal Street to North Avenue. A future consideration of the plan is for another subway from North to South following the general line of Grant Street.

The Rat's Revenge*

WITH a rat pursuit is not delusion but a hideous reality. The hand of every man is against him. Waking or asleep, his life hangs by a thread. What is more natural, therefore, than that he seize any opportunity that offers to wreak his spite upon his enemies? Who can blame the rodent which gnawed through the insulation of a 30,000-kilowatt generator in the main Interborough power house at Fifty-ninth Street and the Hudson River, thereby causing a short circuit which resulted in the second most complete subway tie-up in the history of the city?

To a rat the men who seek to trap or destroy him because he wastes their substance are as sinister as any interests that ever set out on the trail of a public official. Lacking the gift of oratory with which to denounce these pursuers, without a stenographer to whom he could dictate denunciations of them, what was more reasonable than that he should avail himself of the only means at hand to "get back at them"?

To be sure, a subway tie-up of twenty minutes is not comparable to a subway tie-up of seven years. But a rat without official position, without a political organization or a Hearst newspaper behind him, without even a radio station through which to launch accusations against potential destroyers, can hardly expect to interrupt a city's transit system indefinitely. He can only do his poor best.

Had this spirited little creature been clothed with power, filled with the belief that he was being hounded not for his shortcomings but for his virtues, and inspired with an ambition to overthrow all who disliked him, he might have wrecked the whole plant and kept the people out of subways till an entire new equipment could be installed. He was, however, but a rat. And while he could not approach the record for subway holdups that will stand for all time, his was an achievement of which he has no cause to be ashamed.—Editorial from New York *Tribune*.

*Apropos of a tie-up on the lines of the Interborough Rapid Transit Company on the morning of Feb. 2.

"Friday the Thirteenth"

Eventful Day for Chicago in Purchase Negotiations Announced by Mayor Dever

"The money lenders are satisfied; for the city I can say we have driven a good bargain." With these words Mayor Dever of Chicago buried his threat to repudiate the recent appraisal of the Chicago Surface Lines and ended nearly a year of jockeying over the price to be paid by the city in the event of municipal purchase. The figure referred to is the 1907 compromise basis price of approximately $163,000,000.

The Mayor set Feb. 13 for the completed traction bill to go to Council for adoption. This will be too late for referendum at the Feb. 24 election. The purchase of the properties and the approval of the $500,000,000 traction plan will then have to wait for the judicial and aldermanic election of April.

No effort is made to conceal the chance of defeat at the polls, and this, the Mayor says by inference, is because of the good management under which the lines are being conducted. He said:

> And yet the people are skeptical. For many years the lines were terribly managed. The people are afraid to change—afraid of politics. But we have guarded them against that.

This ignores and at the same time answers William Hale Thompson, a bedfellow in demagoguery of Mayor Hylan of New York, who has a slate of aldermanic candidates out shouting of "Wall Street," "La Salle Street," the "interests," and what not in no way connected with taking a street car to work in the morning.

Mayor Dever said to bankers, that failure of the city plan would knock the bottom out of traction company finances and that there would not be a dollar toward paying the principal of $110,000,000 due in 1927.

George E. Brennan said he would put the Democratic party organization behind the purchase plan and drive it through.

Mr. Maltbie on Milwaukee's Proposed Franchise

W. H. Maltbie, consultant on public utility valuations, rates and taxation, Baltimore, has an extended article in the January issue of the *National Municipal Review* on the proposed service-at-cost franchise in Milwaukee. This franchise is to be submitted to the voters before adoption, and its principal terms were published in the ELECTRIC RAILWAY JOURNAL for Oct. 4, 1924, page 571.

In Mr. Maltbie's opinion, the chief interest in the Milwaukee franchise, which provides service at cost, is in the mutual concessions which have been made by the municipality and utility, in order to reach a working basis and in the safeguards that have been devised for the protection of the interests of both parties. On the other hand, Mr. Maltbie points out that the contract seems to provide no reward for efficiency. It does, however, work to the benefit of the city in that it reserves to the city the right of inspection of practices and to insist (subject to arbitration in event of dispute) on the adoption of new methods.

Indeterminate Franchise Sought in Oakland

The Key System Transit Company, Oakland, Cal., has started a campaign to secure an indeterminate franchise to replace the present short-term franchises, some of which will expire in 1933 and the remainder by 1936.

This question will probably be put up to the voters at the election in April and it is likely that until the matter is definitely settled none of the extensions recommended in the joint traffic survey, which has been in progress since last summer, will be built.

President C. O. G. Miller of the Key System says it is impossible to finance improvements in which a large amount of money is involved under short-term franchises. He says:

> The company is willing to make these extensions recommended by engineers appointed by the California Railroad Commission, the city of Oakland and the Key System provided the necessary funds can be obtained and provided a reasonable expectation can be indulged that the people from whom these moneys are obtained will be assured of an adequate return on the investment and the company assured of a continued right to operate the property under proper conditions for a proper length of time.
>
> We are ready, therefore, to co-operate with the public authorities of the East Bay cities and especially with those of the city of Oakland in the preparation of such franchise provisions as will receive the approval of the electors and adequately protect the public interest, while enabling us to meet the public demand for increased service.

No railway extensions have been made since the present Oakland charter was amended in 1917.

An amendment to the charter such as has been proposed has an excellent chance of passage at the polls, as most of the voters, realizing that the bay cities are growing rapidly, are willing to do almost anything in order to secure better transit.

The franchises of the Southern Pacific electric lines in Oakland expire on March 6, 1930. So far this company has made no announcement of future intentions, but it is likely that the company will stand with the Key System in seeking charter amendments.

The Southern Pacific electric service in the bay cities is practically all interurban; that is, between the various bay cities and their suburbs and San Francisco. That company has no feeder lines and recently abolished its Alameda service. Some extensions of this service have been talked of at various times, but it is certain that they will never be effected under the terms of the present Oakland charter.

Massachusetts Arbiters Refuse Wage Increase

The arbitration board has declined to increase the pay of employees of the Middlesex & Boston Street Railway, Newtonville, Mass., from the present rate of 55 cents an hour to a new level of 70 cents an hour. Judge Malcolm E. Sturtevant of the Somerville police court, chairman of the board, says that the trend of the cost of living is downward, and that the road cannot pay higher wages at present. The arbitration award will be binding until Dec. 31, 1925. The board favors an 8-hour day, but instead of fixing this limit leaves it to the company and union to settle. Miscellaneous employees are awarded overtime at the rate of 50 per cent extra for each half hour or fraction thereof. Pitt F. Drew, president of the railway, served with Chairman Sturtevant as one of the arbitrators. James H. Vahey was the carmen's representative on the board. He dissented from the decision.

Reorganization and Rehabilitation in Cincinnati Promised

If the proposed new 25-year traction ordinance is accepted by the city of Cincinnati, Ohio, the Cincinnati Street Railway will be reorganized and will launch a program that will include bus "feeder" lines and the operation by the company of the rapid transit system. Samuel Assur, vice-president of the Cincinnati Street Railway, has so advised the city administration. He pointed out that the reorganized company could finance such a program of improvement by issuing "modern first mortgage bonds from time to time when interest costs on the market are low." These bonds at reasonable rates of interest would provide funds for years to come.

With regard to rapid transit, Mr. Assur said that the passage of the new ordinance would mean that engineers would be employed at once by the company to make a traffic survey and an estimate of the cost of equipping and operating the "loop" upon its completion to Oakley. This would mean that the $6,000,000 "sunk in the loop by the city" would not become a total loss. Mr. Assur said that the loop could be made to co-operate with the present system so as to give rapid transit to many communities and that when the success of the loop had been established rapid transit should be provided for the western and extreme eastern suburban sections. Mr. Assur declared that the company would be able to operate under a 7½-cent fare, despite the predictions of the members of the citizens' traction committee to the contrary.

Bill Aims at Missouri Bus Jurisdiction

A bill was introduced in the Missouri Legislature on Jan. 21 to place motor transportation under the jurisdiction of the Missouri Public Service Commission. It provides a fee in addition to the regular motor licenses for the operation of the automobiles used in public service. The bill is broad in its terms and includes the St. Louis buses and service cars.

The Missouri Public Service Commission would, under the terms of the bill, govern the rates, operation and equipment of motor carriers and fix the tax which they would have to pay cities and counties in which they operate. Bus companies would not be permitted to operate without a certificate of convenience and necessity issued by the state board. Senator McCawley said the purpose of the bill was to protect the public and encourage responsible bus companies. The bus lines would be subject to periodical inspection, their load weighs regulated and they would be required to report regularly to the Public Service Commission.

West Side Project Advanced in New York City

The New York Central Railroad is ready to build without cost to New York City a $24,000,000 combined automobile express highway and elevated freight railroad along the west side of Manhattan from Seventy-second to Canal Street. In consideration of the improvement the New York Central would accept a readjustment of its rights and easements along its lines and in its yards.

Borough President Miller has been negotiating for 6 months with the New York Central. He took up with railroad executives the question of eliminating surface railroad operation by steam on Eleventh Avenue at about the time that he concluded negotiations for the opening of Depew Place—the bottle neck of Park Avenue at the Grand Central Terminal.

The city's chief gain from the elevated express highway and freight railroad, according to President Miller, would be the removal of the dangerous railroad tracks from the surface of Eleventh Avenue and the reclamation of 84 blocks of street surface for traffic. The removal of the tracks would eliminate 100 grade crossings and would provide an entirely new avenue connecting with the vehicular tunnels at Canal Street. The express motor highway would be on the roof of the elevated freight railroad.

Of the total cost of the project $13,000,000 is the amount for the freight railroad and $11,000,000 for the motor highway.

In commenting on the proposed undertaking President Miller, among other things, said:

> For 77 years the Hudson River Railroad has operated a steam surface railroad on west side streets. The dangerous condition ensuing and the deaths resulting from this operation were apparent from the start. For years State Legislatures, city officials, commissions, associations and many others have endeavored to abolish the tracks on "Death Avenue." In addition, the presence of the tracks and their noisy, unsightly operation casts a blight upon the west side of the city, and has greatly retarded the development of one of the most accessible districts in Manhattan, adjoining its most valuable waterfront.
>
> Under the plan now proposed the tracks will be taken off these streets; the entire district, which has long been stagnant, will develop commercially on account of the new facilities planned and the value of this great area of real estate will be enhanced.

In the official announcement no mention is made of the intended electrification of the lines, but the very nature of the improvement implies that this change will follow.

Bus Company Organized in Anderson, Ind.

Walter Shroyer, secretary-treasurer, Harry A. Nichol, general manager, and Arthur W. Brady, president of the Union Traction Company are the incorporators of the Traction Motor Transit Company, Anderson, Ind. While it is said that the purpose of the Traction Motor Transit Company is to operate a bus now in use between Fort Harrison and the Union Traction station, it was indicated by Mr. Brady that the company also will operate trucks. That the company would do so has been stated unofficially before.

Economic Marketing in Industry

Secretary Hoover Stresses the Place of the Technical Paper in the Business World

Economic marketing in industry, with particular stress laid on the help industrial and business papers may give in cutting the corners of waste in sales and distribution, was the general topic of discussion in a three-day convention of the business and editorial representatives of the fifteen publications of the McGraw-Hill Company, publisher of the ELECTRIC RAILWAY JOURNAL, which closed Friday night, Jan. 30, with a dinner in the Hotel Pennsylvania, New York. Reading of a letter from Herbert Hoover, Secretary of Commerce, in which that Cabinet official stressed the importance of the industrial and business publications as leaders in economic and industrial thought, was one feature of the banquet. Julius H. Barnes, formerly president of the Chamber of Commerce of the United States; Fred I. Kent, vice-president of the Bankers Trust Company, New York; David Sarnoff, vice-president and general manager of the Radio Corporation of America, and Fred M. Feiker, vice-president of the Society for Electrical Development, were the guest speakers.

Outstanding American industrialists took part in the sessions of the convention itself. Their talks followed closely the lines laid down for discussion and each speaker stressed important phases of the effort of the McGraw-Hill Company to develop to the maximum its program of service to industry in promoting economic and efficient selling and distribution methods. Facts brought out in the company's nationwide survey of the buying habits of industry were emphasized repeatedly in the convention and round-table group discussions.

The convention opened Wednesday morning, Jan. 28, with a discussion of the new era of sales development by James H. McGraw, president of the McGraw-Hill Company. There were talks by important industrialists, these including W. L. Batt, president of the S.K.F. Industries, Inc., and P. L. Thompson, advertising director of the Western Electric Company and a past-president of the Association of National Advertisers.

Secretary Hoover's letter, read at the dinner by Mr. Feiker, struck the keynote of the convention. He said:

> I wanted to attend your convention to say a personal word of appreciation for the fine service which you, your company and your publications are rendering to American industry. It is a real disappointment to me that I cannot come.
>
> A big change has come in the spirit of American business, and for this change you are in part responsible. I mean the change from rule-of-thumb and *laissez faire* to scientific determination of facts and programs of action based on facts. The business press is probably the greatest force in making industrial opinion. The schools and colleges have an important place, the trade associations can do much in the fields of production and distribution, the government bureaus that keep in contact with business can help to promote sound leadership in industrial and economic thinking. All have an important place, but the business press and technical journals are in a unique position and have a unique opportunity. I believe that no organization of technical publications has come nearer to living up to this opportunity than the McGraw-Hill publications under the leadership of James H. McGraw.
>
> The thought that I have in mind is that your great group of journals cannot only recognize and support sound industrial leadership, you can also initiate it. The field of your opportunity is practically limitless.

The objectives of the sales convention were outlined at the dinner by Malcolm Muir, vice-president of the McGraw-Hill Company, who also reviewed briefly the accomplishments of the three days of discussion. Edward J. Mehren, vice-president of the company and chairman of its editorial board, was toastmaster and spoke briefly at the close of the dinner, stressing the opportunities of the industrial press, as brought out in the convention, to serve the whole field of industry.

Service Must Be Cut or Fares Raised in Buffalo

Immediate reduction in service on the local lines of the International Railway, Buffalo, will be necessary unless a higher rate of fare is authorized at once by the Public Service Commission. Herbert G. Tulley, president of the corporation so stated in a formal notice served on the Public Utility Commission.

Mr. Tulley says that for the three years past the International Railway has been supplying a service which cost much more than the fares collected. In 1924 the cost of this service exceeded the receipts by $660,000. He says service has been made possible through liberal contributions from the owners, a condition which can no longer be continued. The company cannot this year commit itself to the expenditure of the $500,000 desired by the city of Buffalo in its track and repaving program until an increased fare has been authorized.

In a letter addressed by President Tulley to Mayor Frank X. Schwab, he says in part:

> It was from the first recognized by the railway that bus service on Delaware Avenue and Delavan Avenue would have to be run without a profit. The results show this to be the case. In our desire to do everything possible to secure your co-operation, we have been willing to add this deficit to the sum of our earlier losses, which have been occasioned largely through the Mayor's continued connivance with the enemies of the company in diverting every possible passenger to the irresponsible jitneys and in fighting against our every planned economy.
>
> The International has been operating a bus line in Bailey Avenue at a 7 cent fare with a loss of more than $2,000 a month. The company can, however, go no farther in this direction and has requested the Public Service Commission to at once permit collection of a 10-cent fare without which service must be soon discontinued.
>
> The city is desirous that the company shall this year spend about $500,000 for track replacement and paving. This, we shall be unable to undertake, unless and until increased revenue be received. Meanwhile the only expenses which we can undertake will be those necessary to the better protection of our passengers or in line with more economical operation.

President Tulley says that the operating deficit for 1924 has been increased to $1,660,000. He says a street railway must expect to give some non-paying service, but that when the operation as a whole results in a continuing deficit there is nothing to do but stop running the losing lines and continue the profitable ones.

Opposed to Fare Charge

Complaint has been made to the New York Public Service Commission by the municipal authorities of Buffalo against the practice of the International Bus Corporation, a subsidiary of the International Railway Company, Buffalo, of charging 17 cents for a one-way fare from the Kensington district to Black Rock and vice versa when passengers use the Delevan Avenue bus line across town. The bus company will not issue a transfer to a passenger after a transfer has been tendered for a fare. When passengers are required to use a street car to reach the bus, a second transfer from the bus to another car line is denied.

Mayor Frank X. Schwab, at the request of associations of business men and taxpayers in Buffalo, asked Herbert G. Tulley, president of the bus and traction companies, to make this adjustment, but the company says it is a problem for the Public Service Commission. The city authorities also have asked the commission to order the bus company to allow children in arms to ride free when not occupying a seat. The company now makes a charge of 10 cents for children in arms whether occupying seats or not.

Virginia Commission Denies Petition

The Virginia Corporation Commission recently denied the petition of the Alexandria Suburban Motor Vehicle Company, a subsidiary of the Washington-Virginia Railway, to operate bus lines as feeders. At the same time the commission allowed the petition of Robert L. May for a certificate to operate a bus system between Washington and Alexandria.

The railway proposed 24 round trips a day on its feeder lines, while it was brought out that the May system of buses was operating 64 round trips a day and giving adequate service. It was further testified that if the electric railway ceased operation the bus system could handle the traffic. For the past seven months Mr. May has been operating buses under the name of the Alexandria, Barcroft & Washington Bus Lines.

A meeting of the bondholders' committee of the Washington-Virginia Railway will decide this week the fate of the company. Whether the road will be reorganized or definitely pass out, as a means of transportation in and near the Capital City, will be settled. Arthur L. Reynolds, receiver for the company, said that there were two courses open. One is that the bondholders will effect the reorganization of the road on the basis of its present physical valuation, and the other is for complete junking of the line and its abandonment as a carrier between Washington and near-by Virginia. He places a physical valuation of the road as a growing organization at about $4,500,000. He said if the road were junked about $700,000 could be obtained by sale of equipment. A bondholders' committee has been formed and Day & Zimmermann have been retained to investigate the engineering phases of the road's operation.

News Notes

Fares Advanced. — Electric railway fares in Athens will be advanced to 10 cents for one cash fare, with two tickets for 15 cents in the near future. An announcement to this effect was made recently following approval of a petition from the Athens Railway & Electric Company to the Georgia Public Service Commission. As an offset to the advance in cash fares, the Athens Railway & Electric Company will offer a weekly pass book, good for all members of the family, for $1.

Inspection Trip Over New Extension. —The first train over the Niles Center extension of the Chicago, North Shore & Milwaukee Railroad and the Chicago Rapid Transit lines carried a party of about 50 officials of the companies and of the towns served on Feb. 1. Operation over the new road will be started within a short time. The trip was in the form of an official inspection tour and took place just 10 months after work was begun on the branch, which is 5 miles in length. The extension has eight stations, underground, elevated and surface tracks, new catenary trolley wire suspension and many other modern types of construction.

"What Would You Do" Again Asked. —E. M. Walker, president of the Schenectady Railway, Schenectady, N. Y., had reproduced in the Schenectady *Union-Star* of Jan. 28 an editorial entitled "What Would You Do?" This editorial appeared in a recent issue of the Philadelphia *Public Ledger* following the recovery of the company from the difficulties accompanying a heavy snowstorm. The editorial was the subject of comment in the ELECTRIC RAILWAY JOURNAL.

Car Riders Entertained by Transit Guest.—The "Transit Guest" will appear each month in the car racks of the Pittsburgh Railways, Pittsburgh, Pa. The paper will keep the residents of the city informed of the aims and performances of their railway property. The premier number, under date of Jan. 1, gives a few important points on the boarding of cars and also the accomplishments of the company during the past 11 months. The columns of the "Transit Guest" will be open to the public to address the editor on any subject relating to public utilities.

Fare Lowered. — The Connecticut Company, operating buses between Hartford and New Britain, after a conference with the Public Utilities Commission, has reduced the fare between these two points from 33⅓ cents to 25 cents, which is a three-token ride. The commission ordered the Connecticut Company to extend the first fare zone out of New Britain to Isbell's Corner, an addition of about 1 mile, effective Feb. 1.

Buses as Auxiliaries.—Bus service to the Mordecai development and to Roanoke Park was put into effect recently by the Carolina Power & Light Company, Raleigh, N. C., according to an announcement by Paul Tillery, general manager of the company. Two White buses are operating and a third is on the way. Buses and railway fares are the same, but there is a 2-cent transfer charge between buses and street cars. The cash fare is 8 cents or two tickets for 15 cents. School tickets are good on the buses, but the regular transfer change applies. The application to operate buses was made to the City Commissioners and was immediately granted. Mayor E. E. Gulbreth made it plain that the company was granted a license and not a franchise. Under this arrangement either the city or the power company may discontinue the buses when either party sees fit. The plan is to extend the service to other sections of the city if it proves successful.

Higher Fare Extended.— At an executive meeting of the Public Service Commission, held on Jan. 28, the 7-cent fare for the Binghamton Railway, Binghamton, N. Y., was approved, effective Feb. 1, 1925. The old fare was 6 cents, and since 1920 has been continued from year to year by the city and the commission. The city's consent to the proposed renewal was given some time ago.

Terms of Wage Advance Accepted.— Herbert G. Tulley, president of the International Railway, Buffalo, N. Y., has announced that exactly 99.6 per cent of the employees of the company have agreed to the terms of a wage increase, made on condition that the money be converted to the purchase of the company's bonds and stock in furtherance of its policy of employee ownership. This is the second increase of its kind. The wage increase for 1925 is 3 cents an hour payable after the company earns and pays the 5 per cent interest on its bonds. The basic wage will continue at 55 cents an hour. It is said that the co-operative wage fund has been used to purchase $220,000 of bonds at 50 and 9,000 shares of stock at an average of $10 a share.

Higher Fare Allowed.—On the showing of the company that it could not operate profitably on a 7-cent fare and consent having been given by the city of Newburgh to an increase to 10 cents the Public Service Commission on Jan. 29 authorized the Newburgh Public Service Corporation to put into effect a fare of 10 cents on its bus lines. Eleven tickets will be sold for $1 and school tickets for children only at the rate of 14 for $1. The new rate is effective Feb. 1 and will continue for one year. The application of the company was referred to previously.

Interurban Fares Reduced. — Announcement has been made by the Pacific Northwest Traction Company of a reduction of interurban fares to all points south of Everett, Wash., as far as Beverly to a flat 10 cents, with slight reductions in cash fares from Everett to Alderwood Manor. One-way cash fare to Beverly has heretofore been 12 cents. Action of the company is based upon acquisition of the tracks of the local street railway from the interurban station to the city limits. Transfers to local lines by cash fares will be abolished, but transfers will be continued for those using 30 ride books. The price of 30-ride books, now in effect between Everett and Seattle, will be reduced 80 cents a book.

Buses Put in Operation.—Buses were put into operation on Feb. 1. on Broadway, Cambridge, Mass., between Kendall Square and Harvard Square by the Boston Elevated Railway. Fares will remain 10 cents for through trips and 5 tickets will be sold for 30 cents for local use.

Interurban Service Supplied by Buses. —Interurban service on the Aurora-Yorkville line of the Aurora, Elgin & Fox River Electric Company, Aurora, Ill., has been supplanted by buses. J. F. Egolf, general manager, announced that the interurban line south of Montgomery would be dismantled. The new buses are Whites with special Shaffer bodies. Each has a seating capacity of 25. The new schedule provides for bus service on both sides of the river.

Petitions for Rehearing.—The City Council of Buffalo has petitioned the New York State Public Service Commission for a rehearing on the application of the municipal authorities for an order prohibiting the operation of one-man cars on local lines of the International Railway. The city contends figures presented by the traction company witnesses showing the percentage of accidents to car-miles on one- and two-man cars were not accurate and tended to mislead the commission. The company's figures showed a fraction of 1 per cent more accidents with one-man cars than with the full crew cars.

Traction Company Accepts Council's Proposals.—The Rockford City Traction, Rockford, Ill., has presented a franchise to the City Council adapted in its principal provisions to many City Council suggestions. This action threatens to involve the Council in a lengthy battle because of the franchise submitted earlier by T. M. Ellis, Jr., representing the newly formed Rockford Public Service Corporation. The traction company's franchise accepts Mayor Hallstrom's recommendation of a wage board of local citizens, investment of State Commerce Commission with right to fix liability for share of costs in remodeling or building bridges and accession of a tract of land at First Avenue and Kishwaukee Street to the city. Some revisions in routes are included. The traction company first objected to a referendum as unnecessary, but in its draft accepts such action.

Fare Increase Under Consideration. —The State Railroad Commission will decide soon whether or not the Beloit Traction Company, Beloit, Wis., is entitled to the 2-cent fare increase it is seeking. Traction officials pointed out that Beloit is the only city in the state with a 5-cent fare and a 4-cent book rate.

Complaint Against Increase Dismissed.—The complaint of the Mayor and City Council against the increase in street car fares in Johnstown, Pa., charged by the Johnstown Traction Company has been dismissed by the Public Service Commission. The new tariff, which has been effective since early last fall, raised the price of a single trip from 7 to 10 cents, but tokens are sold at the rate of four for 30 cents, making the new rate for regular passengers 7½ cents. The rates on the Windber cars and on the bus lines remain at 10 cents.

Financial and Corporate

Interurban Reorganization Planned

Indiana Road to Pass to Insull Control —Rehabilitation and Change from A.C. to D.C. Contemplated

A proposed plan for the reorganization of the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., improvement of that property and the turning of its management over to Samuel Insull and associates is being submitted to the bondholders by a "first lien holders" committee in Cleveland. After the plan is approved by the bondholders, the legal proceedings carried to a successful conclusion and the program finally approved by the Public Service Commission, the new company will work out a program which will include changing the present alternating-current electrification of the railroad to direct current.

The South Bend line, a 125-mile electric railroad, runs between Chicago and South Bend, Ind., by way of Hammond, East Chicago, Gary and Michigan City. The Chicago terminus of the line is at Kensington, but trains are run downtown over the Illinois Central suburban service tracks. No change in the present plan of operation is contemplated.

The railroad has been operated at a loss for several years. According to the bondholders' committee, new financing is necessary in order to improve the property and put it in a position to give better service.

Entire Plan Still Tentative

Mr. Insull and associates already are interested in the operation of other public utility properties in the territory served by the railroad. The Northern Indiana Gas & Electric Company, of which Mr. Insull is president, serves several of the cities through which the railroad passes, and the Calumet Gas & Electric Company, of which Mr. Insull is also president, serves the adjacent territory. Naturally he is interested in the growth and development of the territory because of the operation of these properties, and has agreed to take over the management of the railroad provided the plan of the bondholders' committee is carried to a successful conclusion.

The entire plan, however, is at present in a tentative state. To be effective it must first be accepted by the bondholders, foreclosure proceedings must be prosecuted through the courts, and, finally, the whole plan must be approved by the Public Service Commission of Indiana. If the bondholders' committee is successful in carrying out the various details of the plan, the management of the property will then be assumed by Mr. Insull and associates. No detailed plans for the rehabilitation of the property have been worked out as yet, as control of the property cannot finally pass to Mr. Insull and associates until all details of the reorganization plan have been accepted by all parties concerned.

The bondholders' committee is composed of Harris Creech, president of the Cleveland Trust Company; John Sherwin, chairman of the board of the Union Trust Company; Warren S. Hayden, of Hayden, Miller & Company; J. R. Nutt, president of the Union Trust Company, and H. P. McIntosh, chairman of the board of the Guardian Trust Company, all of Cleveland. It is understood that the Cleveland Trust Company as trustee for the bondholders will shortly file a foreclosure suit.

The company has $4,776,000 of bonds outstanding, nearly all controlled by Cleveland men.

After a hearing in the foreclosure proceedings, the plan contemplates that the property will be sold under a foreclosure order to the new company which will be organized under the laws of the State of Indiana, and that application will be made to the Public Service Commission of Indiana for authority to issue the following securities:

First or first and refunding mortgage bonds.
Cumulative preferred stock.
Second mortgage, 6 per cent bonds aggregating $250,000.
Adjustment mortgage bonds aggregating $1,750,000 maturing in fifty years.
100,000 shares of common stock of no par value.

The first or first and refunding mortgage bonds will be sold to provide funds for re-electrification and other improvements necessary to enable the railroad to give improved service.

The cumulative preferred stock will be issued to raise funds for the same purposes and also to provide money for general corporate purposes.

If the plan is carried out, the second mortgage and adjustment mortgage bonds will be turned over to the "first lien holders" committee for the benefit of the present bondholders.

Boston "L" Has Largest Business in 1924

The Boston Elevated Railway, Boston, Mass., is operating to its financial advantage at the present time, but it lost $336,696 during the fiscal year ended Dec. 31, 1924. Its losses were incurred during the first 10 months. Since Nov. 1 there has been an excess of receipts over the cost of service. The business of the Elevated during 1924 was the largest in the history of the company, both in the matter of total number of passengers carried and the total revenue. Such are the outstanding facts in the annual report which the public trustees of the road have submitted to the Legislature. Owing to the increases in wages, ordered in arbitration proceedings, the operating labor cost of the past calendar year amounted to $17,358,670, an increase for the year of $1,134,394.

Following the latest wage increase the company announced an increase in its 5-cent fares to 6 cents, and the trustees believe that this extra cent will aid largely in meeting the extra cost, as riding does not appear to have diminished. They express the opinion that by the end of the fiscal year, June 30, the receipts will at least equal expenses.

Totol receipts in 1924 were $34,175,319 and the cost of service was $34,812,016. The number of revenue passengers carried was 382,888,848. During 1924 there were 739,151 more revenue passengers carried than in 1923. Passenger revenue mileage was increased by 1,939,014 miles, in large measure due to increased use of one-man cars, which permitted an increased service without corresponding increase in cost. The one-man car and bus miles amounted to 31.7 per cent of the total surface miles operated. The increase in revenue passengers occurred on weekdays and Saturdays, there being a decrease of traffic on Sundays and holidays.

The operation of buses was increased. The miles covered in 1922 were 63,937 in 1923, 465,382, and in 1924, 890,901.

The accident record of the year has shown improvement. Operating expenses on this account were lowered from $975,021 in 1923 to $914,043 in 1924. Accidents per 1,000,000 miles operated with one-man cars were reduced from 230 in 1923 to 205 in 1924. Accidents per 1,000,000 miles operated with two-men cars were reduced from 259 in 1923 to 249 in 1924.

Supreme Court Holds Combination Is Not Illegal

Monopoly in the control and distribution of electric power in the State of Tennessee was held to be authorized by the statutes of the state by the Supreme Court, Jan. 24, in the case of the state on the relation of the Attorney-General vs. Nashville Railway & Light Company, et al.

This suit was instituted to dissolve a combination which had been effected between the Nashville Railway & Light Company, the Chattanooga Railway & Light Company, the Tennessee Power Company and the Chattanooga & Tennessee River Power Company, the voting power of all of which corporations had been by various purchases and arrangements vested in a holding company, called the Tennessee Electric Power Company of Maryland. By this combination the holding company had acquired control and indirect ownership of the hydro-electric power plants on the Caney Fork, Ocoee and Tennessee Rivers, and, as found by the court, had effected a unity of control in the distribution of electricity within all of the territory of Middle and East Tennessee covered by the transmission lines of the power company.

The Supreme Court was of the opinion that the statute creating the Public Utilities Commission and other statutes regulating public utilities and authorizing the organization and combination of public utilities companies have the effect of expressly authorizing monopoly in the production and distribution of electric power and service under the control of the Public Utilities Commission, which approved the combination under attack. The Su-

preme Court held, therefore, that the anti-trust laws forbidding combination in restraint of trade do not apply to the control of electric power.

The opinion of the Supreme Court in this case was delivered by Justice Cook, affirming the decree rendered by Chancellor James B. Newman of Nashville.

Wants to Abandon Portion of Tracks

The Westchester Electric Railroad, New York, N. Y., has filed with the Public Service Commission a petition for permission to abandon a portion of its route and franchise in the village of Tuckahoe on Yonkers Avenue and a portion on Main Street. A declaration of abandonment was adopted by the stockholders of the company on Dec. 24. The route of the Westchester company connects at the Bronx River with the route of the Yonkers Railroad on Tuckahoe Road in Yonkers.

The petition states that it is impracticable to make a physical transfer of passengers at the Bronx River, with the result that the Yonkers Railroad has been operating its cars over the Westchester company's Tuckahoe line beyond the tracks of the New York Central to Waverly Square in the village of Tuckahoe. The Yonkers company has applied for permission to abandon the portion of its route which is on Tuckahoe Road in Yonkers east of Nepperhan Station, and the Westchester company's petition sets forth that if this petition is granted there would be no longer any public convenience or necessity requiring the operation of its route on Main Street and Yonkers Avenue, Tuckahoe, between the New York Central tracks and the Bronx River. Convenience of the public would be better served, the company says, if any bus franchise granted for service on Tuckahoe Road in the city of Yonkers were extended along Yonkers Avenue and Main Street, Tuckahoe, to the New York Central Station.

Reorganization of Northern Ohio Electric Corporation Approved

At a meeting of the stockholders of the Northern Ohio Electric Corporation held on Jan. 27 there were represented 119,738 shares out of 135,000 shares of preferred and common stock outstanding. The plan for reorganization of the corporation, dated Dec. 30, 1924, and the contract for the sale of all of its assets in accordance with that plan were approved. The vote was 119,510 shares for and 228 shares against.

As 87.66 per cent of the outstanding stock has been deposited under the plan and 2.51 per cent additional has been pledged for deposit, a total of more than 90 per cent, the plan has been declared operative, subject to (a) the receipt of opinion of counsel approving the transfer of assets of the Northern Ohio Electric Corporation to the Northern Ohio Power Company and all legal details in connection therewith; (b) the payment for new securities of the Northern Ohio Power Company by the subscribers and underwriters, and (c) the delivery to depositaries of the securities of the new company called for by receipts issued by such depositaries.

Subscriptions aggregating $1,766,200 were received from depositors of preferred stock and these subscriptions will be allotted in full on the basis stated in the plan. Deducting this amount from the $2,800,000 offered for subscription leaves $1,033,800 applicable to the 75,000 shares of common stock as outlined in the plan, or $13.79 per share on which basis allotments will be made in amounts of $100 or multiples thereof, on subscriptions received from common stock holders.

In all cases where subscriptions were made on the full payment basis a call has been made for full payment on Feb. 18, 1925, and in all cases where subscribers elected at the time of making subscriptions to pay in installments a call of 15 per cent of the subscription allotted has been made, payable on Feb. 18, 1925, and for the payment of the remaining installments of 25 per cent each on April 1, 1925; June 1, 1925, and August 1, 1925.

The assets of the company taken over consist practically of all the outstanding $10,000,000 of common stock of the Northern Ohio Traction & Light Company, which operates the city lines in Akron and an extensive system of interurbans.

Is San Francisco's Municipal Line Profitable?

San Francisco officials are at odds over the question as to whether or not the Municipal Railway is being operated at a loss. Supervisor J. B. McSheehy charges that the present system of handling the depreciation fund has made it appear that the road is losing money, whereas the road is making a net profit of $41,000 a month. According to Mr. McSheehy, the depreciation fund is being diverted from its rightful purpose and being used for the construction of extensions.

The supervisor quotes figures to show that since the start of the road 12 years ago revenues have been $25,942,219, with operating costs of $17,541,623, leaving a gross profit of $8,200,597. In addition, according to Mr. McSheehy, payments on account of funded debt have been $2,374,962 and disbursements for accidents and damages $258,708, leaving a net profit of $5,466,927 for the 12 years.

This profit, Mr. McSheehy claims, has been entirely depleted by bond redemptions, loans to the general fund and additions and betterments. He urges as a remedy for this condition the establishment of a depreciation fund by setting aside 3 per cent of the road's gross passenger revenue.

Supervisor Shannon is not so sure about the feasibility of this plan. M. M. O'Shaughnessey, city engineer, is studying plans for six extensions made necessary by the recent growth in population. These improvements cannot be long delayed if proper service is to be maintained. Mr. Shannon is of the opinion that a bond issue may be necessary to expedite the construction of these extensions unless the McSheehy plan is found feasible.

There are other elements in the city that claim that the road is steadily losing money and that it will be necessary to raise fares to the 6-cent level to make the road pay.

This conclusion is assailed by the carmen, who have asked for an increase in pay, and is also frowned on by most of the supervisors, many of whom will come up for re-election in the spring. The labor element is with the carmen. It favors the McSheehy plan to establish a 3 per cent fund taken from the gross passenger revenue.

Supervisor Ralph McLeren, it must be remembered, has a plan that calls for the establishment of a 4 per cent fund.

These plans are all held in abeyance pending the report to be made by the city engineer after he has studied the immediate needs of the city, has estimated their costs and has made his recommendations.

Issue of Stock Approved.—The Board of Public Utility Commissioners of New Jersey has approved the application of the Atlantic Coast Transportation Company, Asbury Park, N. J., to issue $1,000 of capital stock. This is a bus line controlled and operated by the Atlantic Coast Electric Railway.

Reduced Valuation Case Scheduled.—The suit of the city of Rochester, N. Y., to reduce the valuation of the Rochester lines of the New York State Railways under the service-at-cost contract is scheduled to come up in Equity Term of the Supreme Court early in March. Justice John B. M. Stephens will preside.

Wants to Abandon Line.—The North Randall Railway, Cleveland, Ohio, recently applied to the Public Utilities Commission at Columbus to abandon its line from the end of the Broadway city line to the North Randall racetrack. Win L. Kinnan, president, said that the company lost $1,600 last summer, was now losing $700 a month, and owed the Cleveland Railway, which operates it, $30,000.

Revenues Decreased.—A decrease of $211,543 in revenue compared with 1923 is the result of 1924 operation of the Oklahoma Railway, Oklahoma City, Okla. The city lines received $133,622, or 14.2 per cent less than in 1923, while the decrease on the interurban operation was $77,921, or 12.81 per cent. Revenues for December, 1924, shows an increase over December, 1923, attributed to the extreme cold weather.

Authorizes Stock Sale.—The Alabama Public Service Commission has recently granted permission to the Birmingham Electric Company, Birmingham, Ala., to issue and sell 70,000 shares of non-par value preferred stock, paying annual dividends of $7 a share. The stock is to be sold so as to net not less than $90 and accrued dividends per share. Proceeds of the sale will be used to pay for various improvements.

No Fatal Accident in Altoona.—The Altoona & Logan Valley Electric Railway, Altoona, Pa., during 1924 carried 18,949,702 passengers without a single fatal accident, according to the annual report of S. S. Crane, general manager. A total of 679 accidents was reported, of which 553 were due to automobiles backing on the track or "beating" a car to a corner. The company owns more

than 58 miles of car line and during 1924 operated 2,883,000 car-miles. The payroll for the year was $589,358, with an expenditure of $167,349 for track maintenance and $80,167 for equipment maintenance.

Extra Dividend by Holding Company.—The Railway, Light & Securities Company, Boston, Mass., has declared an extra dividend of $1 a share on the common stock and the regular semi-annual dividends of $3 a share on the common and preferred stocks. The dividends were paid on Feb. 2 to holders of record of Jan. 15.

Seeks Authority to Remove Trackage.—The Pacific Electric Railway has applied to the California Railroad Commission for authority to abandon and remove its tracks on the West Colorado Street and Orange Grove Avenue line, Los Robles Avenue and Washington Street line and the California Street line in the city of Pasadena. Motor coach service has been substituted.

Report on Electric Roads Tax Returns.—Of the 138 electric railroad companies making income tax returns in 1922, 62 paid cash dividends during the year of $11,904,765. With 38 companies which did not pay cash dividends they had surplus and undivided profits at the close of the year of $42,599,884. The net taxable income reported by the 138 concerns was $25,570,140.

Asked to Deposit Bonds Separately.—Holders of both the 5 per cent first mortgage bonds of the Indianapolis Northern Traction Company and 5 per cent general mortgage bonds of the Union Traction Company of Indiana are being asked to deposit the bonds with separate depositaries. This request is made so that committees may be appointed to conserve the interests of the holders of the respective bonds.

Wires But Not Tracks Removed.—Samuel Goldman, Woonsocket, R. I., who purchased all the equipment of the Medway & Dedham Street Railway, Dedham, Mass., which suspended operation several weeks ago, has completed the work of removing all feed wires. No plans have been made for removing the rails because the towns through which the trolley passes have declared that if they are removed the streets will have to be restored at the expense of the person who removes the rails.

December Shows Profit.—Profits of approximately $69,000 in excess of expenses are shown in the report for December, 1924, filed by the Cincinnati Traction Company with W. Jerome Kuertz, Director of Street Railroads of Cincinnati. The receipts from all sources aggregated $848,264, while the total expenditures were $779,180. The expenditures were as follows: Operations, $484,970; taxes, $68,154; deductions and bonds, $16,150; rentals and leases, $104,030; interest and sinking fund, $40,842; return on capital, $134,117. Of the last item $35,043 was for December and the remainder represents payment on account due the company as return on capital provided for under the present ordinance. There is still due the company $181,287. The company recently borrowed $437,500 to pay the franchise tax due the city from October, 1923, to Dec. 31, 1924.

Preferred Stock for Sale.—A syndicate headed by Dillon, Read & Company, New York, is offering at $100 per share to yield 7 per cent $3,000,000 of 7 per cent cumulative first preferred stock, known as series A, of the Ohio Public Service Company, Mansfield, Ohio. Among its properties this company operates the city lines in Mansfield and the interurban lines connecting Mansfield and Shelby.

Net Income Increases.—For the 6 months period ended Dec. 31, 1924, the total operating revenue of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was $21,448,951, against $19,576,898 for a similar period in 1923. The expenses increased from $13,001,474 for the last six months of 1923 to $13,968,699 for the last six months of 1924. The net income, however, increased. It was $1,836,712 for the 1923 period and $2,598,518 for the period from July to December, 1924.

Massachusetts Road Does Better.—The Gardner-Templeton Street Railway, East Templeton, Mass., is now free of debt. On Aug. 1, 1924, the line was $3,000 in debt. In December the road cleared $1,026 above expenses. Checks have been sent out paying every debt of the company, according to Edgar A. Shepardson, Baldwinville, the acting president. The company expects two new cars soon as part of the equipment included in its modernization plan. The tracks were all put in good condition during the summer and fall.

Buses May Be Substituted. — The Black River Traction Company, Watertown, N. Y., is reported to have offered to buy the fleet of buses, garages and equipment of the Watertown Transportation Company. The railway's apparent intention is to replace the trolleys with buses.

Net Income Increases.—For the 12 months period ended Dec. 31, 1924, the Philadelphia Rapid Transit Company, Philadelphia, Pa., had a net income of $1,810,365. The year before the net was $1,800,000. The passenger revenue increased from $44,249,361 to $45,002,700 for the 12 months period of 1924. The passengers carried showed a falling off —the number being 917,787,235 for the period from January to December, 1923, and 909,303,945 for the period of January to December of last year. Following the meeting of the company in March a more extended review of the operations during the past year will be given.

Traffic and Revenue Decrease.—The gross income of the Grand Rapids Railway, Grand Rapids, Mich., during the past year was $672,157, a decrease of $24,263 over 1923. Passenger revenue in 1924 totaled $1,719,562, a decrease of $34,738. Passengers carried totaled 24,825,018, a decrease of 3,733,839 over 1923. Car mileage during 1924 totaled 3,727,767 miles. The equalization account at the end of the year showed a deficit of $143,081.

Receipts Show Falling Off.—Receipts of the street railway department of the Georgia Railway & Power Company, Atlanta, Ga., decreased at the rate of $1,200 a day during the last 6 months of 1924 as compared with a similar period in 1923. The total decrease was $221,022 compared with a similar period in 1923. For the first 6 months of 1924 receipts were $9,072 less than for the first half of 1923, making a total decrease of more than $230,000 in receipts for the year as compared with receipts in 1923. Officials estimate that the railway department of the Georgia Railway & Power Company carried 3,361,410 fewer passengers in 1924 than it did in 1923, and attributed this loss largely to unregulated jitney and bus competition.

Company in New Hands.—Acquisition of the properties, rights, privileges and franchises of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., by the Mississippi Power Company was announced recently. The consideration was not made public. The traction company, a $2,000,000 concern, operates 30 miles of car tracks in Harrison County and furnishes illuminating current to Gulfport, Longbeach, Mississippi City, Biloxi, Pass Christian and Ocean Springs. Barney E. Eaton, general attorney for the Gulf & Ship Island Railroad Company, is president of the Mississippi Power Company.

Opposes New Power Line.—The Holyoke Water Power Company maintains that it is the logical concern to supply power to the Holyoke Street Railway, Holyoke, Mass., and will oppose the entrance of the Turners Falls Company into its territory. Consequently the question has gone to the Massachusetts Department of Public Utilities. Some time ago the stockholders of the Holyoke Street Railway ratified the action of the board of directors in arranging for the sale of the railway power plant to the Turners Falls Power Company. The terms of the agreement were mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 22.

Six-Month Period Shows Deficit.—The total revenue of the Interborough Rapid Transit Company, New York, N. Y., for the 6 months ended Dec. 31, 1924, was $28,552,713, an increase of $469,792 over a similar period of 1923. The operating expenses, including taxes and rentals, were $18,967,226, a decrease of $428,608 over the 6-month period ended Dec. 31, 1923. The income available for all purposes was $9,004,927. In the similar period of 1923 the income was $7,247,292. After the consideration of fixed charges, reserve and dividend rental the result showed a deficit of $248,517. The balance in the period from July to December, 1923, was an increase of $1,278,650 over that figure.

Deposits Increased.—For the year ended Dec. 31, 1924, the co-operative welfare association saving fund of the Philadelphia Rapid Transit Company, Philadelphia, Pa., showed receipts of $1,789,209. The total disbursements were $1,762,243. The cash balance on Dec. 31, 1924, was $26,966. The cash balance on Jan. 1, 1924, was $9,899. Interest at the rate of 5 per cent per annum credited to depositors' accounts for the year 1924 amounted to $98,319. Mr. Farley, president of the association, told fellow directors at the close of his term as president that the deposits had increased more than $200,000 during the year just ended. At the same time the membership in the fund had increased more than 1,400, to 9,792.

Legal Notes

CALIFORNIA. — *Negligence of Employer of Injured Person Not a Defense.*

The employee of a gas company, while laying pipe in the street, was injured by a trolley car. Damages were collected by his heirs from the gas company under the workmen's compensation act and suit was then brought against the railway company for a larger amount. The court held that on any damages collected from the railway company, the gas company had a first lien up to the amount paid to the employee under the compensation act, but that the railway company could not interpose as a defense the contributory negligence of the employer in order to defeat the plaintiff's claim to the extent of the amount of compensation paid by the employer under the compensation act. (Milosevich et al. vs. Pacific Electric Railway, 230 Pacific Rep., 15.)

CONNECTICUT.—*Burden on Plaintiff to Show Liability Under Last Clear Chance Doctrine.*

A person was killed at night while on trolley tracks which were close to the traveled portion of a country road. To warrant the assessment of damages against the company, the burden of proof is on the plaintiff to show that the motorman ought to have become aware while there was time to avoid accident of the presence of the deceased on the track. (Polna vs. Connecticut Co., 126 Atlantic Rep., 529.)

GEORGIA.—*Franchise Ordinance Which Was Accepted Held to Be Enforceible Contract.*

A franchise called for the construction of electric railway lines in a city and suburbs and also provided for a gas and electric service. The latter was profitable, but the company did not build the suburban railway extension specified. It put on a bus line in its place and claimed that the State Railroad Commission had jurisdiction in the case. The position of the city, demanding complete compliance with the franchise, was upheld. (City of Spartanburg et al. vs. South Carolina Gas & Electric Co. et al., 125 Southeast Rep., 295.)

MASSACHUSETTS. — *Contract by Street Railway to Pay Annual Sums for Locations Held to Relate to Taxation and Be Invalid.*

In 1902 a railway agreed to pay a town $900 annually "with such sum in excess thereof as would equal its excise tax payable to said town for all its tracks therein located in public ways." A considerable part of the line was on private right-of-way, but later, it absorbed a local railway with considerable track on the highway. Up to 1920, the amount levied and paid as an excise tax on the combined property exceeded the sum of $900 a year. In 1919 the legislature passed a statute that no further excise taxes should be collected of street railway companies. The town attempted to collect from the company after that year on the ground that the payment was not an excise tax, but the court decided otherwise, and held that taxation is a function of the general legislative department of the state, and laws established by it cannot be waived or changed by municipalities or their officers. (Inhabitants of Southborough vs. Boston & W. Street Ry., 145 Northeast Rep., 422.)

MASSACHUSETTS. — *To Move Car from One Berth to Another Not Negligent.*

The plaintiff was waiting on a subway station platform when the car she expected to take stopped at one berth, but before the doors were opened, it moved to another berth. The plaintiff was thrown down and injured by the crowd which rushed first to the first boarding point and then to the second, but no negligence on the part of the company was shown. (Alward vs. Boston Elevated Railway, 125 Northeast Rep., 332.)

MICHIGAN.—*Decision of Public Utility Commission Upheld in Telephone Case.*

A public utility company is entitled to earn enough to meet the continuous depreciation of its plant and equipment and to provide funds from earnings to offset this depreciation. Such a fund is the property of the utility, and it has the right to invest this fund and earn on it, and such fund should not be deducted from present fair value in fixing a rate base. Upon the issue of confiscation in the fixing of rates, a federal question, decisions of the United States Supreme Court control. The allowed rate of depreciation, 4 per cent on total fair value, less land and right-of-way, though small, was not confiscatory. (Michigan Public Utilities Commission vs. Michigan State Tel. Co., 200 Northwest Rep., 750.)

MISSOURI. — *Police Patrol Wagon Has Paramount Right of Way.*

A police patrol wagon, answering a call, approached a place on the street where there were island platforms for the use of street railway passengers. The driver of the patrol wagon would have kept on the outside of the island platform on his side of the street except that the street was very narrow at this point because of building operations and a pedestrian attempted to cross in front of the wagon. It was therefore turned into the space between the loading platforms and struck a street car coming in the opposite direction and just entering its berth. The company was held responsible because the motorman of that car should have stopped it at the approach of the patrol wagon. (Hogan vs. Fleming et al., 265 Southwest Rep., 875.)

VERMONT—*Priority of Claim Against Insolvent Railway Company.*

The Supreme Court of Vermont ruled as follows in regard to various claims against an electric railway company in the hands of a receiver. The franchise required the company to pave the track area and authorized the city to do the work and charge the cost to the company if the company failed to do so. It did not provide for any special lien on the company's property, in case the company failed to pay for the work, but the company had to file a bond with the council, conditioned upon the faithful performance of its duties and obligations under its franchise. This bond was filed for the company before it became insolvent by a surety company, which recompensed the city for its paving charges after the company became insolvent and then set up a claim for priority of this indebtedness because of its nature. This claim was brought in the name of the city but its priority was denied by the court. The claim of the state of Vermont for taxes, based on the value of the company's property which included franchise rights, was held entitled to priority in receivership proceedings. An injured passenger who had attached property of the railway was held to have a lien prior to existing mortgages thereon, under the Vermont statute. The principal other claims were those of a power company, which owned approximately 90 per cent of the capital stock of the railway company, and sued for payment on various claims. It was shown that practically all of the directors and to some extent the other officers of the two corporations were the same persons during the time that the claims of the power company accrued. One of these claims was for office rent and office accounting; another was for expressage, freight, labor and supplies. Another was for power furnished. Another was for funds advanced. All of these claims were judged according to the criterion of whether they were "services rendered or materials furnished for the purpose of keeping the road in repair or in running the same." Tested by this rule, office rent, clerk hire, bookkeeping, funds advanced, and express and freight charges paid were classified by the court as unsecured claims, but electric current for power and lighting was classified as material furnished and received preference. Other lesser claims not given priority were for legal services, printing, telephone rentals, clearing snow from the tracks and premiums on an insurance policy to cover workmen's compensation liability. On the other hand, a claim from a manufacturing company for supplies for repairs of electrical machinery was entitled to preference. [Westinghouse E. & M. Co. vs. Barre & Montpelier Traction & Power Co. et al., 126 Atlantic Rep., 594.]

WISCONSIN. — *Duty at Street Railway Crossing.*

Where a person crosses street car tracks and knows, or could know in the exercise of ordinary care, that a trolley car is approaching at an excessive rate of speed, he must act accordingly. It is not sufficient that he should assume that the car is approaching at a reasonable and lawful rate of speed. (Balistrieri vs. Chicago, N. S. & M. R.R., 200 Northwest. Rep., 650.)

Personal Items

J. P. W. Brown Most Valuable Citizen

Electric Railway Official at Nashville So Pronounced and Signally Honored for Outstanding Civic Service

John P. W. Brown, general superintendent of the Nashville Railway & Light Company, Nashville, Tenn., and Lieut. John Harding, Jr., Nashville's around-the-world flier, were jointly honored by the citizens of Nashville on Jan. 2 at a meeting of the Kiwanis Club at the Chamber of Commerce at noon.

Mr. Brown was awarded the Kiwanis loving cup in recognition of his outstanding civic service to Nashville during 1924.

Newspapers printed columns of the praises that were sung of Mr. Brown. It is timely to recount in summary the work which won for him the honor of "Nashville's ideal citizen." The title was given him because:

He led the 1924 Community Chest campaign to the most successful completion of its history.

He was chairman of the industrial committee of the Chamber of Commerce, and thus helped bring new industries to Nashville.

He did outstanding religious work as president of the Personal Workers of the First Presbyterian Church.

He was an active member of the board of directors of the Nashville Y.M.C.A., and in such work did valuable service to the young men of this city.

His division won first honors in the Vanderbilt "Fill the Stadium" drive.

And last: Serving with equal unselfish zeal in the ranks as an enthusiastic worker, his forceful efforts have constantly been attended by unfailing success, and an unfailing modesty.

Naturally the question arises, "What manner of man is it upon whom Nashville has conferred her greatest honor in the award of the pronouncement of him as its most valuable citizen?" John P. W. Brown became connected with the electrical industry in Nashville 27 years ago when he supervised the inspection of installations of all electric lighting, power and scenic effects at the Tennessee Centennial Exposition immediately upon the completion of his work at Vanderbilt University. He became identified with the Cumberland Electric Light & Power Company as switchboard operator in 1898, and 2 years later, when the Cumberland company was merged with the railway and became the Nashville Railway & Light Company, Mr. Brown was made superintendent of the lighting and power departments of the new company.

On May 19, 1917, Mr. Brown was promoted to the position of assistant general superintendent over the entire local railway and light property, and 5 years ago succeeded B. C. Edgar as general superintendent of the company, which position he still holds. That Mr. Brown's position has been one of increasing responsibility year by year is attested by the fact that when he entered the employ of the company only 300 light and power customers were being served, while at present the Nashville Railway & Light Company has more than 34,000 electric consumers on its power lines. In fostering that growth Mr. Brown played a most important part.

That his value and services have been appreciated is evidenced by his last elevation to the position of general superintendent of the Nashville property.

J. P. W. Brown

Transportation Department Divided in Detroit

A separation has been made by the Department of Street Railways, Detroit, Mich., of the duties of the transportation division of the property. The work relating strictly to routing, schedules, traffic, etc., has been taken over by a newly created traffic division, and the duties pertaining strictly to the operation of the cars has been taken over by a newly created operating division, so that the transportation division no longer exists.

E. S. Rider, formerly superintendent of transportation, has been appointed superintendent of traffic, in charge of the traffic division.

D. A. Smith, formerly assistant superintendent of transportation, has been appointed superintendent of operation, in charge of the operating division.

E. R. Hughes was elected chairman of the Oklahoma Corporation Commission on Dec. 29, 1924. Mr. Hughes was elected to the commission in 1920 and has two years yet to serve. He succeeds Joe Cobb as chairman.

Lord Ashfield, chairman of the London underground railway companies, has been appointed chairman also of the British Dyestuffs Corporation, Ltd., in succession to Sir William Alexander, M. P., who has resigned on account of his increasing business and political activities. Lord Ashfield has hitherto been a government representative on the board of the company, a position he now vacates in order to become chairman. Besides being chairman of the London underground railway he is chairman of the London General Omnibus Company, and he is associated with the boards of the Provincial Cinematograph Theaters, Ltd., the Midland Bank, the United Railways of Havana and Regla Warehouses, Ltd., and the Mexican Railway.

Consulting Engineer Resigns From General Electric

David B. Rushmore, one of the consulting engineers of the General Electric Company, has resigned following orders from his physician to take a long rest and avoid desk work.

Mr. Rushmore has served 25 years with the General Electric Company and with the Stanley Electric Company of Pittsfield, which was absorbed by the General Electric Company. He went to Schenectady in 1905, and for many years was engineer of the power and mining department. Since 1922 he has been one of the consulting engineers. Previous to his service with the General Electric Company, Mr. Rushmore was with the Westinghouse Electric & Manufacturing Company and later with the Royal Electric Company, Montreal.

He was graduated from Swarthmore College in 1894 with the degree of bachelor of science and engineering, and from Cornell University in the following year in the electrical engineering course. In 1897 he received the degree of civil engineer from Swarthmore, and in 1923 the honorary degree of doctor of science from that institution.

Changes in Stone & Webster Managerial Personnel in South

Howard C. Foss has assumed active supervision of the affairs of the Savannah Electric & Power Company, Savannah, Ga., as president, thus establishing a local president in charge of the operations of another of the large companies under Stone & Webster executive management. Because of the additional responsibilities assumed by Mr. Foss, his duties as Southeastern district manager for the Stone & Webster companies will be assumed by Alba H. Warren, now manager of the El Paso Electric Railway, El Paso, Tex. The Southeastern district office will remain in Savannah. Mr. Warren will take up his work there within a few weeks.

Robert C. Brooks, formerly manager of the Savannah Electric & Power Company, has been appointed manager of the Pawtucket division of the Blackstone Valley Gas & Electric Company at Pawtucket, R. I.

Tom P. Walker, formerly manager of the Baton Rouge Electric Company, Baton Rouge, La., has been appointed manager of the El Paso Electric Railway, El Paso, Tex.

J. F. McLaughlin, general superintendent of the El Paso Electric Railway, El Paso, Tex., is to succeed Mr. Walker at Baton Rouge.

Alfred F. Townsend, manager of the Eastern Texas Electric Company, Beaumont and Port Arthur, Tex., has been appointed vice-president and general manager of the operating subsidiary companies of the Western United Corporation with headquarters at Aurora, Ill. These subsidiary companies have

recently signed contracts with Stone & Webster, Inc., Boston, Mass., for its executive management service.

J. G. Holtzclaw, receiver and formerly manager of the Pensacola Electric Company, Pensacola, Fla., succeeds A. F. Townsend as manager of the Eastern Texas Electric Company.

J. A. Phelan, for the last 4 years general superintendent of the Rockford City Traction and Rockford & Interurban Railway properties, Rockford, Ill., has resigned to accept a position as head of the time-table department of the Chicago Motor Coach Company.

Charles W. Dupuis, president of the Citizens National Bank, Cincinnati, Ohio, has been elected president of the Cincinnati Street Railway, operated under lease by the Cincinnati Traction Company. Mr. Dupuis succeeds Bayard L. Kilgour.

James Dalrymple, general manager of the Glasgow Corporation Tramways, Glasgow, Scotland, after an absence of 2 months on a visit to Bombay, has returned to Glasgow. He went to Bombay on the invitation of the tramway there to inspect the undertaking and to advise on its conduct.

Gen. Harvey Hannah was made chairman of the Tennessee Railroad & Public Utilities Commission at the recent reorganization meeting. Gen. Hannah has been on the commission several terms. Dorsey B. Thomas, formerly in the State Senate from Benton County, has been made secretary.

C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, Rushville, Ind., was re-elected president of the Indiana Public Utility Association at the annual convention held in Indianapolis on Jan. 22.

Charles B. Thomas, East St. Louis, Ill., former referee of bankruptcy for the Eastern Illinois federal court, resigned on Jan. 17 as special counsel for the receiver of the Alton, Granite & St. Louis Traction System.

S. C. Waggoner is road supervisor of the Indianapolis & Cincinnati Traction Company, with office in Rushville, Ind. He succeeds D. S. Petro.

Fred Capshaw has succeeded Joe B. Cobb as a member of the Oklahoma Corporation Commission. Mr. Cobb was chairman of the commission. He has been admitted to practice law in Oklahoma.

Clyde B. Aitcheson of Oregon has been elected chairman of the Interstate Commerce Commission for 1925. He succeeds Henry Clay Hall. The chairmanship is filled anew each year on a seniority basis from the membership of the commission.

L. C. Bullington, formerly assistant manager of the power department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed manager of the Cincinnati district office. Mr. Bullington succeeds James A. Brett, who died recently in Bermuda. Mr. Bullington goes to Cincinnati, after a long connection with the Westinghouse company, first as southeastern manager with headquarters at Atlanta, Ga., and later as manager of the Buffalo district branch.

Dwight Dean Joins Forces of Motor Manufacturer

Dwight B. Dean, who recently joined the forces of the Yellow Coach Manufacturing Company, Chicago, with headquarters of his own at Cleveland, is one of the best known men in the electric railway industry in the central West, particularly the selling field. He has been an attendant at the annual conventions of electric railway men since 1889, the year the predecessor to the American Electric Railway Association met in Minneapolis. At that time Mr. Dean was employed as a salesman by the Electric Merchandise Company, Chicago. Consumer resistance was not known by that name then, but it existed in a superlative degree, as Mr. Dean quickly learned. He broke this resistance down so successfully for the Chicago company that the McGuire Company of the same city was quick to appreciate his ability and to send him out to sell car trucks. This was in 1891. Two years later he joined the forces of the Terre Haute Car & Manufacturing Company as sales manager of the street railway car wheel department.

Mr. Dean had learned so well how to induce his prospect to sign on the dotted line, as they say, that he was now directing others in the art of doing business successfully. For 7 years he remained with the Terre Haute company. In 1900 Mr. Dean again changed his job, but not his allegiance. He became connected with the J. G. Brill Company in charge of its Chicago office and Western territory. It was a good stroke for Mr. Dean and a better one for the Brill company. Mr. Dean's scope of activity was enlarged and the car manufacturer secured the services of a man who had proved his ability by more than 10 years of intensive work among people in an industry of which the car manufacturer was a part. Three years later the Brill company purchased the G. C. Kuhlman Car Company at Cleveland and Mr. Dean moved to Cleveland as sales manager. There he has continued ever since, a period in all of 24 years with the Brill interests.

Thomas F. Woodlock, New York, has been nominated by President Coolidge to be a member of the Interstate Commerce Commission, vice Commissioner Potter, resigned. Mr. Woodlock was born in Ireland in 1866. He was educated at Beaumont College, near Windsor, England, the Catholic public school corresponding to such schools as Eton and Harrow. He matriculated at the London University in honors. He went into business in the London Stock Exchange. In 1892 he came to New York and joined the late Charles H. Dow and Edward D. Jones in the Dow-Jones News Service. He immediately specialized on American railroads. His pamphlet on "The Anatomy of a Railroad Report" is still a textbook on the subject. After the death of Charles H. Dow, in 1902, he became the editor of the *Wall Street Journal*, which post he held until 1905. After his resignation he became a member of the New York Stock Exchange, in partnership with Schuyler N. Warren. After a few years he returned to newspaper work and economic writing, chiefly in connection with railroads.

J. D. Michele has been retained by the Youngstown & Suburban Railway as manager of its bus division, following the purchase by the company of the Canton-Youngstown Safety Coach Line. Mr. Michele entered the bus business in 1914, operating a line between Cleveland and Akron, Ohio. This was the beginning of the Cleveland-Akron Bus Company, which is now one of the principal bus enterprises of the state.

H. E. McWethy, for the past 3 years electric railway engineer for the Minnesota Railroad & Warehouse Commission, has opened an office in the Builders Exchange Building, St. Paul, Minn., to engage in practice as an engineer-statistician. He purposes to handle public utility rate analyses and valuations for presentation before public service commissions and courts and for purposes of stock and bond issues. Mr. McWethy received his technical engineering training at the University of Wisconsin, and was graduated from the College of Electrical Engineering in 1909. Then followed 2 years apprenticeship training with the Westinghouse Electric & Manufacturing Company at East Pittsburgh. In 1911 he became associated with the Wisconsin Railroad Commission at Madison, and served with this commission as a valuation engineer and rate expert until 1920. From 1920 to 1922 he was engaged as an appraisal expert in the valuations of the Nashville Railway & Light Company at Nashville, Tenn., the Philadelphia Rapid Transit Company, and for other properties. In 1922 he was retained by the Minnesota Railroad & Warehouse Company as its expert adviser in the valuation proceedings involving the electric railway systems of the Twin Cities and Duluth.

Obituary

Oliver P. Balliet, one of the first engineers of the plant of the Allentown & Reading Traction Company, Allentown, Pa., died Jan. 10 at his home in Forrest, Ohio. He was at the time of his death general manager of the Hardin Electric Power Company.

Col. Jorgen Ording, who as draftsman and engineer assisted in the construction of the first cable car lines of Denver, Col., died recently at Christiansand, Norway.

William C. Kelly, a pioneer in elevated railroad service in Chicago, died on Feb. 1, following an illness of about 3 months. He was 67 years old. During the World's Fair in Chicago Mr. Kelly was employed by the intramural railroad, the first electrically operated elevated railroad, and at the close of the fair became associated with the Metropolitan West Side Elevated Railroad, with which he was connected until the time of his death. He aided in the construction of the road, which was begun in 1894. Mr. Kelly was one of the oldest employees in point of service with the present Chicago Rapid Transit Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Differential Steel Car Company Receives Traction Orders

The Cleveland Railway, Cleveland, Ohio, placed an order recently with the Differential Steel Car Company of Findlay, Ohio, for four standard motor-equipped Differential door chute cars, two standard trailer Differential door chute cars, two flat rail cars and four crane cars of a new type just designed by the Differential Steel Car Company. The Boston Elevated Railway has also placed an order with the Differential Steel Car Company for one Clark concrete breaker and the Key System Transit Company, Oakland, Cal., has ordered one Clark concrete breaker.

Buses Not Included Among White Price Reductions

No changes in the prices of bus chassis or of heavy-duty trucks are included in the reductions ranging from $250 to $300 announced in certain White Motor Company products. In short, the reductions affect four of the ten White models, including both ½-ton and 2-ton models.

Factory expansion and improvement in manufacturing methods have made reductions possible, it is explained. Some savings have been made in the cost of manufacturing light-duty trucks and these are being passed along to customers. With the beginning of the new year the company completed a program of expansion which greatly increased manufacturing facilities. This included the erection of the new engineering and research building as well as the acquisition of all buildings adjacent to the truck factory formerly occupied by the White Sewing Machine Company.

Cos Cob Station Enlarged

The use of nothing but electric locomotives on the New York, New Haven & Hartford Railroad between New York and New Haven has made necessary certain changes in the generating station located at Cos Cob, Conn. A new 9,000-kw. turbine and condenser will be used to replace one of the 3,750-kva. turbo-generators, which will be used in some other part of the power system. The contract for the equipment has been awarded to the Westinghouse Electric & Manufacturing Company.

Louisiana Utilities Spend Large Sums for Improvements

The 1924 report of the committee on public utility information showed that the public utilities of Louisiana and Mississippi expended more money on improvements than in any previous year. The New Orleans Public Service, Inc., occupied first place on the list, with $8,000,000. The Shreveport Railways spent $200,000 in improvements, $25,000 for special work for new car houses and shops, $35,000 for an automatic substation and a 3-mile feeder and $7,700 for paving. Three new cars were added to its equipment. The South New Orleans Light & Traction Company of Algiers made improvements to the sum of $28,173. The Baton Rouge Electric Company, Baton Rouge, made improvements that cost $464,454 to its plant, including an addition of 3.05 miles of track and five new cars.

Cement Production Increased

Figures on portland cement production for 1923 and 1924 show an increase of about 8 per cent. Production figures by districts are shown in the accompanying table.

Commercial District	1924	1923
Eastern Pennsylvania, New Jersey and Maryland	38,281	35,722
New York	7,547	6,990
Ohio, Western Pennsylvania, West Virginia	14,322	13,496
Michigan	9,162	7,620
Wisconsin, Illinois, Indiana, Kentucky	21,856	21,193
Virginia, Tennessee, Alabama, Georgia	11,347	7,909
Eastern Missouri, Iowa, Minnesota, South Dakota	14,851	14,037
Western Missouri, Nebraska, Kansas, Oklahoma	9,912	9,779
Texas	4,566	4,179
Colorado and Utah	2,425	2,428
California	11,615	11,002
Oregon, Washington, Montana	2,975	3,105
	148,859	137,460

American Brass in Waterbury

It was erroneously stated in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 10, that the office of the American Brass Company was in Bridgeport, Conn. The company has neither a mill nor an office in that city. Its general offices are located in Waterbury.

G. E. Welcomes Investigation

No action has been taken in the United States Senate on the resolution of Senator Norris ordering an investigation of the General Electric Company on the ground that it monopolizes or controls electric light and power company business. The resolution was returned to the Senate by its interstate commerce committee in a modified form. It had been planned to take up the resolution on Feb. 5, but consideration of the nomination of Attorney-General Stone to be a Justice of the Supreme Court prevented. Such an investigation would be welcomed by the company, according to Owen D. Young. In spite of the trouble and expense involved such a step is preferable to having unfounded charges made, he said.

Rolling Stock

San Diego Electric Railway, San Diego, Cal., has purchased 16 flat cars of the Union Pacific Railway for freight business. The equipment of the freight department will be augmented by an up-to-date 60-ton electric locomotive from the Westinghouse Electric & Manufacturing Company, Pittsburgh.

Union Traction Company, Coffeyville, Kan., it is reported, has purchased several one-man interurban motor cars.

San Antonio Public Service Company, San Antonio, Tex., plans to purchase a few light-weight double-truck street cars during the present year. The details of the purchase have not been made public.

Wilmington & Philadelphia Traction Company, Wilmington, Del., it is reported, has purchased eight Reo pay-enter buses for service in the city of Chester. The traction company was given the exclusive franchise subject to furnishing equipment by Jan. 9.

Track and Line

Houston, Tex.—Contract for the construction of the 110-mile electric interurban line of the Houston, Beaumont & Orange Interurban Railway has been awarded to W. H. Nichols & Company, railroad constructors, according to Ed Kennedy, promoter of the project. The contract stipulates that the work will be started not later than March 20. The terms of the contract are understood to be cost plus 10 per cent. The cost of completing and putting the line into operation was estimated by R. E. Gurley, chief engineer, at $5,333,062, or nearly $60,000 a mile.

St. Louis-Kansas City Short Line Railroad, through Lee Dunlap, vice-president, applied to the Missouri Public Service Commission at Jefferson City, Mo., Jan. 28 for permission to build an interurban electric railway between St. Louis and Kansas City. The tentative date for a hearing on the application is Feb. 11. The plans of the company call for a standard gage, electrified double-track railroad. It plans to operate both freight and passenger trains. Promoters of the railroad claim the proposed route will be 40 miles shorter than any steam railroad operating between St. Louis and Kansas City.

Metal, Coal and Material Prices

Metals—New York	Feb. 3, 1925
Copper, electrolytic, cents per lb.	14 625
Copper wire base, cents per lb.	17.00
Lead, cents per lb.	9.60
Zinc, cents per lb.	7.71
Tin, Straits, cents per lb.	57 00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.275
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.625
Central, Ill., screenings, Chicago, net tons	1.325
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.25
Weatherproof wire base, N.Y., cents per lb.	20.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-lb. lots), N. Y., per gal.	$1.24
White lead in oil (100-lb. keg), N. Y., cents per lb., carloadlots	0.1297
Turpentine (bbl. lots), N. Y., per gal.	0.95

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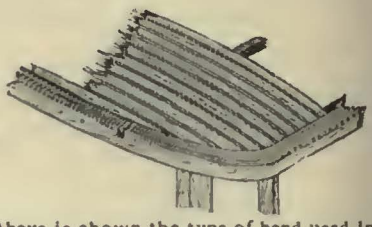
Many of the foremost chassis manufacturers have sent engineers to our plant to see these highly improved body manufacturing methods in practice. They have been thoroughly convinced of the marked advantages of Superior Aerostructure bodies.

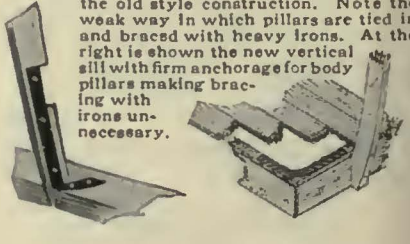
Write for full information or send a representative to see Superior Aerostructure bodies in the making.



Above is shown the type of bend used in Superior bodies. All bends are made with laminated wood, creating a joint that in wood-working is the equivalent of a weld in metal working. These laminated bends are as strong as though the wood grew in that form for our convenience.

Above is shown the old style cross grain section formerly used. Lack of strength and clumsiness is evident. Note the irons for bracing. These are not needed with the new construction. This is one place where weight is saved.

The use of vertical sills. At the left is shown the old style construction. Note the weak way in which pillars are tied in and braced with heavy irons. At the right is shown the new vertical sill with firm anchorage for body pillars making bracing with irons unnecessary.



THE SUPERIOR MOTOR COACH BODY CO.

LIMA, OHIO

Aerostructure SUPERIOR BODIES *Coach Bodies*

Six Track Bracket— on Bates Poles

The illustration shows an interesting part of the Italian State Railways' installation on Bates Poles.

Bates Poles are found in unusually severe services of all kinds, as well as in all types of standard construction. The broad usage of Bates Poles in all divisions of railway services is evidence of their suitability for such services.

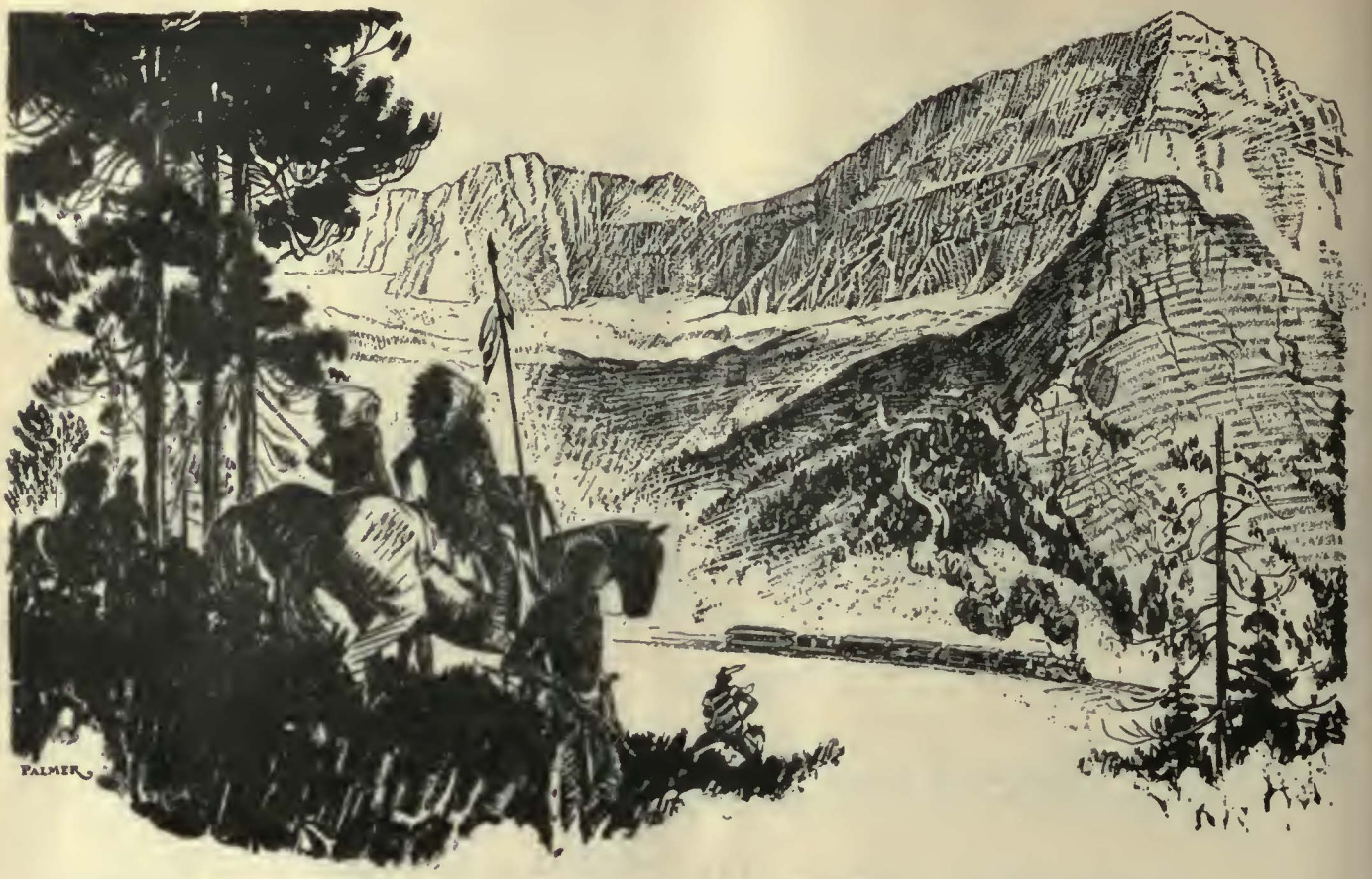
Modern, long-lived overhead construction demands steel poles that are sturdy, trim and cheaply maintained. The simplicity of Bates One Piece Steel Poles, their great strength and trim appearance, together with their surprisingly low first cost, makes these poles the logical pole for such universal adoption.

Require a Bates recommendation on all of your proposed overhead installations. Our suggestions may prove of great value to you.

Expanded Poles, Fabricated Towers or Substations—Painted or Galvanized

Bates Expanded Steel Truss Co.

231 SOUTH LA SALLE ST., CHICAGO, ILL.



Foreseeing and Fulfilling

LIFE has always been dependent upon contact with supplies. Wandering herdsmen consumed what was close at hand and then moved on.

With the forming of fixed communities came the need for transportation. Supplies moved instead of men.

Today, with the growth of thickly populated areas, TRANSPORTATION has become the key to national prosperity.

In this country the anticipation of public needs by the railroads has produced a transportation system unequaled in any part of the world. The railroad executives have continually sensed coming conditions and built toward them. In this great work the car builders have assisted. They have earned their place as a vital supporting industry of the railroads by foreseeing as well as fulfilling the needs of the transportation experts.

But the work of looking ahead is never completed. Today railroad executives foresee the coming need of rebuilding their steel cars. They find that the facilities necessary are far more extensive than those required for rebuilding wooden cars.

Many of them have looked into the future with profit. Three reasons have caused them to avail themselves of the facilities of the outside car-building and car-repairing establishments for this rebuilding work.

First: They deem it folly to tie up in additional shops capital much needed for transportation.

Second: They have determined that a large increase in their shop organizations for such fluctuating work would be unwise and unprofitable.

Third: They have found that the car builders and car repairers have anticipated this very need and are equipped for it, adequately.

"*Foreseeing and Fulfilling*" is one of a series of advertisements being published by the Railway Car Manufacturers' Association with the expectation that the facts they present will be mutually serviceable to the railways and to their supporting industries.

Its Striking Simplicity Shows Thoroughbred Parentage

PATRONAGE by the riding public is determined to a great extent by appearance.

Frills, curlicues and jig saw designs have their place on the circus wagon and in the carnival tent but when it comes to transportation, the public, in their more serious moments of travel, like the confidence inspired by simple dignified outward appearance and clean cut interiors in public conveyances.

In this simple yet attractive design is incorporated the principle of rigid construction which makes for low maintenance cost to the operator.

Each seat space is allotted a full width window permitting the passenger a wide unobstructed range of vision.

In all it presents a dignified, pleasing, businesslike appearance which the traveler enjoys in public conveyances.

The Auto Body Company's experienced and advanced engineering ability and large modern production facilities are of vital importance to chassis manufacturers and fleet operators.

Let Auto Body Company's engineers consider your quantity Bus Body Production Problem.

Twenty-Two Years' Experience

THE AUTO BODY COMPANY

LANSING, MICHIGAN

Designers and Manufacturers of Motor Coach and Bus Bodies ✿ Open and Enclosed Automobile Bodies

Monitor Edgewound Resistors are made of ribbon of zero temperature coefficient of resistivity and each convolution is individually supported at two points. On basis of air temperature permitted by the Underwriters, these units will dissipate 60 watts per inch of length.

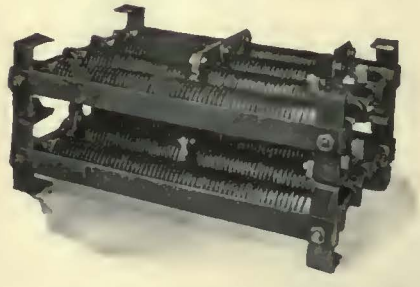
A new principle of ventilation

HEAT is dissipated from Monitor Edgewound Resistors so evenly and uniformly that the temperature of the resistive conductor is, for all practical purposes, the same throughout.

The resistor units can be mounted side by side, on end, or on top of each other without affecting the even dissipation of heat and without overheating any part of the resistor as a whole. As a result there is no danger of a Monitor Edgewound Resistor burning out due to overheating in any section.

This unusual performance of the Monitor Edgewound Resistor is due to a new principle of ventilation plus the absence of localized heating such as occurs in resistors that change resistance with temperature. The well known "chimney effect" which causes cumulative heating, often burning out those parts in the path of the upwardly moving heated air, is eliminated.

Stronger, more compact, lighter in weight and more flexible and simple in its arrangement and construction than any resistor ever known, the Monitor Edgewound Resistor, is worthy of careful investigation. Write for Bulletin 107.



Monitor Eight-unit Edgewound Resistor with four units in parallel and two in series. Resistor tapped at two intermediate points.

The Original "Just Press a Button" System

Monitor Controller Company

500 East Lombard St., Baltimore, Md.

Birmingham Boston Buffalo Chicago Cincinnati Cleveland
New Orleans Detroit St. Louis Pittsburgh New York Philadelphia

6720-2

Monitor Edgewound Resistor

Why does Detroit prefer Six Wheel Coaches?

ON OCTOBER 18, 1924, the Detroit Motor Bus Company, of Detroit, Michigan, ordered one SAFEWAY Six-Wheeler for a thirty-day trial.

Since that date this company has ordered additional equipment and deliveries have been made as follows:

November	18, 1924	5
"	30, 1924	5
December	4, 1924	5
"	10, 1924	7
"	14, 1924	1
"	17, 1924	6
January	5, 1925	7

WITHIN a period of less than sixty days this company has bought 37 Six Wheel vehicles. In addition to this they have contracted for 18 single deck, city type Six Wheelers.

Why is the Detroit Motor Bus Company replacing its four wheel equipment with SAFEWAY Six Wheel Coaches? The answer to this question will be found in a letter from Mr. W. F. Evans, president of the company, printed on the following page.

THE SAFEWAY SIX-WHEELER

Made by The Six Wheel Company, 1800 Lehigh Avenue, Philadelphia, Pa.

Every operator of Four Wheel Buses should read this letter

Mr. Rodney Day, *President*,
THE SIX-WHEEL COMPANY,
Philadelphia, Pa.

January 12, 1925.

Dear Mr. Day:

I have your inquiry relative to our experience with six-wheel Safeway buses up to the present time. Your inquiry is timely a I have just had a complete mileage record up to date, and yesterday and today have been examining the condition of tires o vehicles that have been in service between ten and eleven thousand miles each.

The entire fleet has completed just a trifle under 65,000 miles. Of the first two vehicles in service, one has completed 11,00 miles and the other one just a few hundred miles under that number.

The condition of the tires is very pleasing indeed. Mr. Deers, of the Goodyear Tire & Rubber Co., examined bus No. 601 which is the first one that went into service with me today. The tires are in most excellent condition, and it is our opinio that they will do 30,000 bus miles of service. This, of course, brings tire cost on a basis about equal to that of the solid tire

Our study of the wear and tear would indicate that we have lengthened the life of our wooden bodies from three to four year on this chassis. Needless to say, the riding public are very much pleased with this development.

We have found the safety feature of four-wheel drive and four-wheel braking beyond comparison with any buses that w have operated so far. I guess the best evidence, after all, is that we have placed an order with your Company for an additiona eighteen buses of the single-deck type.

There is now no doubt in our minds that the six-wheel bus, driving on the four rear wheels, affords opportunity fo practically equally balanced load on all wheels, and makes the use of the pneumatic tire a practical and commercial propositio on vehicles of large carrying capacity.

The control of these vehicles under heavy traffic conditions has bee most excellent, and we see more virtue in the engineering principle involved as the miles operated increase.

With kindest regards, I am,

Most sincerely yours,

W. F. EVANS,

WFE:FH

President.
Detroit Motor Bus Company

THE SAFEWAY SIX-WHEELER

Made by The Six Wheel Company, 1800 Lehigh Avenue, Philadelphia, Pa.

Every operator of Six Wheel coaches enjoys these advantages

THERE are certain definite advantages in the operation of SAFEWAY Coaches. They are the direct result of Six Wheel construction and are never found in any four wheel vehicle:

Better Traction—Contact with the road at six widely separated points with power applied to four rear wheels provides adequate traction even on icy streets and muddy or snow-covered roads.

More Comfort—Oscillating motion of four rear wheels absorbs road shocks and reduces passenger discomfort from road irregularities.

Greater Safety—Six point road contact practically eliminates skidding; prevents sidesway; brakes applied on all four rear wheels provide greater braking area and permit high speeds without danger.

Economy—Absorption of road shocks and vibration increases life of the vehicle from one to three years. (Silent, all-metal body with removable panels is an important SAFEWAY feature.) Distribution of load over six wheels increases tire life and makes the cost of pneumatic tires approximate that of solids.

Highway Conservation—Absorption of road shocks reduces damage to highways at least 50 per cent. (Important from standpoint of forthcoming bus legislation.)

Profits—Superior service, comfort and safety attract riders and increase revenue from each bus.

Prior to the installation of Six Wheel equipment, the Detroit Motor Bus Company had operated four wheel buses for many years. Their investigation of Six Wheel construction covered a period of almost two years and provided a fair comparison of the relative merits of the four and six wheel types of vehicle. It was on the basis of the many apparent advantages of Six Wheel construction that the first order for SAFEWAY Coaches was placed. Subsequent business has followed as these advantages proved out in actual operation.

Any operator who is considering the purchase of new equipment will be interested in the detailed account of this company's experience with SAFEWAY Six Wheel Coaches. Requests on business stationery will receive immediate attention.

THE SAFEWAY SIX-WHEELER

Made by The Six Wheel Company, 1800 Lehigh Avenue, Philadelphia, Pa.

An INTERNATIONAL *Rear View*
The compact sturdiness of International Coach design is apparent in this illustration. All models are built for low center of gravity, assured safety and added comfort, while maintaining sufficient road clearance.

An INTERNATIONAL *Interior*
More-than-pullman comfort and perfection in detail. Note the broad, silent, sliding windows; the dome lights; the comfortable upholstery, of leather or finest automobile fabrics. Ample provision for heating and ventilating.

Coaches in Four Basic Models:

54-L-1	12 to 18 passengers
54-M	18 to 22 passengers
54-H	25 to 30 passengers
54-H-1	25 to 30 passengers

Ample, dependable 6-cylinder power; 4-speed transmission; air brakes on all four wheels; long flexible springs, including auxiliary side springs; low-hung frame; interior refinements unexcelled.

Florida!

Between Tampa and the Gulf of Mexico now lies the 100-ft. Gandy Blvd., and Gandy Bridge, the great new piece of engineering spanning the waters of Tampa Bay. Florida newspapers have lately carried the information that this modern development of which southwest Florida is proud will provide the daily route for twelve De Luxe International Motor Coaches forming the "Florida Blue Line," running between Tampa and St. Petersburg.

The Dakotas!

The Interstate Transportation Co. is a pioneer coach line with routes operating out of Bismarck, Minot, Grand Forks, and Aberdeen. Their long experience with northwest roads has led them to Internationals. We have received this sweeping endorsement from J. G. Belanger, president of the company: "We are glad to inform you that the Interstate Transportation Co. has standardized on International Coaches for all routes in the future."

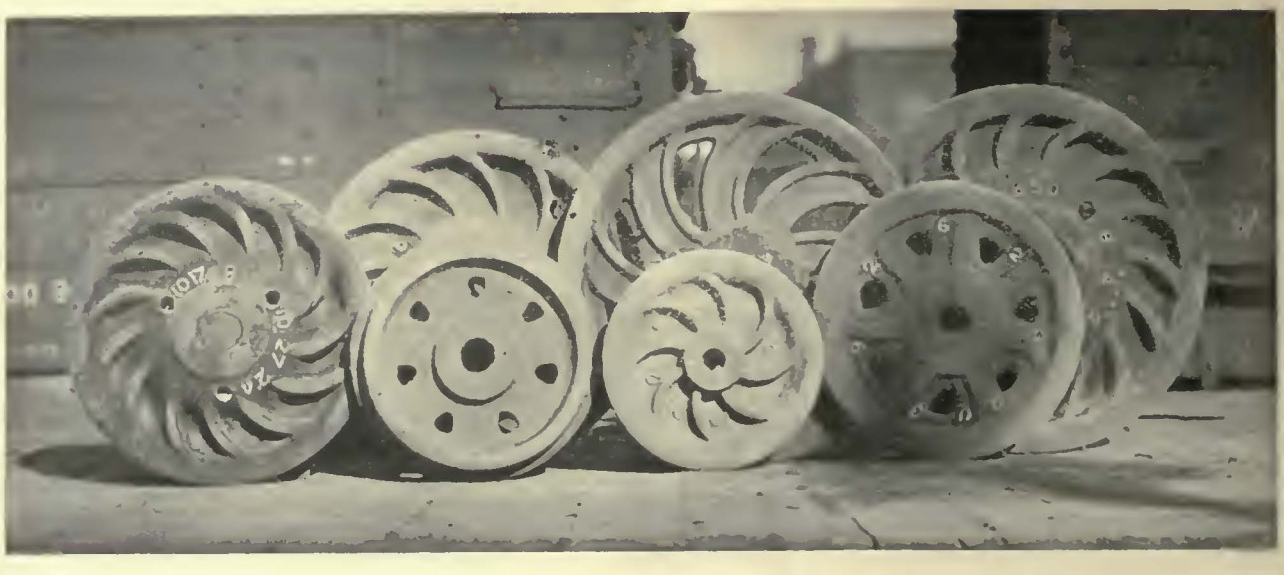
There are many differences in operating conditions between Florida and the Dakotas, but the versatility of the line of International 6-cylinder Motor Coaches fits all needs.

The Answer lies partly in the Four Basic Models which enable the International engineers to prescribe proper design and mechanical equipment to solve varied road and load problems. Chassis, power units, types of drive, and gear ratios are built for the individual job.

The answer lies, further, in the over-all reach of International service. International Company-owned branches, to the number of 105 in the United States, serve the interests of International Coach owners. Let us send you the International Motor Coach catalog.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Ill.

INTERNATIONAL 6-CYLINDER MOTOR COACHES



Chilled Iron Wheels

possess the required factors of safety at the lowest cost.

The hard wearing surface of the tread has sufficient bearing power to carry the maximum load of any car yet designed without permanent deformation, and has the maximum resistance to abrasion.

The hard tread and flange have a maximum wearing value.

The wearing surface of the tread and flange causes the least abrasion of the rail and offers the least resistance to rolling. There is a consequent saving in rail replacement cost and fuel consumption.

The metal of the tread produces the greatest co-efficient of brake shoe friction, yet removes the least quantity of brake shoe metal. Braking efficiency insured with decrease in brake shoe consumption over other types of wheels.

They carry a service guarantee

Cost Less Per Car Mile

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 PLANTS ~ DAILY CAPACITIES 20000 WHEELS

The Perfect Track

Carnegie Steel Cross Ties

should be included as an essential item in your track maintenance program, as the use of steel cross ties is an essential item toward the attainment of the perfect track—the safe, repair-free track.

The tie shown below is a popular new fabricated section for use as a joint or intermediate tie. The standard I-beam section is used in its construction.

Extensive and modern facilities permit us to serve you promptly and efficiently.

Special Fabricated Tie for use as a Joint or Intermediate Tie

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building · 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

1739

Tune in on the DOOR ENGINE talk from Station CCH

This is station CCH, the Consolidated Car Heating Company, broadcasting its weekly program to the electric railway industry, direct from its factory at Albany.

The Message is Door Engines—

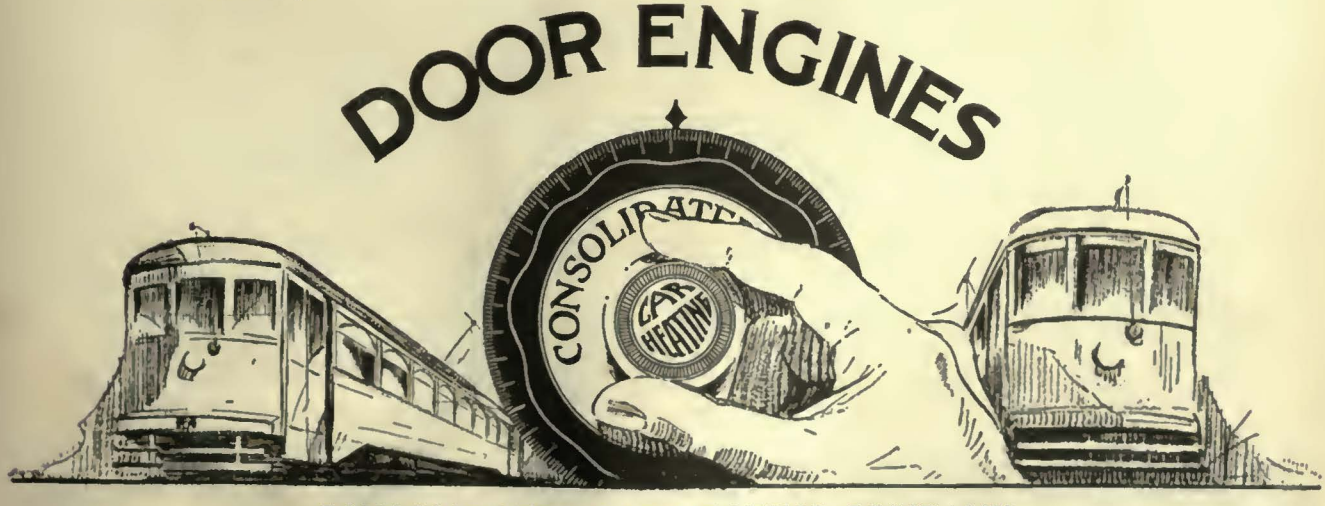
CONSOLIDATED Engineers have worked out many improved features in complete pneumatic door-operating equipment for folding and sliding doors and steps.

Some of these features are:

1. **The triple-safety principle—a cushion bumper on the door, a collapsing door operating arm and an engine by-pass valve which prevents building up a harmful pressure. With these features at work, it is impossible to injure the passenger.**
2. **Door engine cylinders are ground and honed to a high finish, which prevents wear on piston levers.**
3. **Ball bearing rollers on door hangings and door operating arm.**
4. **Bronze bushings and machine cut gears and racks, assuring long-life and smooth operation.**
5. **Door engines are interchangeable for right or left.**

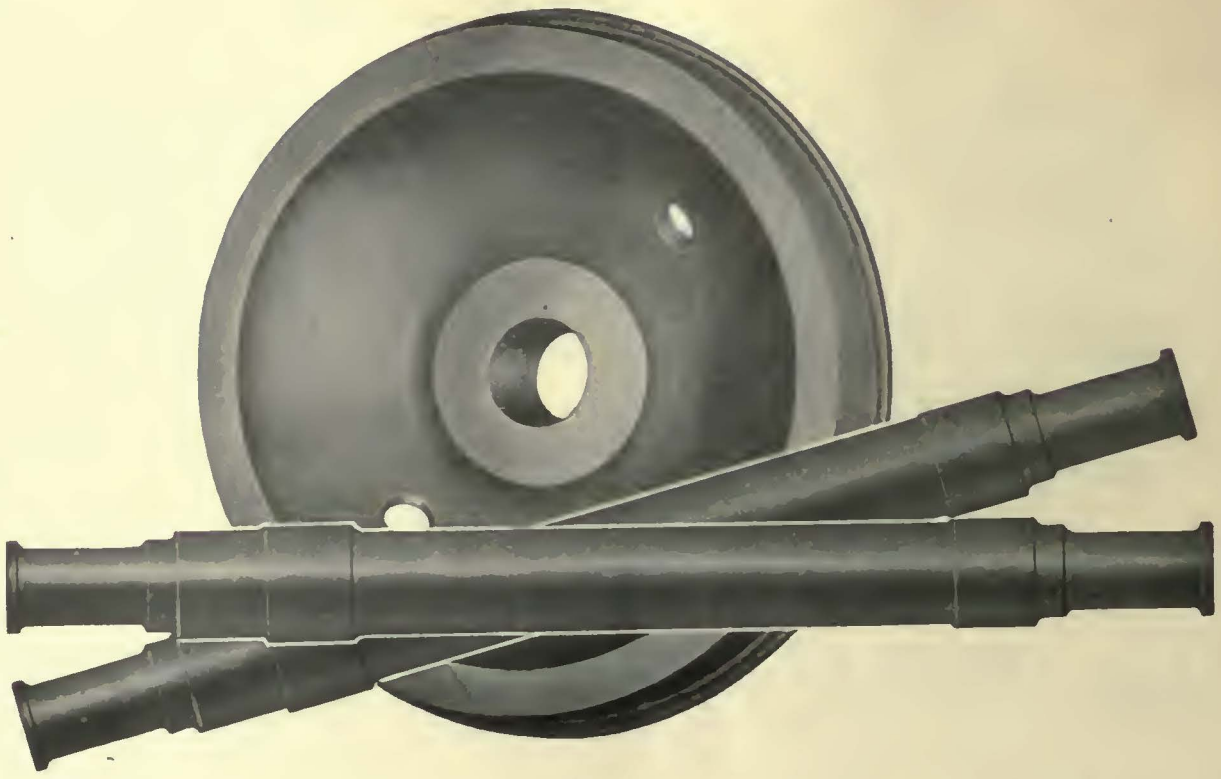
Station CCH now signing off until next week, when it will resume broadcasting with another weekly message.

Good day!



CONSOLIDATED CAR HEATING COMPANY

New York **ALBANY, N. Y.** Chicago



Cambria Rolled Steel Car Wheels and Forged Axles

CAMBRIA ROLLED STEEL CAR WHEELS for Electric Service are made at the Johnstown Plant of Bethlehem Steel Company by a combination rolling and forging process. This process thoroughly works the steel and gives an exceptional refinement in structure which does not readily develop flat spots. For this reason Cambria Rolled Steel Car Wheels will give you the longest service at lowest cost.

CAMBRIA FORGED AXLES for Street, Interurban, Subway and Elevated cars, and Armature Shafts for Electric Service are made to meet any reasonable specification. They can be furnished treated or untreated; solid or hollow bored; smooth forged only; rough turned all over; rough turned on journals and wheel seats; or finished turned on journals and wheel seats.

We will also mount wheels on the axles if so desired.

We have a large stock of wheels in standard sizes and can supply on short notice:

Wheels for City and Suburban Service from 21 to 36 inches diameter with rims 3⅜ inches to 4 $^{15}/_{16}$ inches wide and 1½ to 2½ inches thick.

Wheels for Interurban Service from 22 to 37 inches diameter with rims 3½ inches to 4 $^{15}/_{16}$ inches wide and 1½ to 3 inches thick.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Sales Offices

New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, St. Louis, Buffalo, Pittsburgh, Cleveland, San Francisco, Detroit, Chicago, Cincinnati

Bethlehem Steel Export Corporation, 25 Broadway, New York City
Sole Exporter of Our Commercial Products

BETHLEHEM

SEARCHLIGHT SECTION

POSITIONS VACANT

CAR designers, experienced on steel passenger railroad cars and trucks for high speed electric service wanted for work in the East. Applicants will please state ago, experience in detail, salary expected and when they will be available for employment. P-777, Electric Railway Journal, 10th Ave. at 36th St., New York.

ELECTRICAL engineer with good technical training and about eight years' experience in electric light, power and railway public utility work. Location, large city in Brazil. In applying please give full particulars regarding self and experience, stating also salary desired and when available. P-778, Electric Railway Journal, 10th Ave. at 36th St., New York.

SPECIAL track work draftsmen wanted, preference given men having had experience with special track work manufacturer, but will consider one or two junior draftsmen familiar with trigonometry. State age, experience and salary in first letter. P-774, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

MASTER mechanic having had twenty years' practical experience on small road in New England desires similar position. Unquestionable references and ability assured. PW-776, Electric Railway Journal, 10th Ave. at 36th St., New York.

GENERAL repairman, 12 years' experience on armature winding, and electric equipment, on city and interurban equipment. PW-779, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

SUPERINTENDENT of equipment thoroughly experienced and successful in the efficient maintenance of auto buses, city and interurban cars, desires to change. Confidential interview solicited. PW-771, Electric Railway Journal, 10th Ave. at 36th St., New York.

WHAT AND WHERE TO BUY

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

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Ammeters
Weston Electrical Instrument Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stand
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Automobile Trucks
General Motors Truck Co.

Axles
Johnson & Co., J. R.
Taylor Elec. Truck Co.

Axles, Car Wheel
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
General Electric Co.
Mors-Jones Brass & Metal Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Baldwin Locomotive Wks.
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heating Co.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Superior Motor Coach Body Co.
Auto Body Co.

Boilers
Babcock & Wilcox Co., The

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

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

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Indianapolis Switch & Frog Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boxes, Switch
Johns-Pratt Co.

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

Brake Adjusters
Nat'l By. Appliance Co.
Westinghouse Tr. Br. Co.

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

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.

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

Brush Holders
Anderson Mfg. Co., A. & J. M.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bulkheads
Haskelite Mfg. Co.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
International Harvester Co.
International Motor Co.
Six Wheel Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
E. G. Long Co.

Cables
(See Wires and Cables)

Cambric Tapes, Yellow & Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow & Black Varnish
Mica Insulator Co.

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies Co.

Car Mfrs. Ass'n
Railway Car Mfrs. Ass'n.

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

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Differential Steel Car Co., Inc.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
Thomas Car Wks., Perley A.
Wason Mfg. Co.

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

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Horne & Ebling Corp.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Change Carriers
Cleveland Fare Box Co.
Galef, J. L.

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

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. M. & J. M.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coils, Armature and Field
General Electric Co.
Westinghouse Elec. & M. Co.

Coil Banding and Winding Machines
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
Galef, J. L.
International Register Co. The
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Galef, J. L.

Coin Wrappers
Cleveland Fare Box Co.
Galef, J. L.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Compressors, Gas
Ingersoll-Rand Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll Rand Co.
Westinghouse Elec. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Copper Wire
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes
Allis-Chalmers Mfg. Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.

Crossing Foundations
International Steel Tie Co.

Crossing Frogs and Switches
Ramapo Ajax Corp.

Crossings, Manganese
Bethlehem Steel Co.
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

Crossing Signals .See Signal Systems, Highway Crossing)

Crossings, Track, (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Crushers, Rock
Allis-Chalmers Mfg. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co.
Morton Mfg. Co.

Dealers' Machinery
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Electric Service Supplies Co

Detective Service
Wish Service, P. Edward

Door Operating Devices
Consolidated Car Heating Co.
National Pneu. Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging, (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.

Ears
Ohio Brass Co.

Electric Grinders
Railway Track-work Co.

Electrodes, Carbon
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Electrodes, Steel
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Electrical Wires and Cables
American Elec. Works
Roeblings Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng
Bureau of Commercial Economics, Inc.
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Ong, Jee R.
Railway Audit & Inspection Co.
Richey, Albert S.
Dwight P. Robinson & Co.
Sanderson & Porter
Shaw, Henry M.
Stevens & Wood, Inc.
Stone & Webster

Engineers Inspecting & Chemists
Pittsburgh Testing Laboratory

Engines, Gas, Oil and Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Exterior Side Panels
Haskelite Mfg. Co.

Fare Boxes
Cleveland Fare Box Co.
Galef, J. L.
Nat'l Ry. Appliance Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Sup. Co.
Star Brass Works

Fibre and Fibre Tubing
Westinghouse Elec. & M. Co

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Floors
Haskelite Mfg. Co.

Forgings
Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.

Frogs, Track, (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Fuses and Fuse Boxes
Consolidated Car Heating Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Refillable
General Electric Co.

Garages, Steel
Austin Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

Galvonometers
Weston Electrical Instrument Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Bethlehem Steel Co
Carnegie Steel Co.

Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co.
Westinghouse Elec. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
English Electric Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co., The

Goggles, Protector
Indianapolis Switch & Frog Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
Mors-Jonee Brass & Metal Co.
Nuttall Co., R. D.

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Co.
Panelyte Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

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

Helmets, Welding
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Hoists, Portable
Ingersoll-Rand Co.

Hose, Bridge
Ohio Brass Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Indicating, Signals
Nichols-Lintern Co.

Inspecting Engineers & Chemists
Pittsburgh Testing Laboratory

Instruments, Measuring, Testing and Recording
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Weston Electrical Instrument Corp.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Standard Underground Cable Co.
Westinghouse E. & M. Co.

Insulating Machinery
Amer. Ins. Machinery Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

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

Insulation Cloth Paper & Tape
Mica Insulator Co.

Insulation, Slot
Irvington Varnish & Ins. Co.

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

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

Interior Side Linings
Haskelite Mfg. Co.

Jacks (See also Hoists and Lifts)
Electric Service Sup. Co.
National Ry. Appliance Co.

Journal Boxes
Brill Co., The J. G.

Junction Boxes
Horne & Ebling Corp.
Standard Underground Cable Co.

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

Lamps, Arc and Incandescent (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Co.

Lightning Arrestors
Shaw, Henry M.

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

Line Material (See also Brackets, Insulators, Wires, Etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
English Electric Co.
General Electric Co.
Hubbard & Co.
Mors-Jorse Brass & Metal Co.
Westinghouse Elec. & M. Co.

Locomotives, Electric
Baldwin Locomotive Wks.
General Electric Co.
Westinghouse Elec. & M. Co.

Locomotives, Oil Engine, Electric Drive
Ingersoll-Rand Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Manganese Steel Guard Rails
Ramapo Ajax Corp.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Indianapolis Switch & Frog Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.

Mica
Mica Insulator Co.

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

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

Motors, Electric
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Nuts and Bolts
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Oxygen
International Oxygen Co.

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

Paints & Varnish Preservatives
Baldwin Locomotive Wks.
Joseph Dixon Crucible Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Pavement Breakers
Ingersoll-Rand Co.

Paving Guards, Steel
W. S. Godwin Co., Inc.

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

Pickups, Trolley Wire
Electric Service Sup. Co.
Ohio Brass Co.

Pinion Pullers
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

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

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.

Pneumatic Tools and Accessories
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles and Ties, Treated
Bell Lumber Co.

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

Poles, Ties, Posts, Piling and Lumber
Bell Lumber Co.
Southern Cypress Mfrs. Ass'n.

Poles, Trolley
Anderson M. Co., A. & J. M.
Nuttall Co., R. D.

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

Potheads
Okonite Co.

Power Saving Devices
Nat'l Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Westinghouse Elec. & M. Co.

Pumps
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.

Pumps, Vacuum
Ingersoll-Rand Co.

Punches, Ticket
International Register Co., The
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Joints
Carnegie Steel Co.

Rail Joints, Welded
Indianapolis Switch & Frog Co.

Rail Grinders (See Grinders)

Rails, Relaying
L. B. Foster Co.
Hyman-Michaels Co.

Rails, Steel
Carnegie Steel Co.
L. B. Foster Co.

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

Railway Welding (See Welding Processes)

Rattan
Brill Co., The J. G.
Electric Service Sup. Co.
Hale-Kilburn Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
International Reg. Co., The
Rooke Automatic Reg. Co.

Regulators, Voltage
Leece-Neville Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Electric Service Sup. Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse Elec. & M. Co.

Replacers, Car
Electric Service Sup. Co.

Resistance, Grid
Monitor Controller Co.

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

Resistances
Consolidated Car Heating Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Monitor Controller Co.
Westinghouse Elec. & M. Co.

Roofs
Haskelite Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.
Horne & Ebling Corp.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., The J. G.

Seats, Bus
Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.

Second-Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

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

Shovels
Hubbard & Co.

Shovels, Power
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.

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

Signals, Indicating
Nichols-Lintern Co.

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

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

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson M. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Mors-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.

Soldering and Brazing (See Welding Processes and Apparatus)

Spikes
Amer. Steel & Wire Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co., The

Splicing Compounds
Westinghouse Elec. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Brill Co., The J. G.
Ft. Pitt Spring & Mfg. Co.
St. Louis Car Co.
Taylor Electric Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.

Steel and Steel Products
Morton Mfg. Co.

Steps, Car
Morton Mfg. Co

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

Storage Batteries (See Batteries, Storage)

Strain Insulators
Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.

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

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

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track, Special Work)

Tampers, Tie
Ingersoll-Rand Co.
Railway Track-work Co.

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

Tee Rail, Special Track Work
Bethlehem Steel Co.
Rampo Ajax Corp.

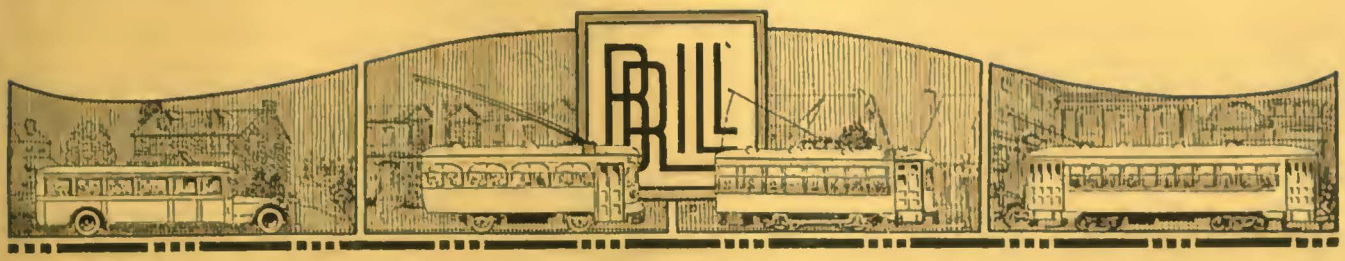
Telephones and Parts
Electric Service Sup. Co.

Terminals, Cable
Standard-Underground Cable Co.

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

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

ALPHABETICAL INDEX TO ADVERTISEMENTS



Trenton & Mercer Co. Trac. Corp.

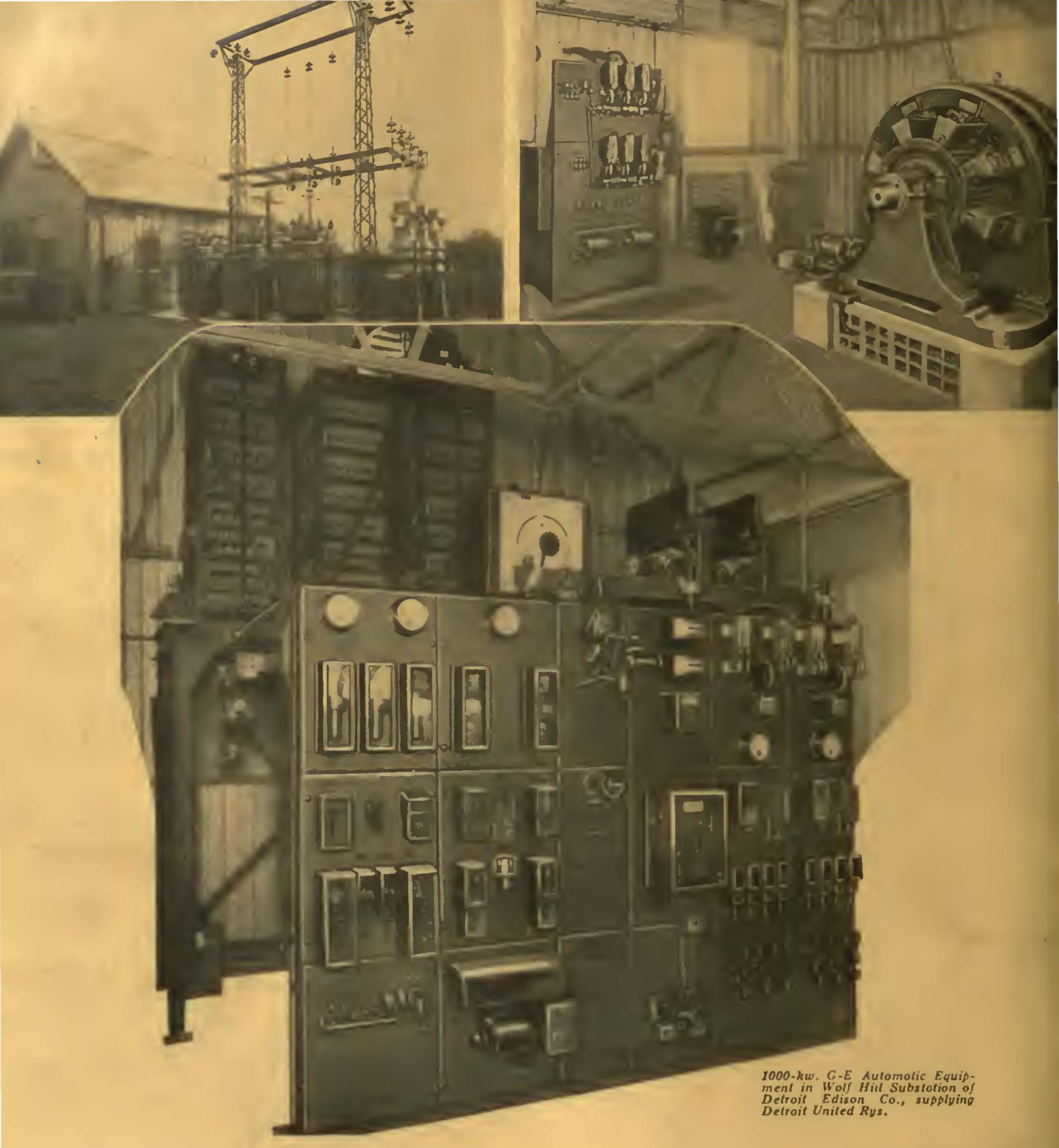
New City and Suburban Cars

Twenty light-weight, one-man two-man cars of this type were recently built in our Philadelphia Plant for Trenton, N. J. Ten cars include quadruple 25 Hp. motor equipment for city service, and ten are equipped with quadruple 35 Hp. motors for suburban service. Otherwise, the cars are practically identical, being mounted on Brill 77-E low-level trucks equipped with Brill Twin Swing Links, measure 44 ft. long over platforms, and seat 48 passengers.

The city cars weigh 34,476 lb. and the suburban cars 36,746 lb.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST LOUIS MO — G.C. KUHLMAN CAR CO CLEVELAND OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



1000-kw. G-E Automotic Equipment in Wolf Hill Substation of Detroit Edison Co., supplying Detroit United Rys.

Detroit, for example

THE universal confidence in G-E Automatic Railway Substations is exemplified in Detroit where 10,000 kw. in G-E Automatics are in operation and 24,000 kw. more—14 units—are on order.

...desired ...en.
...obtained, together with gene... improve...
...power conditions.

The automatic type of substation has now passed the early development stage into economic use. A general degree of confidence seems to exist in its reliability for city and interurban service, and it is satisfactorily meeting every kind of normal or emergency load demand. Where high line switching formerly required the presence of an operator, the remotely controlled supervisory schemes of today have met this requirement.

Ordinarily ... 1200 kw. over a th...

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